

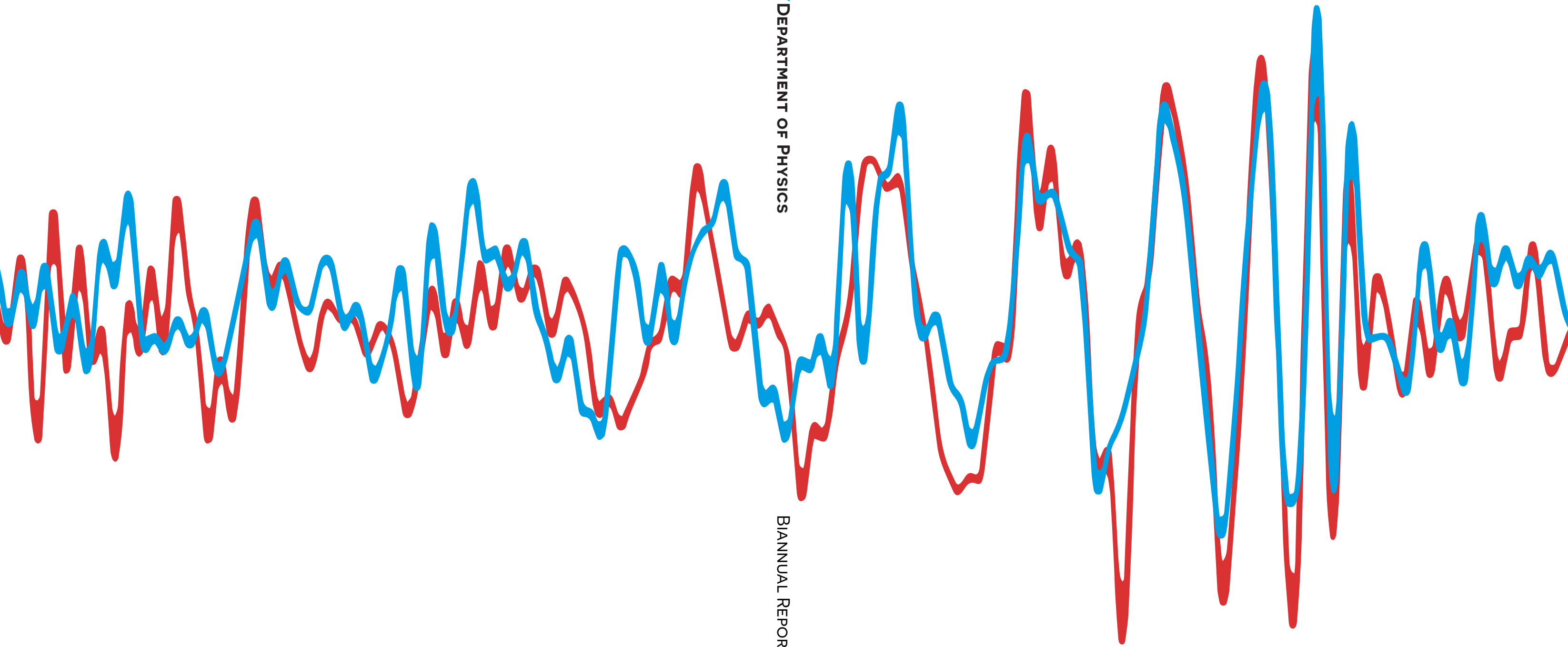
*Detail of a plot showing the combined signals of gravitational waves detected by the twin LIGO observatories at Livingston, Louisiana, and Hanford, Washington. Original image by Ligo.*

# DEPARTMENT OF PHYSICS

BIANNUAL REPORT 2016-2017

TÉCNICO LISBOA / DEPARTMENT OF PHYSICS

BIANNUAL REPORT 2016-2017



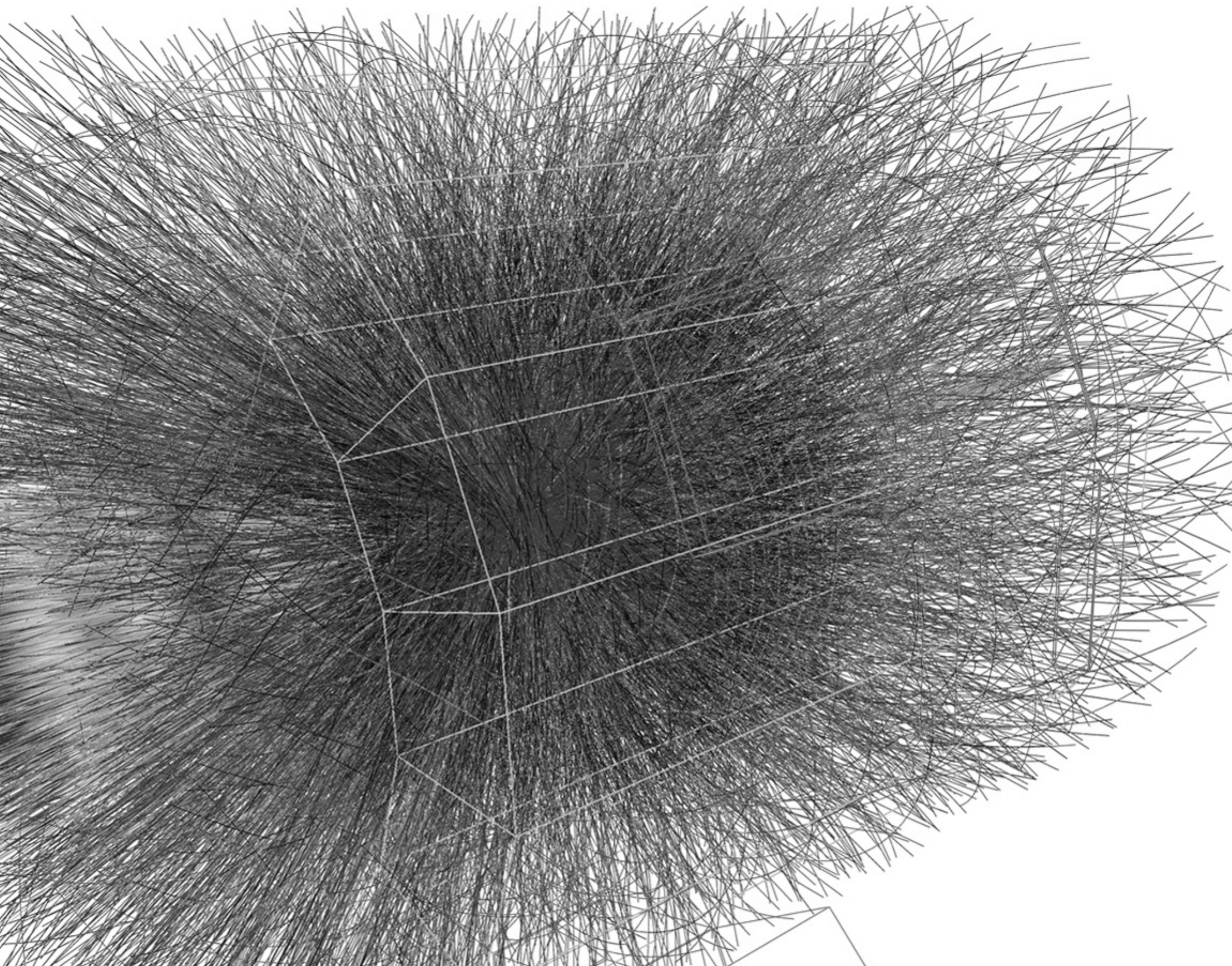
# DEPARTMENT OF PHYSICS

BIENNIAL REPORT 2016-2017

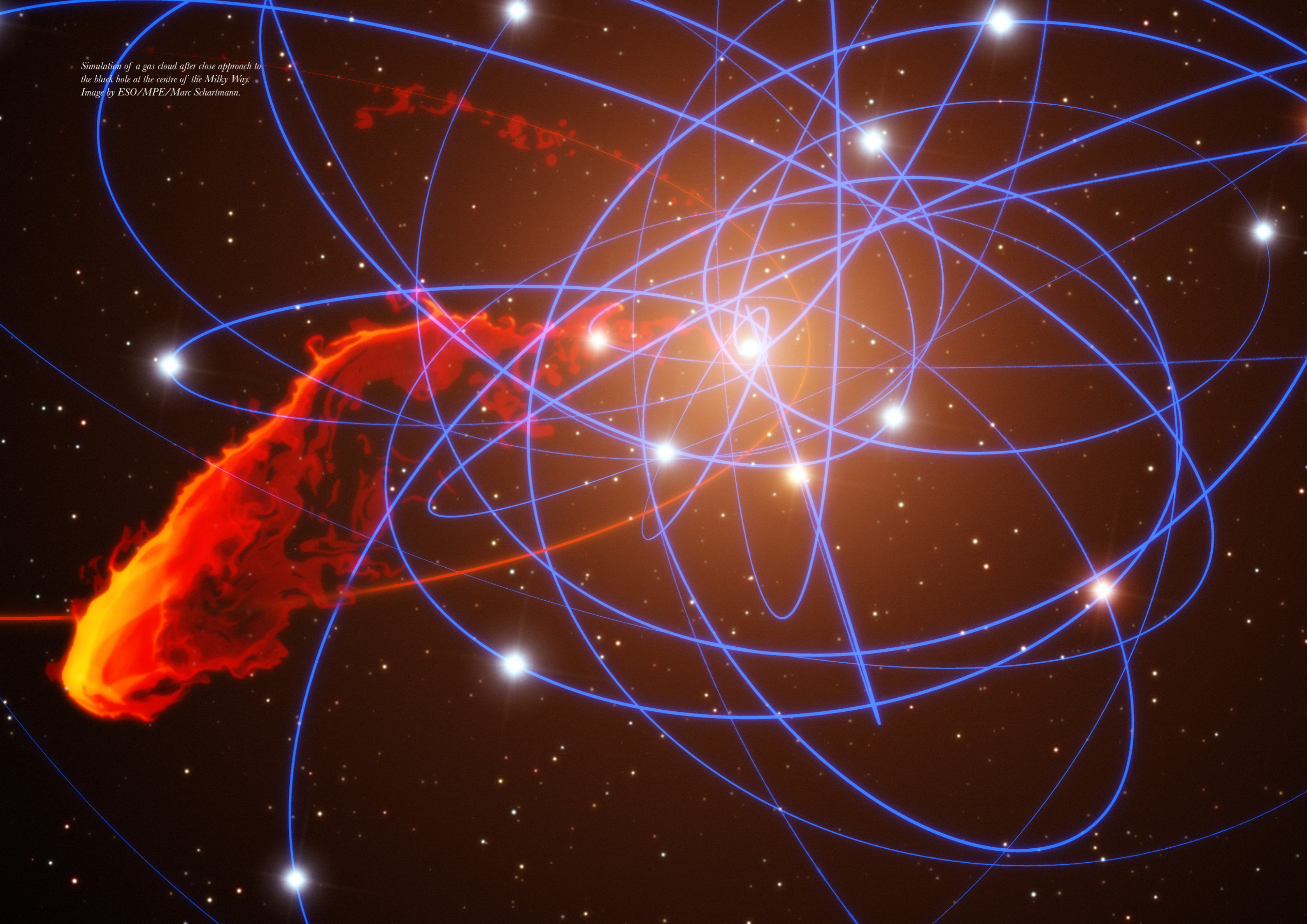
Cover image: Detail of a simulation of a lead ion collision in ALICE. Image by CERN.

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*Simulation of a gas cloud after close approach to  
the black hole at the centre of the Milky Way.  
Image by ESO/MPE/Marc Schartmann.*



# “A DIFFERENT BREED OF PEOPLE”



*Prof. Luís Lemos Alves, president of the DF/IST. Image by Técnico Lisboa.*

I have the pleasure of bringing to you the 2016-2017 biennial report of the Department of Physics (DF) of Instituto Superior Técnico (IST).

The DF was created in 1978 from the so-called “Physics Section”, which had the responsibility of ensuring solid knowledge of basic sciences to IST students, in a key-support to all engineering courses. In the 80s, the DF reinforced its teaching activities by creating very successful undergraduate and post-graduate degrees in Engineering Physics and in Physics, and since that decade it has also intensified its formal collaboration with major international scientific and technological research institutions, such as the European Organization for Nuclear Research (CERN), the Joint European Torus (JET) and the International Thermonuclear Experimental Reactor (ITER), the Integrated Initiative of European Laser Research Infrastructures (Laserlab-Europe) and the Extreme Light Infrastructure (ELI), the European Southern Observatory (ESO) and the European Space Agency (ESA).

These actions were decisive to assert the DF excellence in training and scientific activities, at both national and international levels. This excellence leverages on our students, recruited among the brightest minds in high-schools, and faculty, composed by scientists whose interests span a wide spectrum in science, engineering and technology, ranging from fundamental and theoretical research, for understanding the laws of the Universe, to applied research for answering industrial challenges.

The DF is organized internally in scientific areas, each faculty member belonging to one of these areas: (i) Astrophysics and Gravitation; (ii) Condensed Matter and Nanotechnology; (iii) Interdisciplinary Physics; (iv) Particle Physics and Nuclear Physics; (v) Plasmas, Lasers and Nuclear Fusion. The area of Interdisciplinary Physics comprises the subfields of Energy, Earth Sciences, Dynamic Systems and Biomedical. Most of the faculty are integrated in the research units associated with the DF: Centre for Astrophysics

and Gravitation (CENTRA), Centre for Natural Resources and Environment (CERENA), Centre for Nuclear Sciences and Technologies (C2TN), Centre of Physics and Engineering of Advanced Materials (CeFEMA), Centre for Theoretical Particle Physics (CFTP), INESC - Microsystems and Nanotechnologies (INESC-MN), Institute for Plasmas and Nuclear Fusion (IPFN) and Laboratory of Instrumentation and Experimental Particle Physics (LIP).

The DF coordinates MSc and PhD degrees in Engineering Physics and in Physics, hosting more than 350 students in the integrated Master’s Programme in Engineering Physics (MEFT) - ranked first (2016/2017) or second (2017/2018) in the list of master’s degrees demanding the highest selection mark in Portugal - and about 70 students on the PhDs Programmes in Engineering Physics and Physics. Our reputation allows us to attract the best national undergraduate students for MEFT and many excellent international graduate students for the PhD courses. The latter courses

are also anchors for several international and FCT (Fundação para a Ciência e a Tecnologia) Doctoral Programmes: International Doctorate in Fusion Science and Engineering Erasmus Mundus Fusion-DC, Advanced Programme in Plasma Science and Engineering (APPLAuSE), Doctoral Programme in the Physics and Mathematics of Information: Foundations of Future Information Technologies (DPPMI), International Doctorate Network in Particle Physics, Astrophysics and Cosmology (IDPASC) and Advanced Integrated Microsystems (AIM). The DF is also responsible for teaching 25 curricular units in Fundamental Physics to more than 2000 engineering and architecture students every year, in Alameda and Taguspark IST Campi, and for participating in the Scientific Committee of the Masters’ degrees in Energy Engineering and Management (MEGE) and in Biomedical Engineering (MEBiom).

We have always adopted a distinctive and advanced approach when interacting with our stu-

dents of all cycles, promoting a close relationship between teaching and research activities, carefully designing study programmes delivered by physicists who are leaders in their fields. The combination of groundbreaking research and outstanding students leads to excellent academic results and promising employment prospects, with relevant scientific, technological and societal outcomes.

In the biennial 2016-2017 the DF has pursued the path towards consolidating its influence and visibility, both internally and externally, also preparing a prospective route for its sustained development. To this end, we have continued implementing the career plan of IST, by opening faculty positions for recruitment or promotion as to allow the renewal of human resources in a critical responsible way; we have welcomed the Committee of Visit of the DF, engaging the follow up of the recommendations issued, namely promoting an internal discussion to define the strategic development plan of DF that will frame our mission and vision; we have created and deployed internal regulation and actions for monitoring the activity of assistant professors during probationary period; we have launched the initiative *Distinguished Visiting Professor DF*, to temporarily hire external faculty members that hold excellent CVs; we have opened a call for the recruitment of a high-level technician, to support the operation of the teaching laboratories of MEFT; we have implemented the curricular restructuring of MEFT and our PhD Programmes, approved in 2016 by the *Agência*

*para a Avaliação e Acreditação do Ensino Superior.*

Concomitantly, we have started analysing the experimental teaching in MEFT, also preparing the process of requalifying the corresponding experimental infrastructures; we have promoted and/or participated in an analysis of teaching activities at IST, also aiming the restructuring of the Bolonha model; we have pursued/created many communicational initiatives, partly integrated in the celebration of the 30th anniversary of MEFT that took place in 2017, nurturing our responsibility in public outreach with impact in thousands of high-school students and teachers, benefiting from the invaluable and growing collaboration of our students and our alumni.

The DF is mostly the people composing it, living it and educated from it: the professors, permanent and invited, the teaching collaborators, the technical and administrative staff, the undergraduate and graduate students of MEFT and our PhD Programmes, the students' association *Núcleo de Física do IST* (NFIST) and the alumni network of MEFT.

All these people are “a different breed of people”, striving to explore innovative ideas and directions in science, technology and education, fostering creative thinking in every-day life, highly-committed to our students in the mission of providing both solid fundamental knowledge and a fascination with the unknown driving to new discoveries.

Welcome to the Department of Physics.

**Professor Luís Lemos Alves**  
President of DF/IST

# DEPARTMENTAL ACTIVITIES

In the biennial of 2016-2017, the Department of Physics carried out various actions covering its different fields of activity.

## Strategic actions

Prepared the auto-evaluation report, for analysis by the Committee of Visit (COV).

Organized the visit on-site of the COV.

Engaged in various initiatives, following the 2016 report of the COV:

- Started preparing the Development Strategic Plan of DF, including an internal strategic analysis by the larger scientific areas and an external strategic analysis of the scientific area of Interdisciplinary Physics.
- Appointed a think-tank for analysing the experimental teaching of the Master's in Engineering Physics (MEFT), and for starting the process of requalifying the corresponding experimental infrastructures (in terms of equipment and facilities).

## Human resources

Implemented at DF the career plan of IST, by opening calls for several recruitment/promotion positions: two full professors, one in double appointment with the Department of Nuclear Science and Engineering; five associate professors, two principal investigators, two assistant professors, one assistant investigator.

Launched the initiative Distinguished Visiting Professor DF, welcoming Professor Heinrich Hoerber in 2017.

Created and deployed internal regulation and actions for monitoring the activity of assistant professors during probationary period.

Opened a call for the recruitment of a high-level technician, to support the operation of the teaching laboratories of MEFT.

## Teaching

Coordinated several courses, with implementation of the curricular restructuring approved in 2016



Prof. Ana Branquinho in a laboratory class of Mechanics and Waves. Image by Débora Rodrigues/Técnico Lisboa.

Participated in the Scientific Committee of the Master's programme in Energy Engineering and Management (MEGE).

Participated in the Scientific Committee of the Master's programme in Biomedical Engineering (MEBiom).

Organized the teaching duties of the 80 members of DF, for the 1st, 2nd and 3rd cycle courses under the responsibility of the department.

### Management

Improved the communication and the administrative workflow at DF.

Prepared and approved the budget of DF.

Prepared internal regulation for the organization of teaching duties, the calendar for the procedures related to sabbatical leaves, and the monitoring of the activity of assistant professors during probationary period.

Developed informatic tools for the support of management activities.

### Infrastructures

Created the Room for Advanced Training (*Sala de Formação Avançada*), a dedicated room to welcome the teaching of 2nd and 3rd cycle courses targeting a reduced number of students.

Invested in the reequipment of the DF Laboratories at Taguspark.

Maintained the Multimedia Room of the DF, for the production of videos and MOOC's.

### International relations

Signed new ERASMUS protocols, aiming attracting more Portuguese and international students for MEFT and the PhD programs.

Fostered new collaborations and protocols with various institutions, national and international, for technological and scientific cooperation and for the exchange of students. Detailed information is given in the sites of the Scientific Areas.

### Communication and image

Pursued and created various communicational initiatives (in 2017, partly integrated in the celebration of the 30th anniversary of MEFT), in a permanent effort for increasing the status and the visibility of DF and its training actions, inside and outside IST, in a collaboration effort involving the Executive Committee, the Coordination of MEFT, the DF staff, the students of MEFT (also through the corresponding students' association - the *Núcleo de Física do IST*, NFIST), and the alumni network of MEFT. These activities will be detailed in part 6 of this report:

- Colloquia of the DF
- IST day - Keep In Touch
- MEFT: Challenging the limits of science and technology
- MEFT: Extending the limits of science and technology
- Physics Tech-Day
- Newtonmas (including an IST Distinguished Lecture)
- Facebook Physics@Técnico
- DF biennial report 2016-2017

by the Agência para a Avaliação e Acreditação do Ensino Superior (A3ES):

- Integrated Master's Programme in Engineering Physics (MEFT);
- Doctoral Programme in Physics (DP);
- Doctoral Programme in Engineering Physics (DEP).

Coordinated 25 curricular units in Fundamental Physics at IST (Mechanics and Waves - MO, Electromagnetism and Optics - EO, Thermodynamics and the Structure of Matter - TEM, Physics for the Integrated Master's programme in Architecture), taught to more than 2000 students of various Engineering Degrees every year in Alameda and Taguspark IST Campi.

Engaged and promoted an analysis of the teaching activities (programs, evaluation, methodologies, bibliography...) in the curricular units of Fundamental Physics at IST:

- Appointed coordinators for work-groups with MO, EO and TEM;
- Appointed a coordinator for the specific analysis of the experimental component with the previous courses;
- Promoted brainstorm meetings with the coordinators of the different courses of IST;
- Organized an on-line database for Problems of Fundamental Physics (e-ProF)

# ORGANIZATION AND RESPONSIBILITIES OF THE DEPARTMENT

## President of the department

Luís Lemos Alves

## Executive committee

Luís L. Alves, President,  
Human resources and horizontal teaching

Susana Freitas,  
Vice-President for connection to enterprises,  
research platforms and alumni

João Mendanha Dias,  
Vice-President for general affairs,  
spaces and budget

Filipe Mendes,  
Vice-President for teaching activities  
and information systems

Pedro Abreu,  
Vice-President for communication and image

## Representative of the DF in Taguspark

António Ferraz

## Course coordinators

Master's Programme in Engineering Physics (MEFT):  
Vasco Guerra, Coordinator  
Filipe Joaquim, Vice-Coordinator

Doctoral Programme in Physics (DP):  
Horácio Fernandes, Coordinator

Doctoral Programme in Engineering  
Physics (DEP):  
Horácio Fernandes, Coordinator

## Coordinators of scientific areas

Astrophysics and Gravitation (AG):  
José Sande e Lemos

Condensed Matter and Nanotechnology (FMCN):  
Pedro Brogueira

Interdisciplinary Physics (FI):  
Rui Dilão

Particle and Nuclear Physics (FPFN):  
Jorge Romão

Plasma Physics, Lasers and Nuclear Fusion (FPLFN):  
Luís Oliveira e Silva

## Responsible for the tutoring program

Vasco Guerra

## Mobility coordinator

Vasco Guerra

## MEFT scientific committee

José Sande e Lemos  
Ana Mourão  
Horácio Fernandes  
João Pedro Bizarro  
Jorge Romão  
Teresa Peña  
Rui Dilão  
Joana Sá  
Pedro Brogueira  
Pedro Sacramento

## Scientific committee of the PhD in Physics

Jorge Romão (FPFN)  
Mário Pimenta (FPFN)  
José Sande e Lemos (AG)  
Luís Lemos Alves (FPLFN)  
Luís Oliveira e Silva (FPLFN)  
José Luís Martins (FMCN)  
Vítor Rocha Vieira (FMCN)

## Scientific committee of the PhD in Engineering Physics

José Sande e Lemos (AG)  
Mário Pimenta (FPFN)  
Luís Lemos Alves (FPLFN)  
Pedro Brogueira (FMCN)  
Vítor Rocha Vieira (FMCN)

## Permanent strategic committee

Luís Lemos Alves (PCA), FPLFN  
José Sande e Lemos (PCA), AG  
Jorge Romão (PCA), FPFN  
Mário Pimenta (PCA), FPFN  
Pedro Brogueira (PCA), FMCN  
Horácio Fernandes (PAS), FPLFN  
Ana Mourão (PAS), AG  
Pedro Sebastião (PAS), FMCN  
Rui Dilão (PAX), FI

## Scientific and pedagogic council

Luís Lemos Alves (President DF)  
Susana Freitas (Vice-president DF)  
João Mendanha Dias (Vice-president DF)  
Luís Filipe Mendes (Vice-president DF)  
Pedro Abreu (Vice-president DF)  
José Sande Lemos (Coordinator AG)  
Pedro Brogueira (Coordinator FMCN)  
Jorge Romão (Coordinator FPFN)  
Luís Oliveira e Silva (Coordinator FPLFN)  
Rui Dilão (Coordinator FI)  
Ana Mourão (representative CENTRA)

Mário Pimenta (Representative LIP)  
Diana Leitão (Representative INESC-MN)  
João Paulo Silva (Representative CFTP)  
Bruno Gonçalves (Representative IPFN)  
Pedro Sebastião (Representative CeFEMA)  
José Marques (Representative C2TN)  
Maria João Pereira (Representative CERENA)  
Vasco Guerra (Coordinator MEFT)  
Horácio Fernandes (Coordinator DP and DEP)  
João Pedro Conde (Coordinator MEBiom)  
José Falcão de Campos (Coordinator MEGE)  
António Ferraz (Representative DF in TagusPark)

## Representative of the DF in MEGE

Filipe Mendes

## Representative of the DF in MEBiom

Patrícia Gonçalves

## Responsible for the e-learning platform of the DF

Samuel Eleutério

## Responsible for equivalence processes in the DF

Pedro Bicudo

## Responsible for teaching laboratories of the DF in campus Alameda

João Mendanha Dias

## Responsible for teaching laboratories of the DF in Campus TagusPark

João Carlos Fernandes

## Responsible for DEMO laboratory of the DF

Ana Mourão



# THE DEPARTMENT IN NUMBERS

51

Permanent faculty

11

Administrative & technical staff

14

Teaching labs

20

Conferences, workshops, schools

353

Students enrolled in MEFT,  
of which 80% are male and 20% are female

69

Students enrolled in the doctorate programmes,  
of which 85% are male and 15% are female

2

High-performance  
computing clusters

180+

Outreach activities  
(including outreach seminars at schools)

2200+

Students enrolled  
in various IST undergraduate programmes

17

Honours/awards  
for pedagogical achievements

2

IST distinguished lectures

4

International masterclasses

5

Scientific areas of expertise

8

Leading research units

138

Seminars

2

Physics olympiads  
(regional)

602

Scientific publications

2

Books

28

Colloquia

PART 2

# EDUCATION



# ENGINEERING PHYSICS: BOOSTING THE FUTURE

The Master's Programme in Engineering Physics at Técnico (MEFT) is a 5-year programme that combines uniquely Physics, Engineering and Advanced Technologies into a single and coherent training.

## Talent that comes in

Every year, 60 new students enrol into the programme for the first time. To access the Master programme students needed a mark of 185.3/200 in the application to University, the second highest in the country in all domains. The continuous flow of highly talented and motivated students, among the very best of their generation, is a major asset of MEFT.

## Talent that goes out

The average mark in the first 3 years (Bachelor) is 15.9/20, while in the last 2 years (Master) is 16.3/20. The employment rate 6 months after the completion of MEFT officially reported is 100.0%. The Engineering Physics programme is designed to generate innovators, out-of-the-box thinkers who are able to address challenges in the knowledge frontier determining investments crucial to the society, in domains where Physics and Engineering are linked together. The graduates work in areas such as energy, environment, health systems and biomedicine, financial services and research, organization and visualization of information, communications, interconnectivity and computation.

## The scientific value

In its already 30 years tradition of quality, constant update, and internationalization, the Engineering Physics Master's programme gives graduates an in depth training on science, mathematics and engineering concepts, while promoting critical reasoning and independent thought.

## The societal value

The training has a threefold mission:

- To create human capital with the capacity to recognize, innovate and solve problems critical to society.
- To renew generations of scientists and university faculty staff in areas of international scientific interest and investment, as Particle and Nuclear Physics, Physics of Matter under extreme conditions, Lasers, Advanced Materials, Space Science and Astrophysics.
- To train generations of entrepreneurs for leadership that adapt well to the acceleration of the scientific and technological development and are able to work at the frontiers of knowledge, as well as of consultants/auditors of projects or risk situations.

## The dream

The training makes real the vision that material, economical, human and social progress can be achieved by the understanding and the manipulation of matter - not only at the macroscopic and human scale, as in the scientific and industrial revolutions of the XVII, XVIII and XIX centuries, but also at the scale of the atomic nucleus and electrons in the atoms and molecules, reached by the Quantum Mechanics revolution of the XX century, and certainly, in the XXI century, also at the large scale of the distant and unknown parts of the Universe.

**Vasco Guerra and Filipe Joaquim,**  
MEFT Coordination, July 2018

*Milky Way, Paranal Observatory.  
Image by ESO/B. Tafreshi.*



# THE MEFT CURRICULUM



Still from the video “Engineering Physics@Técnico” by Sonat Duyar by Sonat Duyar (New Light Pictures).

MEFT is sustained by scientific research units carrying out their investigation in the following areas: Astrophysics and Gravitation; Plasma Physics, Nuclear Fusion and Lasers; Nuclear and Particle Physics; Condensed Matter Physics and Nanotechnology; Interdisciplinary Physics (Energy, Physics

of the Earth, Dynamical Systems, Biomedical Applications). A new MEFT curriculum was introduced in September 2017, to make it simultaneously more flexible and organised.

## MEFT training: 1st cycle (Before Sept. 2017/After Sept. 2017)

1st year	
1st semester	2nd semester
Mechanics and Waves/Mechanics and Relativity	General Mechanics/Oscillations and Waves
Programming	Chemistry
Linear Algebra	Differential & Integral Calculus Ii
Differential & Integral calculus I	Digital Systems
Laboratory of Basic Physics/ Introductory Experimental Physics	Workshop Laboratory/Technological Laboratory

2nd year	
1st semester	2nd semester
Computational Mechanics	Analytical Mechanics
Complex Analysis and Differential Analysis	Probabilities and Statistics
Laboratory of Oscillations and Waves/ Laboratory of Mechanics, Oscillations and Waves	Circuits Theory and Fundamentals of Electronics
Thermodynamics and Structure of Matter/ Physical Thermodynamics	Laboratory of Electromagnetism and Thermodynamics
Option A: Computational Physics or Microprocessors/Computational Physics	Electromagnetism and Optics/Electromagnetism

3rd year	
1st semester	2nd semester
Mathematical Techniques in Physics/ Physics of Continuous Media	Laboratory of Advanced physics/ Advanced Experimental Physics
Quantum Mechanics I	Management
Laboratory of Atomic Physics/ Laboratory of Atomic Physics and Radiation	Laboratory of Advanced physics
Optics and Radiation Physics/(none)	Statistical Physics
Classical Electrodynamics	Solid State Physics
Option B: Physics of Continuum Medium Systems or General Electronics/Option 1: Mathematical Techniques in Physics or Electronics	Option C: Quantum Mechanics II or Electronic Instrumentation/Option 2: Quantum Mechanics II or Microcontrollers

**MEFT training: 2nd cycle (Before Sept. 2017)**

4th year	
1st semester	2nd semester
2 curricular units from core training	2 curricular units from core training
2 curricular units - Engineering track 3/ 2 curricular units - Physics track	1 curricular unit - Engineering track/ 1 curricular units - Physics track
1 track option - Engineering track/ 1 curricular unit - Physics track	2 curricular units from track options
5th year	
1st semester	2nd semester
Introduction to Research	Dissertation
MEFT Project	
Free option	
2 curricular units from track options	

**Core training**

Management in Science and Technology, Quantum Optics and Lasers, Plasma Physics, Particle Physics.

**Physics track**

Condensed Matter Physics, Nuclear Physics, Relativity and Cosmology, Complements of Quantum Mechanics

**Engineering track**

Data Acquisition Systems, Nanotechnology and Nanoelectronics, Energy Technology.

**Engineering and physics track options**

From the list of 37 curricular units proposed by the Scientific Areas of the DF.

**MEFT Training: 2nd Cycle (After Sept. 2017)**

4th year + 5th year	
Mandatory training	Structural training (4 out of 5 curric. units)
Introduction to Research	Astrophysics
MEFT Project	Entrepreneurship, Innovation and Science Management
	Nanotechnologies and Nanoelectronics
	Particle Physics
	Plasma Physics and Technology

4th year + 5th year	
Engineering track (4 out of 5 curric. units)	Physics track (4 out of 5 curric. units)
Electronic and Optical Instrumentation	Complements of Quantum Mechanics
Energy Technologies	Condensed Matter Physics
Micro and Nanofabrication Techniques	Nuclear Physics
Nuclear and Particle Physics Technology	Optics and Lasers
Optics and Lasers	Relativity and Cosmology
<b>5 Elective units *</b>	<b>5 Elective units *</b>
5th Year, 2nd semester (both tracks)	
Master's Dissertation in Physics Engineering	

**\* Elective units**

Any curricular unit with 6 to 7.5 ECTS credits, from the list of 37 curricular units offered by the Scientific Areas of the DF, or from another integrated Master programme, another Bologna Master programme, or from an Advanced Studies Diploma programme.

**Website**

<https://fenix.tecnico.ulisboa.pt/cursos/meft>

**Coordination**

Prof. Vasco Guerra and Filipe Joaquim

# PHYSICS FOR OTHER IST COURSES

## Curricular units of fundamental physics

The DF has the outstanding responsibility of teaching the general courses of Fundamental Physics to the 1st cycle of all Engineering courses of IST. In total, this mission corresponds to a teaching workload in 25 Curricular Units (CU) of Mechanics and Waves

(MO), Electromagnetism and Optics (EO), Thermodynamics and the Structure of Matter (TEM) and Physics, distributed among 18 courses as indicated in the table below.

Course	Curricular unit			
	Mechanics and Waves	Electromagnetism and Optics	Thermodynamics and the Structure of Matter	Physics
MEEC	•	•	•	
MEAero	•	•		
MEBiom	•	•	•	
LMAC	•	•	•	
MEC		•	•	
LEGM	•	•	•	
MEQ	•	•		
MEAmbi	•	•		
MEBiol	•	•		
MEM	•	•		
MEMec	•	•		
LEAN/LENO	•	•		
LEIC - Alameda	•	•		
LEIC - Tagus Park	•	•		
LETI - Tagus Park	•	•		
LEE - Tagus Park	•	•	•	
LEGI - Tagus Park	•	•		
MA				•

## Other curricular units for IST courses other than MEFT

The DF has also the responsibility of teaching the following CUs to the Master's programme in Biomedical Engineering (MEBiom) and to the

Master's programme in Energy Engineering and Management (MEGE), in the latter case divided by specialization field.

Course	Curricular unit	
	Quantum Mechanics	Radiation Physics
MEBiom	•	•

MEGE courses	Specialization field				
	Nuclear Energy	Renewable Energies	Energy Conversion	Fuels	Energy Efficiency
Energy Services		•	•	•	•
Photovoltaic Solar Energy		•			
Solar Thermal Energy		•	•		
Nuclear Reactors	•		•		
Nuclear Energy			•		
Radiological Safety and Protection	•				
Radiation Physics and Technology	•				
Nuclear Fission and Fusion Technologies	•				
Nuclear Instrumentation Techniques	•				
Material Science for Nuclear Technologies	•				
Nuclear Physics	•				
Quantum Structure of Matter	•				

# PHD IN PHYSICS

## Coordinator

Horácio João Matos Fernandes

## Scientific committee

Jorge Manuel Rodrigues Crispim Romão  
Mário João Martins Pimenta  
José Pizarro de Sande e Lemos  
Luís Paulo da Mota Capitão Lemos Alves  
Luís Miguel de Oliveira e Silva  
José Luís Rodrigues Júlio Martins  
Vitor João Rocha Vieira

## Objectives

The PhD Programme in Physics is designed to provide advanced knowledge and research capabilities in at least one of the scientific areas in which the Physics Department is organized. It basically aims at preparing researchers for autonomous research and development activities in the broad domain of Physics in order to become research scholars in an academic or industrial environment.

## Organization

In the first year the PhD candidates follow a plan of studies with 4 advanced courses. After the first year all activity is devoted to research in preparation of the PhD thesis under the scientific supervision of a faculty member. The duration of the PhD is typically 3,5 to 4 years.

## Scientific areas

- i. Particle and Nuclear Physics
- ii. Plasma Physics, Lasers and Nuclear Fusion
- iii. Condensed Matter Physics and Nanotechnology
- iv. Astrophysics and Gravitation
- v. other Physics' areas

## Associated research units

Centro de Física Teórica de Partículas (CFTP)

Laboratório de Instrumentação e Física Experimental de Partículas (LIP)

Instituto de Plasmas e Fusão Nuclear (IPFN)

Centro de Física e Engenharia de Materiais Avançados (CeFEMA)

Instituto de Engenharia de Sistemas e Computadores - Microsistemas e Nanotecnologias (INESC-MN)

Centro Multidisciplinar de Astrofísica (CENTRA)

Centro de Ciências e Tecnologias Nucleares (C2TN).

## FCT PhD programmes supported by the PhD in physics

Advanced Programme in Plasma Science and Engineering (APPLAuSE)

Doctoral Programme in Physics and Mathematics of Information (DP - PMI): Foundations of Future Information Technologies

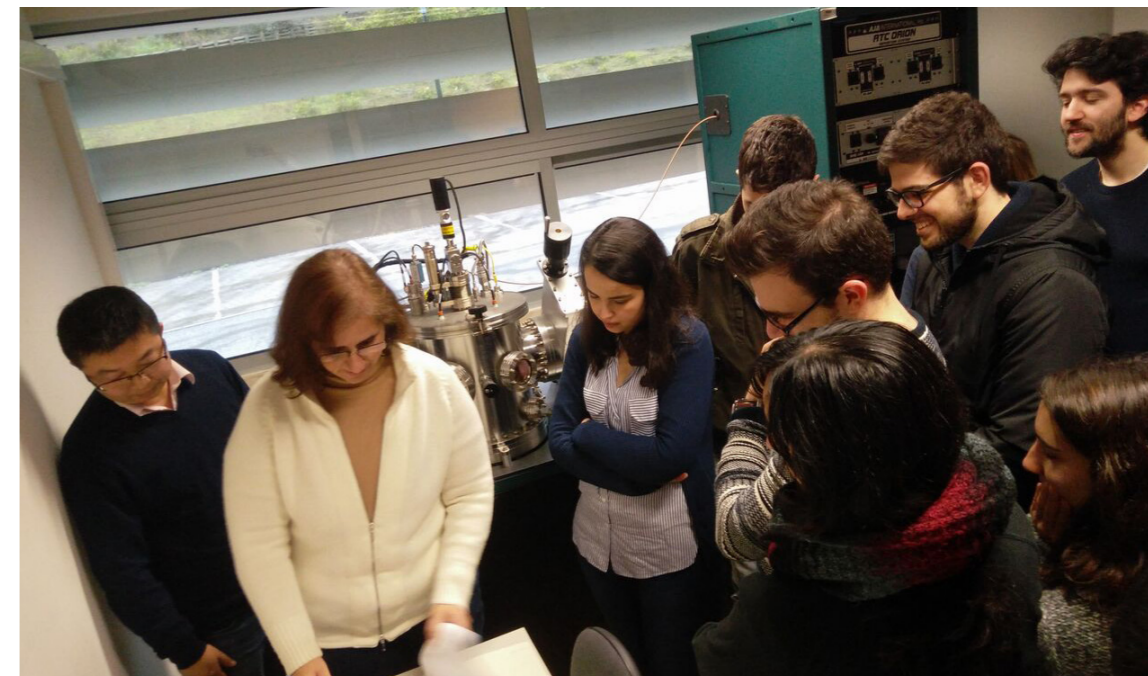
Doctoral Programme in Particle Physics

Astrophysics and Cosmology (IDPASC - Portugal)

These programmes have their own PhD fellowships.

## Number of registered students

34



*The INESC-MN Spintronics and Magnetic Biosensor group organized a reflection day which included the revision of scientific activities and career plans. Image by INESC-MN.*

## Employment

The PhD programme in Physics form highly qualified researchers to work in national and international scientific centres, research laboratories, in the industry or in public or private service.

Our graduates will be able to work in large European institutions of research and technological development such as:

- European Organization for Nuclear Research (CERN)
- European Southern Observatory (ESO)
- European Space Agency (ESA)
- Joint European Torus (JET)
- International Thermonuclear Experimental Reactor (ITER)

The PhD graduates in Physics can also follow an academic career as professors at universities or at any other school of higher education.

## Collaborations with foreign institutions

Universidad Valencia (Spain)

Consejo Superior de Investigaciones Científicas - CSIC, Madrid (Spain)

Saclay Nuclear Research Centre - CEA (France)

Université de Paris (France)

École Polytechnique Fédérale de Lausanne - EPFL (Switzerland)

University Tokyo (Japan)

Imperial College (UK)

Oxford University (UK)

Cambridge University (UK)

Massachusetts Institute of Technology - MIT (USA)

Princeton University (USA)

University of California, Los Angeles - UCLA (USA)

# PHD IN ENGINEERING PHYSICS

## Coordinator

Horácio João Matos Fernandes

## Scientific committee

José Pizarro de Sande e Lemos  
Mário João Martins Pimenta  
Luís Paulo da Mota Capitão Lemos Alves  
Pedro Miguel Félix Brogueira  
Vitor João Rocha Vieira

## Objectives

The PhD Programme in Engineering Physics is designed to provide advanced knowledge and research capabilities into subjects involving physical engineering applications, such as advanced experimental techniques of plasmas physics, intense lasers, optics, nanotechnologies and nuclear and particle physics. Emphasis is also given to data acquisition systems, real time control measurements, instrumentation for plasmas and nuclear physics, and micro and nano-fabrication techniques.

## Organization

In the first year the PhD candidates follow a plan of studies with 4 advanced courses. After the first year all activity is devoted to research in preparation of the PhD thesis under the scientific supervision of a faculty member. The duration of the PhD is typically 3.5 to 4 years.

## Scientific areas

- i. Particle and Nuclear Physics
- ii. Plasma Physics, Lasers and Nuclear Fusion
- iii. Condensed Matter Physics and Nanotechnology
- iv. Astrophysics and Gravitation
- v. other Physics' areas

## Associated research units

Centro de Física Teórica de Partículas (CFTP)

Laboratório de Instrumentação e Física Experimental de Partículas (LIP)

Instituto de Plasmas e Fusão Nuclear (IPFN)

Centro de Física e Engenharia de Materiais Avançados (CeFEMA)

Instituto de Engenharia de Sistemas e Computadores - Microsistemas e Nanotecnologias (INESC-MN)

Centro de Ciências e Tecnologias Nucleares (C2TN).

## FCT PhD programmes supported by the PhD in Engineering Physics

Advanced Programme in Plasma Science and Engineering (APPLAuSE)

Doctoral Programme in Physics and Mathematics of Information (DP - PMI): Foundations of Future Information Technologies

Doctoral Programme in Particle Physics

Astrophysics and Cosmology (IDPASC - Portugal)

Doctoral Programme in Advanced Integrated Microsystems (AIM)

These programmes have their own PhD fellowships.

## Number of registered students

35

## Employment

The PhD Programme in Engineering Physics form highly qualified researchers to work in national and international Research & Development offices of industrial enterprises such as:

- EDP Renováveis (Portugal)
- LusoSpace (Portugal)
- Lertech (China)
- Picosense (USA)
- Nordiko (UK)
- AIXTRON AG (Germany)
- Fusion for Energy F4E (Spain)

Our graduates will also be able to work in the great European institutions of research and technological development:

- European Organization for Nuclear Research (CERN)
- European Southern Observatory (ESO)
- European Space Agency (ESA)
- Joint European Torus (JET)
- International Thermonuclear Experimental Reactor (ITER).

## Collaborations with foreign institutions

Universidad Valencia (Spain)

Consejo Superior de Investigaciones Científicas - CSIC, Madrid (Spain)

Saclay Nuclear Research Centre - CEA (France)

Université de Paris (France)

École Polytechnique Fédérale de Lausanne - EPFL (Switzerland)

University Tokyo (Japan)

Imperial College (UK)

Oxford University (UK)

Cambridge University (UK)

Massachusetts Institute of Technology - MIT (USA)

Princeton University (USA)

University of California, Los Angeles - UCLA (USA)



# DOCTORAL THESES

## March 1, 2016

*Neutron dosimetry and spectrometry studies for radiological protection using the n\_TOF spectrometer at CERN*

Student: Sílvia da Costa Frias Barros  
Supervisor: José Pedro Miragaia Trancoso Vaz  
Co-supervisors: Isabel Maria Ferro Pereira Gonçalves e Lídia dos Santos Ferreira

## March 14, 2016

*Towards sub-100nm magnetoresistive devices: from simulations to applications*

Student: Ana Neves Vieira da Silva  
Supervisor: Susana Cardoso de Freitas  
Co-supervisor: Ricardo Alexandre de Matos Antunes Ferreira

## March 15, 2016

*Extragalactic dark matter annihilation signals and halo substructure properties*

Student: Maria de Los Angeles Moline  
Supervisor: Sergio Palomares Ruiz  
Co-supervisor: David Emanuel da Costa

## March 18, 2016

*Design, construction, characterization and bilateral comparison of an air-kerma cavity standard*

Student: Margarida Isabel Camacho Caldeira  
Supervisor: Carlos Manuel Azevedo de Sousa Oliveira  
Co-supervisors: Jean-Marc Bordy e Lídia dos Santos Ferreira

## April 10, 2016

*Timing studies on Scintillator - silicon photomultiplier based photon detection system*

Mythra Varun Nemallapudi  
Supervisor: João Manuel Coelho dos Santos Varela  
Co-supervisor: Etienne Auffray Hillemanns

## June 27, 2016

*Tomography of the East African Rift System in Mozambique*

Student: Ana Lúcia das Neves Araújo da Silva Domingues Alves  
Supervisors: João Filipe de Barros Duarte Fonseca e Ana Margarida Godinho Ferreira  
Co-supervisor: Gerald Roberts

## July 1, 2016

*Fundamental fields around compact objects: Massive spin-2 fields, Superradiant instabilities and Stars with dark matter cores*

Student: Richard Pires Brito  
Supervisor: Vítor Manuel dos Santos Cardoso  
Co-supervisor: Paolo Pani

## July 7, 2016

*Search for a charged Higgs boson in taunu and tb decays in proton-proton collisions at  $\sqrt{s}=7$  and  $8\text{ TeV}$  with the CMS detector*

Student: Pietro Vischia  
Supervisor: João Manuel Coelho dos Santos Varela  
Co-supervisor: Michele Gallinaro

## July 8, 2016

*Transverse momentum dependent parton distribution functions through SIDIS and Drell-Yan at COMPASS*

Student: Márcia Margarida Varanda Quaresma  
Supervisor: Maria Paula Frazão Bordalo e Sá  
Co-supervisors: Sérgio Eduardo de Campos Costa Ramos e Catarina Marques Quintans

## July 25, 2016

*Analysis of near relativistic protons and electrons in solar events using the HI-SCALE and EPAM instruments*

Student: Jorge Bruno Soares de Sousa Morgado  
Supervisor: Patrícia Carla Serrano Gonçalves  
Co-supervisor: Dalmiro Jorge Filipe Maia

## October 21, 2016

*Diode-pumped solid-state lasers for optical parametric amplification pumping*

Student: Celso Manuel de Figueiredo Paiva João  
Supervisor: Gonçalo Nuno Marmelo Foito Figueira

## December 7, 2016

*Search for direct stau pair production at  $8\text{ TeV}$  with the CMS detector*

Student: Cristóvão Beirão da Cruz e Silva  
Supervisor: João Manuel Coelho dos Santos Varela  
Co-supervisors: Pedrame Bargassa e André David Tinoco Mendes

## March 2, 2017

*Plasma rotation in JET and Tore Supra Tokamaks*

Student: João Miguel Dias Pereira Bernardo  
Santiago David Armando Reyes Cortes  
Supervisor: João Pedro Saraiva Bizarro

## March 9, 2017

*Toroidal momentum transport in fusion plasmas: experimental evidence of the momentum pinch*

Student: Jorge Miguel de Sousa Ferreira  
Supervisor: João Pedro Saraiva Bizarro

## April 6, 2017

*Numerical and experimental characterization of beams of negative ions and investigation on strategies for beam efficiency improvement*

Student: Carlo Baltador  
Supervisors: Piergiorgio Sonato e Horácio João Matos Fernandes  
Co-supervisor: Gianluigi Seriani

## April 6, 2017

*Advanced tools for three-dimensional modeling and control of thermonuclear fusion devices*

Student: Leonardo Pigatto  
Supervisors: Paolo Bettini e Bernardo Brotas de Carvalho  
Co-supervisor: Tommaso Bolzonella

## April 6, 2017

*GPGPU application in fusion science*

Student: Tautvydas Jeronimas Maccina  
Supervisors: Paolo Bettini e Bernardo Brotas de Carvalho

## May 4, 2017

*Measurement of the longitudinal profile of cosmic ray air-showers at the Pierre Auger Observatory*

Student: Francisco Gonçalves Dias Cardoso Diogo  
Supervisor: Sofia Andringa Dias  
Co-supervisor: Mário João Martins Pimenta

## May 5, 2017

*Characterization, optimization and applications of coherent XUV sources*

Student: Swen Erich Künzel  
Supervisor: Marta Leitão Mota Fajardo

## June 6, 2017

*Quantum transport and spatial search by quantum walk in the presence of disorder*

Student: Leonardo Filipe Gonçalves Novo  
Supervisor: Yasser Rashid Revez Omar

## June 14, 2017

*Symmetries of flavour democracy, fermion masses and mixing*

Student: Nuno Miguel Pinto Figueiredo Raimundo Ribeiro  
Co-supervisor: Gustavo Castelo Branco

## July 5, 2017

*Annealing-free AlOx magnetic tunnel junction sensors*

Student: Simon Christian Knudde  
Supervisor: Susana Cardoso de Freitas

## July 20, 2017

*Study of the influence of Al content on optical activity and lattice site location of rare earth implanted AlxGa1-xN*

Student: Maria Isabel Guerreiro Fialho  
Supervisor: Eduardo Jorge da Costa Alves

## December 7, 2017

*Spin structure of the proton at low X and low Q<sup>2</sup> from the COMPASS experiment at CERN*

Student: Ana Sofia da Silva Nunes  
Supervisor: Sérgio Eduardo de Campos Costa Ramos  
Co-supervisor: Maria Paula Frazão Bordalo e Sá

# MASTER THESES

## March 1, 2016

*Implementation of the prothrombin time test in the Spirit® point of care platform*

Student: Sofia Rodrigues Vaz

Supervisor: Pedro Miguel Félix Brogueira

Co-supervisor: João Manuel de Oliveira

Garcia da Fonseca

## May 4, 2016

*Development of a cosmic ray telescope*

Student: Bernardo D'Almeida Mauricio do Rosário

Supervisor: Pedro Jorge dos Santos Assis

## May 4, 2016

*Intermittency and diffusion*

*in the hodgkin-huxley model*

Student: Gaspar Filipe Santos Magalhães

Gomes Cano

Supervisor: Rui manuel Agostinho Dilão

## May 5, 2016

*Accurate intraocular lens position*

*determination in pseudophakic eye*

Student: Miguel Joana de Sousa Prata

Supervisor: João Alberto dos Santos

Mendanha Dias

Co-supervisor: Maria Filomena Jorge Ribeiro

## May 8, 2016

*Design and prototyping of an inverter*

*for Dahlander motors*

Student: Rúben André Soeiro Marques

Supervisor: Horácio João Matos Fernandes

## May 19, 2016

*Multiagent System Optimization*

Student: José Miguel Filipe Antunes

Supervisor: João Manuel de Freitas Xavier

Co-supervisor: Rui Manuel Agostinho Dilão

## May 19, 2016

*A deep learning assessment of spike detection*

*with multi-electrodes arrays*

Student: Pedro Corrêa Pereira Vasco de Lacerda

Supervisor: Adam Raymond Kampff

Co-supervisor: Rui Manuel Agostinho Dilão

## May 25, 2016

*Feasibility study and simulation of a high energy*

*diode-pumped solid-state amplifier*

Student: Victor Hariton

Supervisor: Gonçalo Nuno Marmelo

Foito Figueira

## May 30, 2016

*3D map of the distribution of metals in a cell:*

*applications to the toxicity of nanoparticles*

Student: Miguel Serras Vasco

Supervisor: Maria Teresa Ferreira Marques Pinheiro

Co-supervisor: Luís Manuel Cerqueira Lopes Alves

## May 31, 2016

*Cosmic censorship beyond general relativity:*

*collapsing charged thin shells in low energy*

*effective string theory*

Student: Pedro Mendes Aniceto

Supervisor: Vitor Manuel dos Santos Cardoso

Co-supervisor: Jorge Miguel Cruz Pereira

Varelas da Rocha

## May 31, 2016

*Estudo e desenvolvimento de um sistema*

*computacional de intraday trading autónomo*

Student: Sérgio David Vitorino Ramos

Supervisor: João Carlos Carvalho de Sá Seixas

Co-supervisor: Armando M. de Carvalho Nunes

## June 3, 2016

*Critical behavior in gravitational collapse:*

*analytical configurations of collapsing*

*massless scalar wave packets*

Student: Rui Manuel de Almeida André

Supervisor: José Pizarro de Sande e Lemos

## June 6, 2016

*Efeitos do ambiente de radiação espacial*

*em missões tripuladas a Marte*

Student: Ana Luisa Martins de Carvalho Casimiro

Supervisor: Patrícia Carla Serrano Gonçalves

Co-supervisor: Jorge Miguel de Brito Almeida

Sampaio

## June 6, 2016

*Integrated microfluidic platforms for magnetic*

*separation, mixing, trapping and counting*

Student: Andreia Sofia de Lemos Barroso

Supervisor: Susana Cardoso de Freitas

## June 7, 2016

*Radiation environment and its effects*

*on the martian surface and underground*

Student: Pedro Miguel Silva de Magalhães

Supervisor: Patrícia Carla Serrano Gonçalves

Co-supervisor: Maria Luisa Ferreira da Gama

Velho Arruda

## June 8, 2016

*Design and exploitation of a vorticity probe for turbulence*

*studies in fusion devices*

Student: Inês Sofia Malhado Henriques

Supervisor: Bruno Miguel Soares Gonçalves

Co-supervisor: Carlos Alberto Garcia da Silva

## June 14, 2016

*Compact ultrafast laser pulse shaping using*

*chirped volume Bragg gratings*

Student: Filipe Ruão Marques Teixeira

Supervisor: Gonçalo Nuno Marmelo Foito Figueira

## June 14, 2016

*Constraining dark mater neutrino emission*

*using realistic solar models*

Student: José Maria Vargas Lopes

Supervisor: Ilídio Pereira Lopes

## June 15, 2016

*Asteroseismic constraints on asymmetric*

*dark matter: light particles with an*

*effective spin-dependent coupling*

Student: André Miguel Pólvora Martins

Supervisor: Ilídio Pereira Lopes

## June 15, 2016

*Tomographic determination of emissivity*

*profiles in the ISTTOK Tokamak*

Student: César Augusto Silva Alves

Supervisor: Horácio João Matos Fernandes

Co-supervisor: Pedro Jorge de Paula Carvalho

## July 26, 2016

*Bosonic stars: scalar and vector field*

*self-gravitating configurations*

Student: Miguel Castilho Soares Duarte

Supervisor: Vitor Manuel dos Santos Cardoso

Co-supervisor: Richard Pires Brito

## July 27, 2016

*Sail and rig shape from single images*

Student: Ana Sofia Frutuoso Oliveira

Supervisor: José Manuel Bioucas Dias

Co-supervisor: Pedro Miguel Félix Brogueira

## September 21, 2016

*Self-production systems for household electricity*

*and hot water consumptions*

Student: Alejandro Durá González

Supervisors: Filipe Mendes and Carlos Santos Silva

## October 13, 2016

*Superradiance of bosonic fermion condensates*

Student: Rodrigo Luís Lourenço Vicente

Supervisor: Vítor Manuel dos Santos Cardoso

## October 20, 2016

*Modelling chlorine plasmas*

Student: Duarte Rogado Nina

Supervisor: Vasco António Dinis Leitão Guerra

## October 21, 2016

*Energy in general relativity: a comparison*

*between quasilocal definitions*

Student: Diogo Pinto Leite de Bragança

Supervisor: José Pizarro de Sande e Lemos

## October 25, 2016

*Vacuum polarization solver*

Student: Pedro Vidal Cabrita Carneiro

Supervisor: Thomas Emmanuel Aurelien Grismayer

Co-supervisor: Luís Miguel de Oliveira e Silva

## October 28, 2016

*Comparaçao de metodos de imagem para fins*

*de radioterapia: estudo comparativo entre*

*tomografia computadorizada e ecografia*

Student: Inês Henriques de Carvalho Pino

Supervisor: Maria Esmeralda Ramos Poli

Co-supervisor: Maria Teresa Marques Pinheiro

## October 28, 2016

*Development of a micro CuInSe2 solar cell*

*grown by electrodeposition*

Student: David Miguel Barata Correia

Supervisor: Diana Cristina Pinto Leitao

Co-supervisor: Sascha Sadewasser

## November 4, 2016

*Analytical studies of energetic particle*

*resonances in tokamaks*

Student: Andre Calado Coroado

Supervisor: Paulo Jorge Rodrigues

Co-supervisor: Nuno Filipe Gomes Loureiro

**November 7, 2016***Turbulence and sheared flow in fusion plasmas*

Student: Eduardo José Lascas Neto

Supervisor: Luis Alexandre Mendes Fazendeiro

Co-supervisor: Nuno Filipe Gomes Loureiro

**November 8, 2016***Characterization of novel high density neurophysiological probes using optical recordings of neural activity*

Student: Shane Miguel Lennon Beato

Supervisor: Maria Teresa Haderer de la Peña Stadler

Co-supervisor: Leopoldo Petreanu

**November 8, 2016***3-dimensional soft magnetic tactile sensors for the human-friendly robot Vizzy*

Student: Tiago Jose Pinheiro Paulino

Supervisor: Susana Cardoso de Freitas

Co-supervisor: José Alberto Rosado dos Santos Victor

**November 9, 2016***Desenvolvimento de um protótipo para auxílio à eficiência energética no setor residencial*

Student: António Miguel Lucas Ornelas

Supervisor: Carlos Augusto Santos Silva

Co-supervisor: Luís Filipe Moreira Mendes

**November 9, 2016***Nonlinear control of an inverted pendulum*

Student: António Samuel Ávila Balula

Supervisor: João Manuel Lage de Miranda Lemos

Co-supervisor: Horácio João Matos Fernandes

**November 10, 2016***Neural encoding of motion visual cues in horizontally sensitive neurons of *Drosophila**

Student: André Filipe Rodrigues Marques

Supervisor: Rui Manuel Agostinho Dilão

Co-supervisor: Maria Eugenia Chiappe

**November 11, 2016***Dilute magnetism in graphene*

Student: Frederico João Ferreira de Sousa

Supervisor: Eduardo Filipe Vieira de Castro

**November 11, 2016***NMR study of the molecular dynamics in magnetic and non-magnetic ionic liquids*

Student: Maria José Jardim Beira

Supervisor: Pedro José Oliveira Sebastião

Co-supervisor: Carla Isabel Lopes Daniel

**November 11, 2016***Ribeiro Ciliary structure inspired force sensor for robotic platforms*

Student: Pedro Manuel Quintela

Supervisor: Susana Cardoso de Freitas

Co-supervisor: Alexandre José Malheiro Bernardino

**November 14, 2016***Orbital Angular Momentum of photons: a tool to transmit information*

Student: João David Ventura Sabino

Supervisor: Gonçalo Nuno Marmelo Foito Figueira

Co-supervisor: Paulo Sérgio de Brito André

**November 23, 2016***Primordial probe: the oldest star of the galaxy as a dark matter laboratory*

Student: Diogo Alexandre Loureiro Coutinho

Supervisor: Ilídio Pereira Lopes

**November 28, 2016***Integration of a concentrating solar thermal system in an expanded cork agglomerate production line*

Student: António Ascensão Castro

Supervisors: Filipe Mendes and João Pereira Cardoso

**November 30, 2016***Voltage distribution characterization of CIGS solar cells utilizing luminescence imaging method*

Student: Rani Putri

Supervisors: Filipe Mendes and Nicolaas J. Bakker

**December 6, 2016***The influence of irradiance concentration using an asymmetric reflector on the electrical performance of a PVT hybrid collector with standard monocrystalline cells*

Student: Joel Nicolás Martínez López

Supervisors: Filipe Mendes and João L. Cima Gomes

**January 13, 2017***Relativistic tidal love numbers:**tests of strong-field gravity*

Student: Guilherme Martinho dos Santos Raposo

Supervisor: Vítor Manuel dos Santos Cardoso

**March 2, 2017***Twisted bilayer graphene - electronic and optical properties*

Student: Gonçalo Filipe Santos Catarina

Supervisor: Eduardo Filipe Vieira de Castro

Co-supervisor: Nuno Miguel Machado Reis Peres

**May 5, 2017***Modelling a solar power tower external receiver in Engineering Equation Solver*

Student: Rita Sofia Feijão Almeida de Oliveira

Supervisors: Filipe Mendes and João Pereira Cardoso

**May 19, 2017***3D magnetic field reconstruction with magnetoresistive sensors*

Student: Filipe Masuch Ribeiro Richeimer

Supervisor: Susana Cardoso de Freitas

Co-supervisor: João Carlos Azevedo Gaspar

**May 19, 2017***High performance magnetic tunnel junctions for magnetic scanning*

Student: Tiago Luis Lourenço da Luz Ventosa

Supervisor: Susana Cardoso de Freitas

**May 30, 2017***MEMS integration in microfluidics for biosensing applications: static cantilever sensor for DNA detection*

Student: Pedro Manuel Lourenço Brito

Supervisor: João Pedro Estrela Rodrigues Conde

Co-supervisor: Susana Cardoso de Freitas

**May 31, 2017***Pattern formation during the growth of *Physarum**

Student: João Bernardo Neves Blanchet Ferreira

Supervisor: Rui Manuel Agostinho Dilão

**May 31, 2017***Spin-orbit interaction and chaos in celestial mechanics*

Student: Manuel Maria Murteira Barreira da Cruz

Supervisor: Rui Manuel Agostinho Dilão

**June 7, 2017***Optimized management of lighting conditions in spaces with multiple users*

Student: João Pedro Pires Martins

Supervisor: Carlos Augusto Santos Silva

Co-supervisor: Luís Filipe Moreira Mendes

**June 8, 2017***Design of a solar concentrator for a PV/T Collector System*

Student: Daniel Akseli Pereira de Barros

Supervisor: Luís Filipe Moreira Mendes

**June 8, 2017***Fabrication of magnetoresistive sensors on plastics*

Student: Luís Filipe Guedelha Macedo

Supervisor: Diana Cristina Pinto Leitão

Co-supervisor: Susana Cardoso de Freitas

**June 9, 2017***NMR study of the twist-bend nematic phase*

Student: José Pedro Albuquerque de Carvalho

Supervisor: João Luís Maia Figueirinhas

Co-supervisor: Carlos Manuel dos Santos

Rodrigues da Cruz

**June 14, 2017***Micromagnetic device simulation*

Student: João Pedro Gomes Moutinho

Supervisor: José Luís Rodrigues Júlio Martins

Co-supervisor: Susana Cardoso de Freitas

**October 11, 2017***Acoustic black holes and superresonance mechanisms*

Student: Sofia Ferro Freitas

Supervisor: Vítor Manuel dos Santos Cardoso

**October 16, 2017***Study of a solar photovoltaic system towards the development of an energy management algorithm*

Student: André Palminha Franco da Cruz

Supervisor: Carlos Augusto Santos Silva

Co-supervisor: Luís Filipe Moreira Mendes

**October 26, 2017***Sum rules and unitarity in multi-Higgs doublet models*

Student: Miguel Filipe Pedra Bento

Supervisor: Jorge Manuel Rodrigues Crispim Romão

Co-supervisor: João Paulo Ferreira da Silva

**October 31, 2017***Update of LoKI-B simulation tool with electron density growth by electron-impact ionizations*

Student: Duarte Nuno Barreto Gonçalves

Supervisor: Luis Capitão Lemos Alves

**October 31, 2017***Orbit transfers between Keplerian orbits*

Student: Mariana da Silva Fernandes

Supervisor: Rui Manuel Agostinho Dilão

**November 2, 2017***Advanced magnetoresistive sensors for industrial applications*

Student: Tiago Afonso Carochi de Sousa Costa

Supervisor: Susana Cardoso de Freitas

**November 2, 2017***Understanding the profitability potential of ancillary service markets: techno-economic analysis of a hybrid power plant*

Student: Charles Alexander Stark, MEGE

Supervisors: Filipe Mendes and Rafael Guédez

**November 2, 2017***Radiation sensors based on GaN microwires*

Student: Dirkjan Verheij

Supervisor: Katharina Lorenz

Co-supervisor: Susana Cardoso de Freitas

**November 6, 2017***High-scale neutrino mass degeneracy in the two-Higgs doublet model*

Student: Bernardo Lopes Gonçalves

Supervisor: Filipe Rafael Joaquim

**November 7, 2017***Passive exoskeletons to support human locomotion - a computational study*

Student: Marta Sofia Galrito Pinto

Supervisor: Maria Teresa H. de la Peña Stadler

Co-supervisor: Miguel Pedro Tavares da Silva

**November 8, 2017***Development of a new PET detector module with improved depth of interaction and time of flight capabilities*

Student: Ana Rita Matos Borrego

Supervisor: João Manuel Coelho dos Santos Varela

**November 8, 2017***Preliminary design of the ITER magnetic diagnostic integrators*

Student: André Gonçalves Torres

Supervisor: André Cabrita Neto

Co-supervisor: Horácio João Matos Fernandes

**November 8, 2017***Phenomenology of a single right-handed neutrino seesaw model*

Student: Mariana Henriques de Araújo

Supervisor: Filipe Rafael Joaquim

**November 9, 2017***Impact of proton-proton nuclear reaction in the evolution of a post-main sequence star*

Student: Gonçalo Nuno Marques Andrade

Supervisor: Ilídio Pereira Lopes

**November 9, 2017***Phenomenology of trinitification models*

Student: João Fonseca Seabra

Supervisor: Filipe Rafael Joaquim

Co-supervisor: David Emanuel da Costa

**November 9, 2017***Reinforcement learning applied to forex trading*

Student: João Maria Branco Carapuço

Supervisor: Rui Fuentecilla Maia Ferreira Neves

Co-supervisor: Maria Teresa H. de la Peña Stadler

**November 9, 2017***Radiation hardness assessment of MR sensors for space applications*

Student: Pedro Filipe Lança Alves

Supervisor: Susana Cardoso de Freitas

Co-supervisor: Patrícia Carla Serrano Gonçalves

**November 10, 2017***Fast-field cycling nuclear magnetic resonance relaxometer's magnet with optimized homogeneity and reduced volume*

Student: Pedro Miguel Santos Videira

Supervisor: Duarte de Mesquita e Sousa Pedro

Co-supervisor: José Oliveira Sebastião

**November 10, 2017***Probing hadronic interactions at ultra-high energies*

Student: Steven Nolasco Farinha Jardim da Silva

Supervisor: Ruben Maurício da Silva Conceição

Co-supervisor: Liliana Marisa Cunha Apolinário

**November 13, 2017***Influence of proton bunch and plasma parameters on the AWAKE experiment*

Student: Mariana Azevedo Trocado Moreira

Supervisor: Jorge Miguel Ramos Domingues

Ferreira Vieira

**November 13, 2017***Optimization of graphene deposition conditions by chemical vapour deposition: impact of temperature*

Student: Paulo Alexandre de Carvalho Gomes

Supervisor: João Pedro dos Santos Hall de

Agorreta de Alpuim

Co-supervisor: Susana Cardoso de Freitas

**November 14, 2017***Neutrino masses in the left-right symmetric model with flavour symmetries*

Student: Miguel Pissarra Levy

Supervisor: Filipe Rafael Joaquim Ricardo

Co-supervisor: Jorge Gonzalez Felipe

**November 14, 2017***Laser ignition of a high-pressure**H<sub>2</sub>/He/O<sub>2</sub> combustible mixture*

Student: Ricardo João Grosso Marques Ferreira

Supervisor: José António S. de Figueiredo Rodrigues

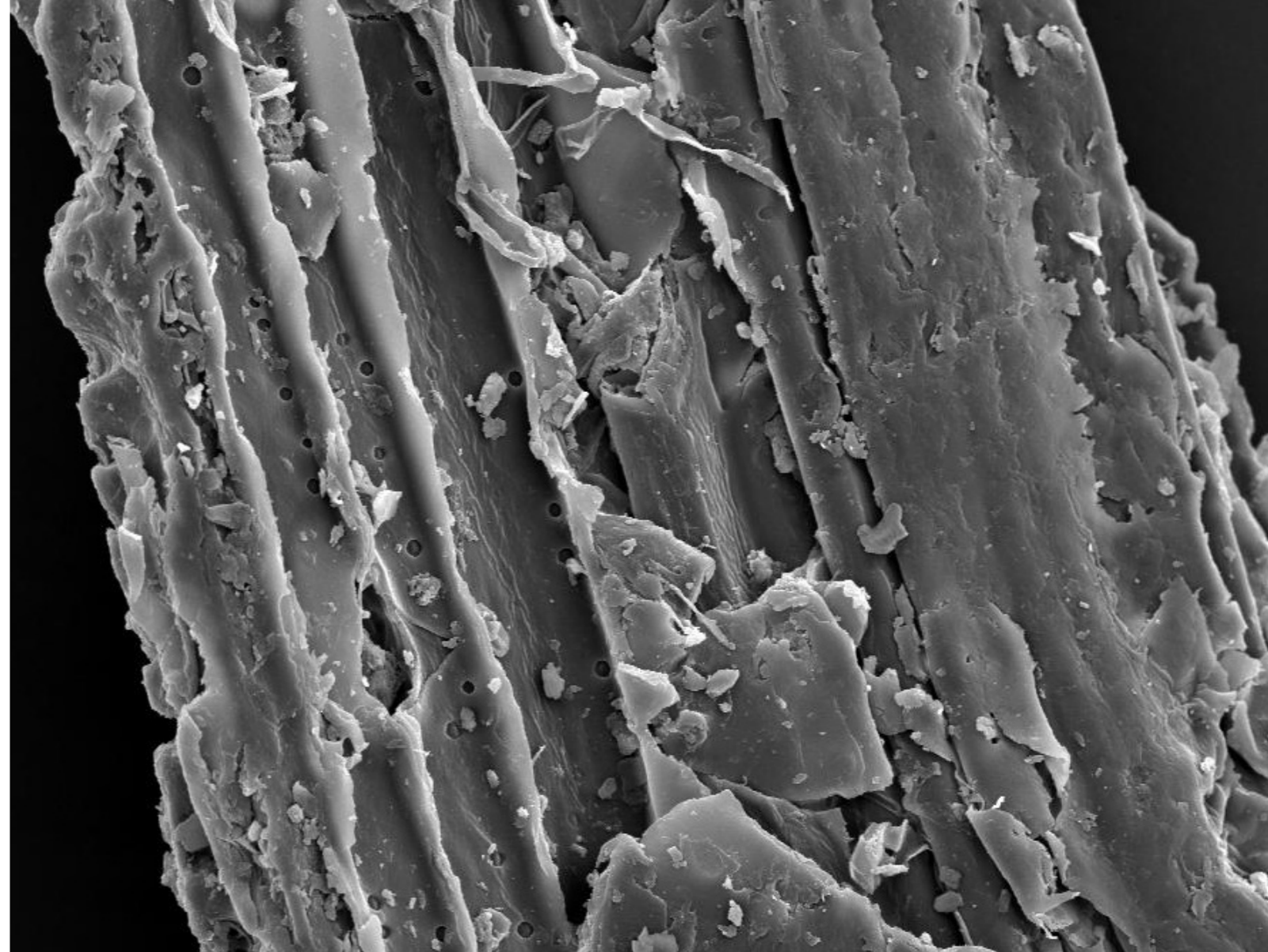
Co-supervisor: Mário António Lino da Silva

**November 14, 2017***Realistic modelling of vacuum polarization induced light scattering scenarios in extreme intense fields*

Student: Rui Pedro Tourinho Torres

Supervisor: Luís Miguel de Oliveira e Silva

Co-supervisor: Thomas Emmanuel Aurelien Grismayer



SEM image of plasma treated sugar cane bagasse. Image by IFPN.

**November 15, 2017***A minimal seesaw model for neutrino masses and the origin of matter*

Student: Débora Marques Barreiros

Supervisor: Filipe Rafael Joaquim Ricardo

Co-supervisor: Jorge Gonzalez Felipe

**November 15, 2017***Design of optical spectrometers within RamSERS project*

Student: Rui Miguel Oliveira Silva

Supervisor: João Alberto dos Santos Mendanha Dias

**November 15, 2017***Constraining magnetic dipole**dark matter through asteroseismology*

Student: Martim Proença da Costa Sousa Branca

Supervisor: Ilídio Pereira Lopes

**November 15, 2017***Liquid and ordered phases of geometrical frustrated charges - A Monte Carlo study of the Falicov-Kimball model on the triangular lattice*

Student: Miguel Moreira de Oliveira

Supervisor: Pedro José Gonçalves Ribeiro

Co-supervisor: Stefan Kirchner

**November 22, 2017***Study for the computational resolution of conservation equations of mass, momentum and energy - Application to solar receivers in Concentrated Solar Power plants*

Student: Giulio Beseghi

Supervisors: Filipe Mendes and Carlos-David Segarra

# PEDAGOGICAL HONOURS & AWARDS

Professor Vítor Manuel dos Santos Cardoso was honoured with the Instituto Superior Técnico Outstanding Teaching Award.

**The following faculty were recognized for excellent teaching in 2015/2016 and 2016/2017:**

Amílcar José Ferros Praxedes

Ana Maria Vergueiro Monteiro Cidade Mourão

António Balula

António Jorge Duarte de Castro Silvestre

António Mário Pereira Ferraz

Diana Leitão

Filipe Rafael Joaquim

João Luís Maia Figueirinhas

João Paulo Ferreira da Silva

João Rosa

Jorge Loureiro

Jorge Miguel Ramos Domingues Ferreira Vieira

José Maria Vargas Lopes

Liliana Marisa Cunha Apolinário

Luís Filipe Moreira Mendes

Luís Humberto Viseu Melo

Marta Leitão Mota Fajardo

Miguel Reis Orcinha

Pedro Francisco de Deus Lourenço

Pedro Miguel Félix Brogueira

Pedro Sebastião

Samuel Rodrigues Martins Eleutério

Sofia Leitão

**In 2016/2017, several students of MEFT were recognized for their academic excellence.**

Lucas de Barros Pacheco Seara de Sá was awarded the Prize “Academic Excellence in MEFT”, introduced in 2017 by DF and MEFT.

**The following students were awarded an honorable mention in “Academic Excellence in MEFT”:**

Diogo da Silva Duarte Cruz

António João Caeiro Heitor Coelho



Several members of the department's faculty were honoured with the “Excellence in Teaching Award” as part of the celebrations of the “Dia do Técnico 2017”. Image by Técnico Lisboa.

**The following students were awarded the prizes of “Best MSc Theses” within the different Scientific Areas:**

Astrophysics and Gravitation  
*Relativistic tidal love numbers: tests of strong-field gravity*  
Guilherme Martinho dos Santos Raposo

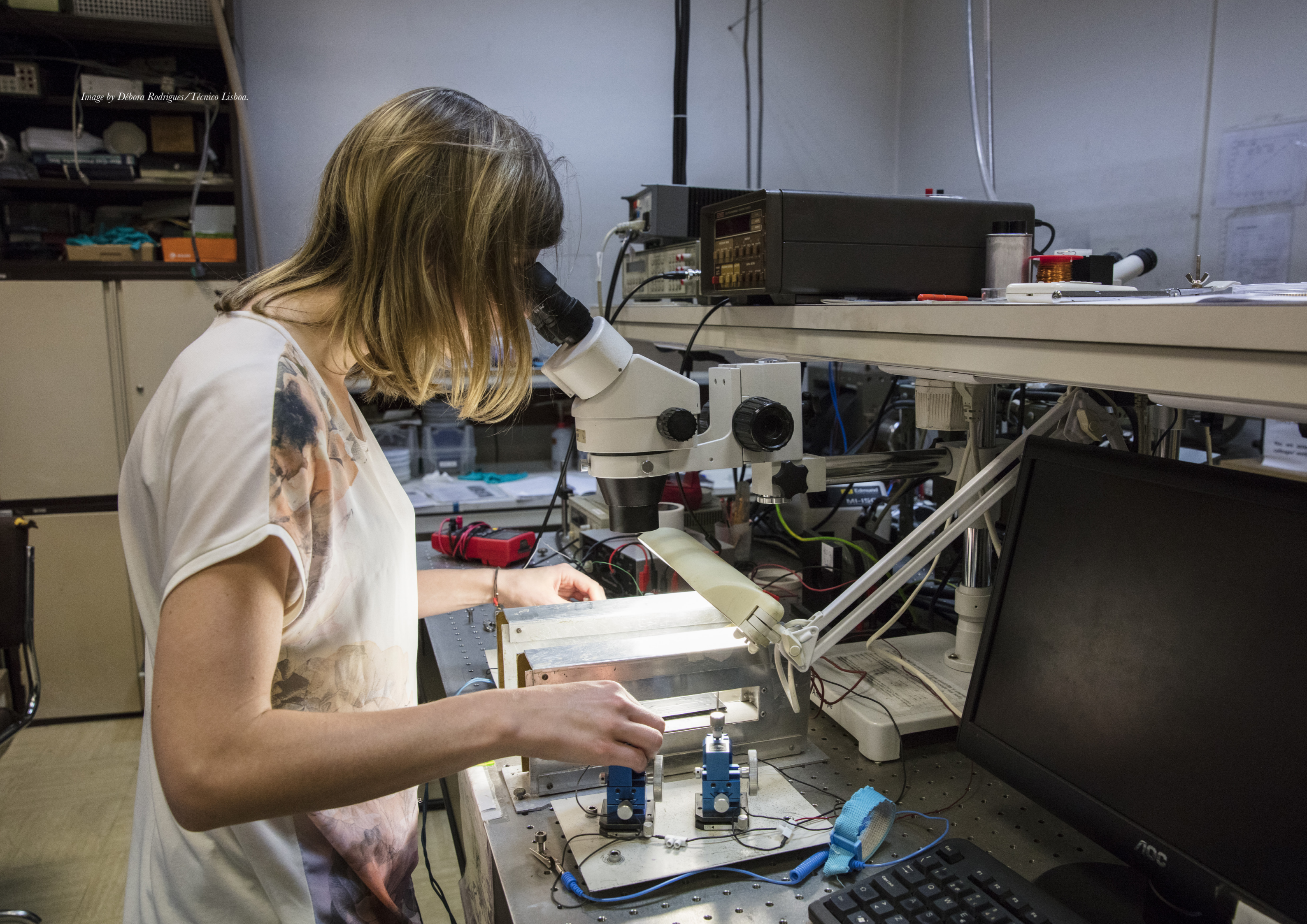
Condensed Matter and Nanotechnology  
*NMR study of the twist-bend nematic phase*  
José Pedro Albuquerque de Carvalho

Interdisciplinary Physics  
*Spin-orbit interaction and chaos in celestial mechanics*  
Manuel Maria Murteira Barreira da Cruz

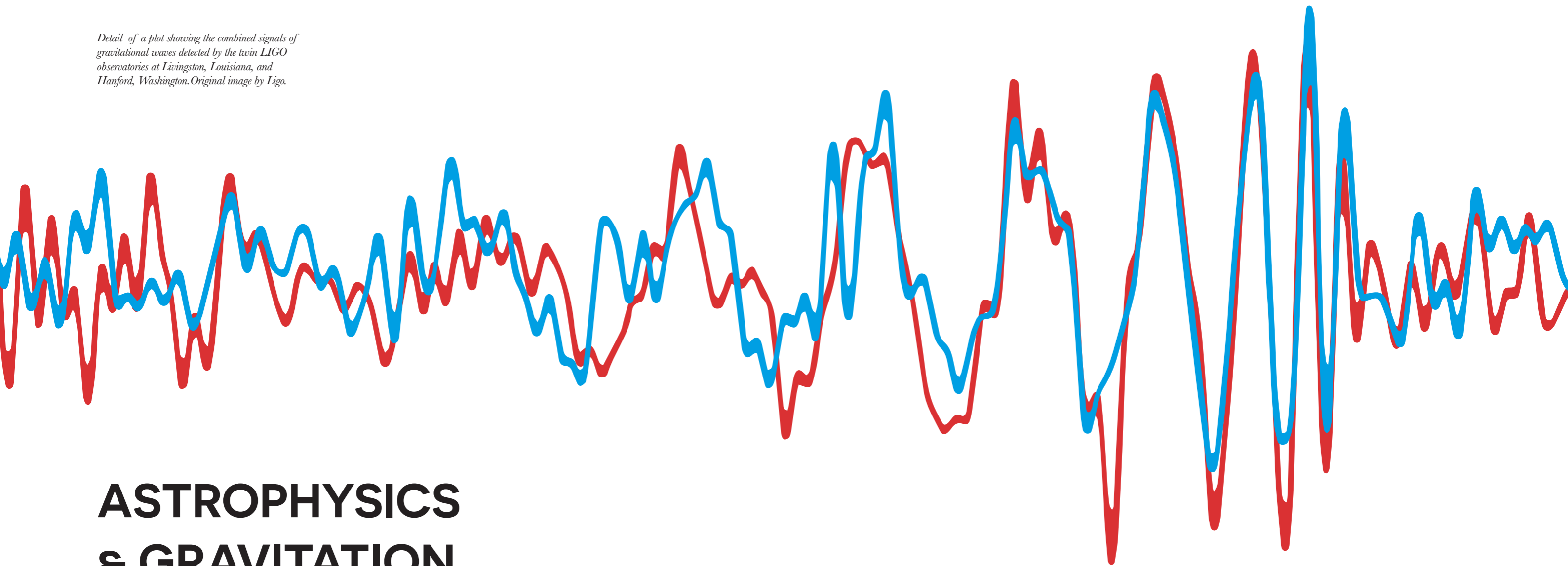
Particle and Nuclear Physics  
*Phenomenology of a single right-handed neutrino seesaw model*  
Mariana Henriques de Araújo

Plasma Physics, Lasers and Nuclear Fusion  
*Influence of proton bunch and plasma parameters on the AWAKE experiment*  
Mariana Azevedo Trocado Moreira

*Image by Débora Rodrigues/Técnico Lisboa.*



*Detail of a plot showing the combined signals of gravitational waves detected by the twin LIGO observatories at Livingston, Louisiana, and Hanford, Washington. Original image by Ligo.*



## ASTROPHYSICS & GRAVITATION

Astrophysics and Gravitation are active areas at the forefront of scientific research of this century. From the universe as a whole and cosmology, to galaxies, stars and black holes, major and exciting developments have been happening in recent times. Black holes and neutron stars are able to accelerate objects to far larger energies than terrestrial accelerators, while simultaneously serving as dark matter deposits. In addition, the violent collision and merger of these objects produces huge bursts of gravitational radiation, which carry detailed information about their progenitors. Gravitational waves were detected for the first time on September 14, 2015, when the two LIGO interferometers displayed a GW signal from a merging pair of black holes. This historical discovery received the Nobel Prize in Physics in 2017 and marks the dawn of the era of

gravitational wave astronomy, and the opening of a new window onto the hitherto invisible landscape of the Universe. Also, every grand challenge in astrophysics and cosmology, namely, dark matter, dark energy, inflation, and early universe, needs support and endeavour from the scientific community to be solved.

On the astrophysical and cosmological side, the formation of baryonic structures in our universe from the smallest to the largest objects - stars, stellar clusters, molecular clouds and H II regions, galaxies and galaxy clusters and superclusters, results from the action of gravity combined with other fundamental forces on baryons, dark matter and dark energy. Among the challenging astrophysics problems that our group aims to solve, to understand

how stars form and evolve, is the contribution of fluid dynamics and magnetic fields to the evolution of the Sun and stars, the determination of how dark matter influences stellar evolution (stellar populations I and III) and how dark energy changes the evolution of the universe. Among the various international activities, we are responsible for an international project to map the polarization of the light from supernova host galaxies to understand the properties of the dust that affects supernova observations and has impact on the determination of the dark energy content of the Universe. We are probing of the interior of stars through their oscillations signature using the current asteroseismic data from the satellite mission Kepler (ESA/NASA), and preparing for the forthcoming PLATO observatory mission (ESA, to be launched in 2025). In addition, one of the most crucial challenges in which our research group is currently working on is the enigma of dark matter: What is dark matter

made of? By understanding how it interacts with baryonic matter and how it affects the evolution of stars throughout the HR diagram and using asteroseismology, we are able to put constraints on the properties of dark matter. Indeed, we have shown that the presence of dark matter particles inside stars modifies their internal structure and their spectra of oscillations.

Gravitation has many faces, going beyond astrophysics. Indeed, gravitation is tied up with fundamental physics as we need to understand the nature of quantum gravity. Thus, the comprehension of new physics is tied to the understanding of general relativity, black holes, and stars. Was Einstein right? Is gravity really described by Einstein equations? What is the nature of the graviton? Is the event horizon of a black hole exactly as we think it is? Do black holes have no hair? Are black holes deformable? What happens to dark matter once it falls into

the Sun or into other stars? What is the nature of dark energy? These are some of the most fundamental questions in physics that one will be able to answer in the next few years.

The Astrophysics and Gravitation area is the right place to be for this. We, the researchers and professors in this area in IST, belong to the largest and most active group in the country working in astrophysics and gravitation, recognized by the European Research Council as of outstanding quality.

We work in theory, we observe with the largest telescopes in the world including the ESO -Very Large Telescope, in Chile, and also in numerical simulations or instrumentation for some of the largest experiments in the world.

Our students have had successful careers in some of the most famous institutes worldwide... Do you want to know more? Schedule a visit to our group, all it takes is an email!

### Teaching activities

MSc curricular units	PhD curricular units
Relativity and Cosmology	Advanced Topics in General Relativity, Astrophysics and Cosmology I
Astrophysics	
Topics In General Relativity And Cosmology	Advanced Topics in General Relativity, Astrophysics and Cosmology II
Astrophysics Laboratory	

### Members

José Sande Lemos,  
Full Professor (Area Coordinator)

Vitor Cardoso  
Full Professor

Ilídio Lopes  
Associate Professor with *Agregação*

Ana Maria Mourão  
Associate Professor

Amaro Rica da Silva  
Assistant Professor

Vincenzo Vitagliano  
Invited Assistant Professor

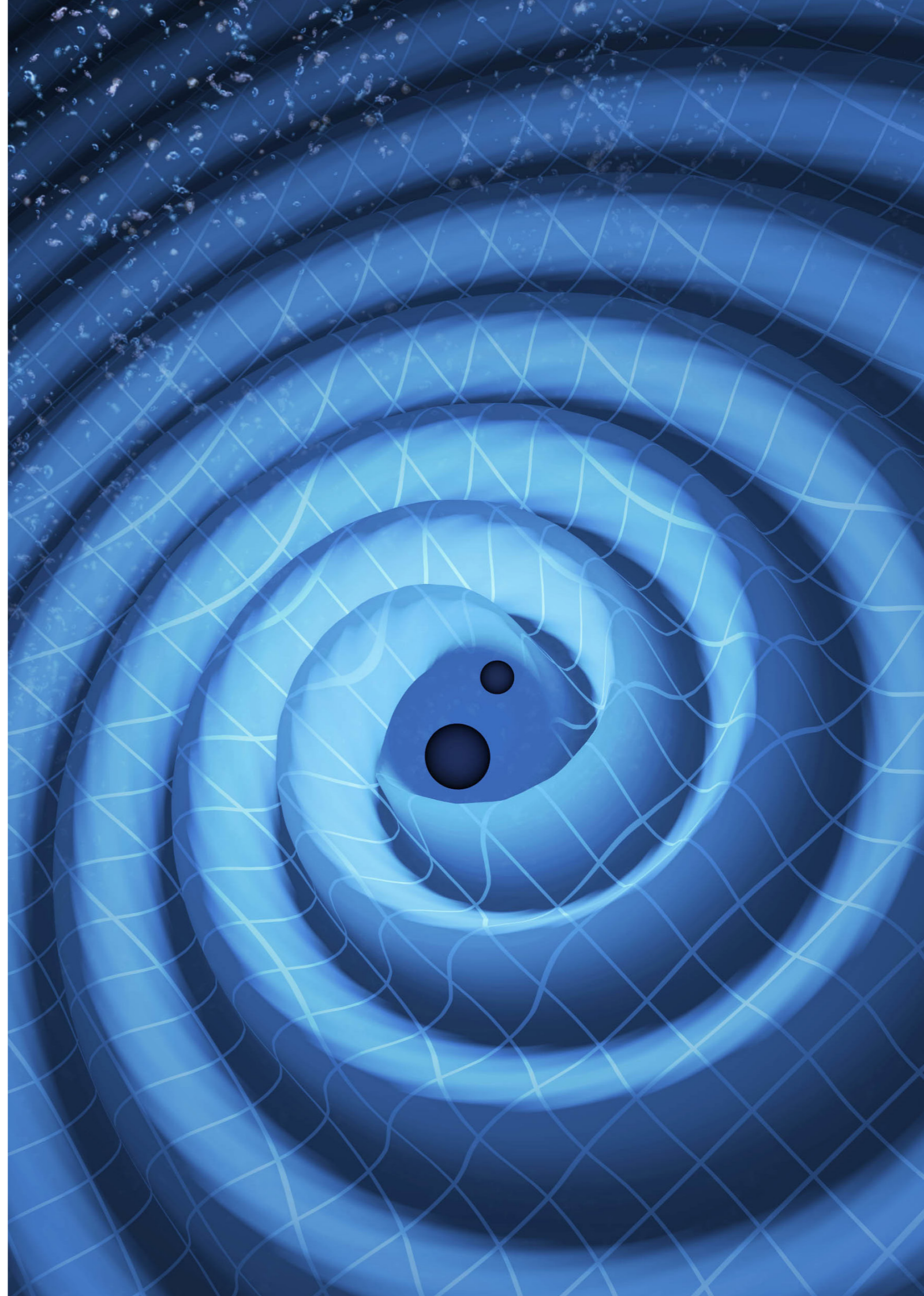
### Website

<https://fenix.tecnico.ulisboa.pt/areacentifica/df/ac-ag>

### Contact

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[infoAG@fisica.tecnico.ulisboa.pt](mailto:infoAG@fisica.tecnico.ulisboa.pt)  
+351 218417938 (Secretariat)

*Opposite page: Detail of an illustration showing gravitational waves caused by the merger of two black holes. Image by LIGO/ T. Pyle.*





# CONDENSED MATTER & NANOTECHNOLOGY

Condensed matter physics deals with the macroscopic and microscopic physical properties of matter in condensed phases. The most familiar examples of condensed phases are solids and liquids that arise from the electromagnetic interaction between atoms. Almost all of the physical world that we interact with in our daily lives is in fact condensed matter, the notable exceptions being light and air. Apparently simple questions like why do metals feel cold or why is glass transparent, are answered by condensed matter physics. Of special interest in condensed matter physics are the different phases of matter, from the magnetism known since antiquity to the topological insulators that were unknown until a few years ago. Topics included in the condensed matter field range from the very practical to the highly theoretical.

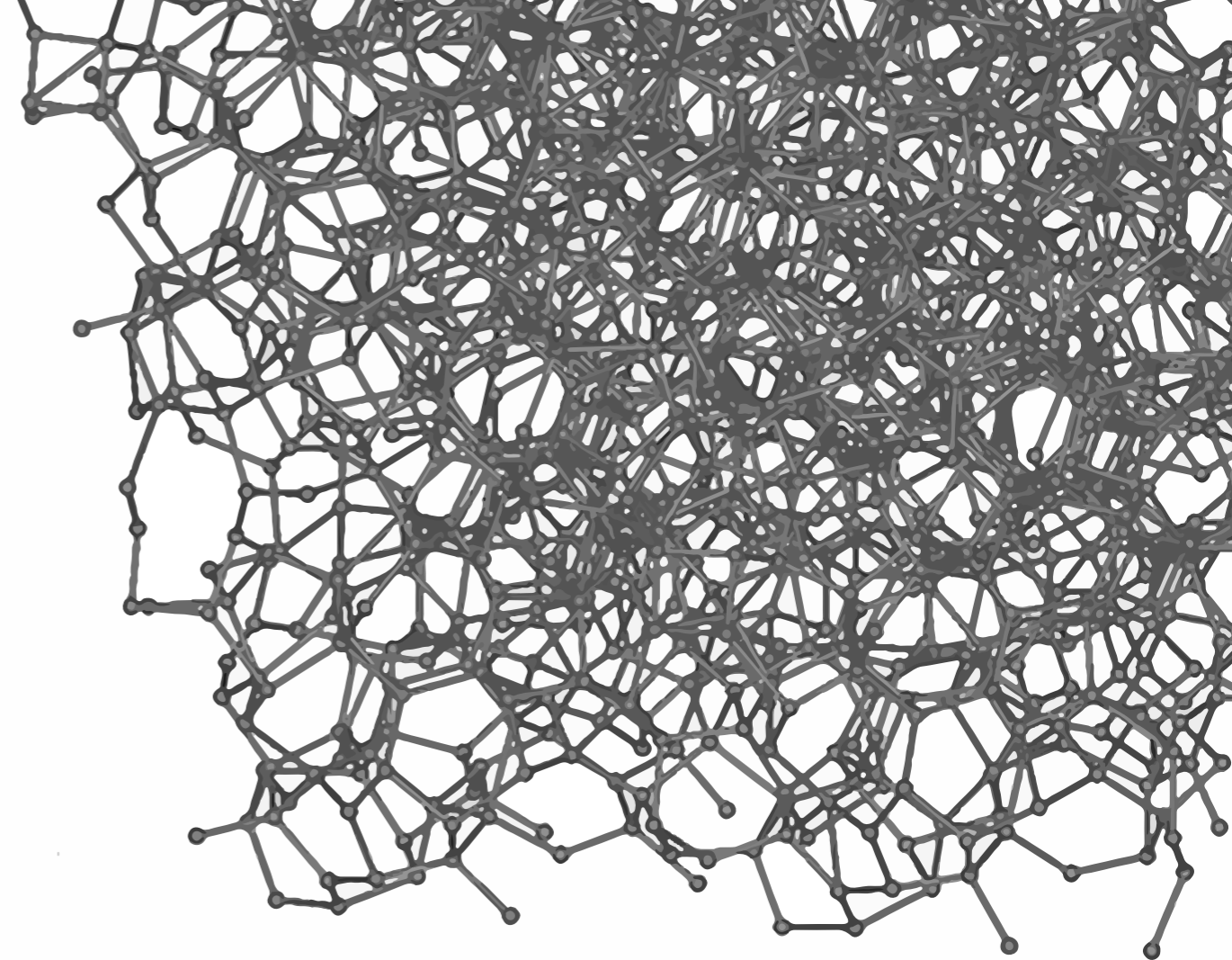
## **Condensed matter physics: from science to technology**

The development of condensed matter physics over the last century allowed us to engineer materials with remarkable properties that changed our society: The electronic industry is based on semicon-

ducting transistors, liquid crystals revolutionized displays, magnetism and spintronics allowed the storage of massive amounts of data, lasers and optical fibers revolutionized communications. Deep knowledge of physics of condensed matter obtained from the measurement of properties with clever experimental probes in the laboratory along the development of techniques of theoretical physics to develop mathematical models and with tools for simulations, stands behind this fantastic technological progress.

Condensed matter physics has been a source of shared new ideas with other fields of Physics, from the renormalization group theory to topological quantum fields, or even the Anderson-Higgs mechanism that gave the name to the Higgs boson. It is also perhaps the best laboratory we have to test exotic quantum and statistical physics effects.

When the sizes of a device or material approach the nanometer scale, (transistors in current computers or smartphones are currently at the 10 nanometer scale) the discrete nature of atoms, which have interatomic distances in the tenths of nanometer, becomes relevant, and materials reveal



*Detail showing the structure of amorphous carbon. Original image by Michael Ströck.*

new physical properties. This opens the opportunity for new science, technology and applications, but also challenges for the further miniaturization of established technologies. This is the new field of nanotechnology.

## **A world of many condensed matter phases: from lab to life**

The understanding of equilibrium phases of matter is important for soft matter like liquid crystals, polymers, dendrimers and ionic liquids. Our activity on Soft Matter includes the research on complex fluids and partially ordered systems with application as smart information displays, optoelectronic devices, drug carriers in nanomedicine, “green” chemistry

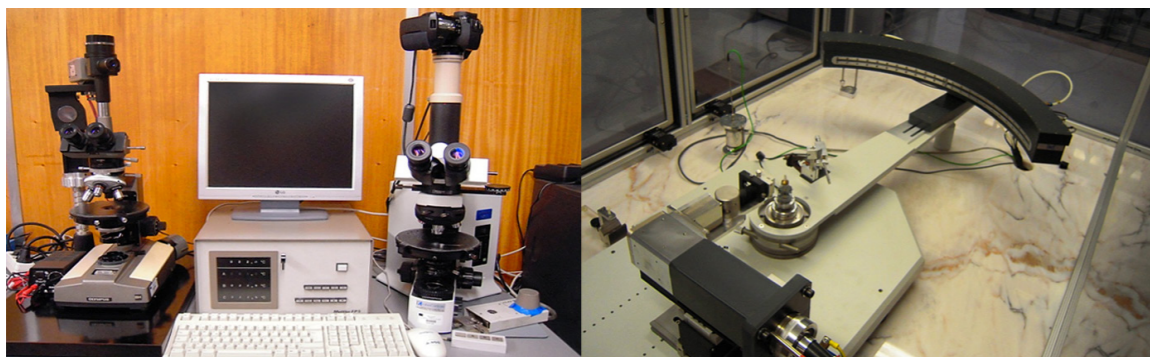
and CO<sub>2</sub> capture systems for environment protection. In our labs we investigate experimentally the physical properties of such systems by means of nuclear magnetic resonance, x-ray diffraction, electro-optical measurements and atomic force microscopy. In these soft-matter systems, the intrinsic mobility of molecules adds a new challenge to the understanding of physical behavior, the theoretical modeling and control of physical properties in envisaged new technological applications.

The understanding of equilibrium phases of matter is also very important for concepts such as emergent phenomena, quasi-particles, or symmetry breaking. New states of matter have fueled the recent activity such as heavy-fermion systems, graphene and other two-dimensional systems, topological insulators.

Our theoretical condensed matter physics research is related with low-dimensional systems and materials, spintronics, cold atoms, superconductivity and applications of quantum information in condensed matter systems. The search for new phases of matter and the complex properties of systems far from equilibrium are two of the main current topics of research. We also study non-equilibrium phase transitions and route to thermalization in strongly interacting systems. In particular, we focus on the dynamics of transitions to topological phases. We also investigate the connection of condensed matter systems with cold atoms in optical lattices and other similarities with other systems, the interplay of quantum information and traditional condensed matter techniques have allowed significant progress. Recently great effort has been put in systems far from equilibrium imposing new ideas on how complex systems behave.

inspection, power electronics, biochips for health, magnetic scanners, among many others, through collaborative projects and contracts for service providing with the international industry.

We work in a clean room level 10, produce thin films with ion beam, sputtering and chemical vapor deposition systems, and define nanostructures by lithography. All of these activities are supported by advanced characterization lab infrastructures. Our students are integrated with the research groups early in their curricular years and gain experience in international teams. Several types of magnetic, semiconducting, insulating and conducting materials are deposited and characterized, to support the activities in micro-electronic devices and photovoltaic cells. In the area of spintronics, the groups have been studying fast spin dynamics in various configurations and using various methods to induce changes in spin orien-



*Polarized optical microscope and x-ray diffractometry.  
Image by CeFEMA.*

The development of experimental techniques such as thin film deposition, scanning tunneling microscopy (STM) or atomic force microscopy (AFM) allows the manipulation of individual atoms, leading to the engineering of systems at a microscopic level where the laws of physics are dominated by quantum effects. This manipulation of matter at atomic or molecular levels in scales from 1 nm to typically 100 nm is the realm of nanotechnology. We combine the theoretical physics with state-of-the-art technologies to produce science and innovations at the nano scale. We are motivated by the applications of the fundamental research. One example is the study of biological systems and processes, ultrafiltration membranes, nano and micro structures polymer surfaces using AFM. Another example is the application of magnetoresistive sensors for safety and surface

tation, in combination with the experimental validation in functional devices. The preparation and characterization of low dimensional nanostructures, such as nanowires and semiconductor heterostructures are also made. Ion beams are used for the modification and characterization of such functional materials. Furthermore, nuclear techniques, using radioactive ions as probes, give information on materials properties on a nanoscopic scale.

We combine the theoretical and experimental tools to build smart devices with novel functionalities. These are inspired by the state-of-the-art technologies, which require a multidisciplinary approach to combine concepts of biology, plasmas, nanomedicine, robotics, microfluidics, or nanoelectronics.

## Facilities

The research is carried out at: CeFEMA-IST, INESC-MN, LATR and at IT.

Laboratory facilities
Laboratory of Micro and Nanotechnologies of INESC-MN
Laboratory of Nanophysics (at Taguspark campus) of INESC-MN
Laboratory of Liquid Crystals and Condensed Matter (CeFEMA)
Laboratory of Nuclear Magnetic Resonance (CeFEMA)
Laboratory of Atomic Force Microscopy (DF and INESC-MN)
Laboratory of Semiconductor Materials and Energy Conversion (CeFEMA)
Laboratory of Physics and Technology of Semiconductors (CeFEMA)
Ion Beam Laboratory and High Resolution X-ray Diffraction Laboratory (LATR, CTN)
Laboratory for Materials Characterization with Radioactive Nuclear Techniques (ISOLDE-CERN)

## Teaching activities

MSc curricular units	PhD curricular units
Complements of Electronics	Advanced Condensed Matter Physics
Nanotechnologies and Nanoelectronics	Advanced Topics in Condensed Matter Physics
Topics In General Relativity And Cosmology	Many Particle Systems and Critical Phenomena
Micro and Nanofabrication Techniques	Physics of Classical and Quantum Information
Condensed Matter Physics	Quantum Information Technologies
Physics of Liquid Crystals	Topics in Advanced Magnetism
Complements of Condensed Matter Physics	Topics of Physics of Liquid Crystals
Physics and Technology of Magnetic Materials	Cond. Matter Physics and Quantum Information
Physics and Technology of Semiconductors	Physics of Semiconductor Nanostructures
Characterization Methods in Solid State Physics	Spintronics
Condensed Matter Physics Laboratory	Topics of Experimental Condensed Matter Physics
Introduction to Spintronics	Advanced Characterisation of Functional Materials
NMR of Partially Ordered Systems	Microfluidics
Topics in Condensed Matter Physics	Complements of Microtechnologies

## Members

Pedro Miguel Félix Brogueira  
Full Professor (Area Coordinator)

José Luís Martins  
Full Professor

Pedro Sacramento  
Associate Professor with *Agregação*

Pedro Sebastião  
Associate Professor with *Agregação*

Reinhard Schwarz  
Associate Professor

Susana Freitas  
Associate Professor

Carlos Rodrigues da Cruz  
Assistant Professor with *Agregação*

João Luis Figueirinhas  
Assistant Professor with *Agregação*

Luís Viseu Melo  
Assistant Professor with *Agregação*

Amílcar Praxedes  
Assistant Professor

Ana Maria Martins  
Assistant Professor

Ana Branquinho de Amaral  
Assistant Professor

António Ferraz  
Assistant Professor

Eduardo Castro  
Assistant Professor

Umesh Mardolcar  
Assistant Professor

Vítor Rocha Vieira  
Invited Full Professor

Heinrich Hoerber  
Invited Full Professor

António Jorge Silvestre  
Invited Associate Professor

Diana Leitão  
Invited Assistant Professor

Helena Dias Alves  
Invited Assistant Professor

João Gaspar  
Invited Assistant Professor

Pedro Ribeiro  
Invited Assistant Professor

## Website

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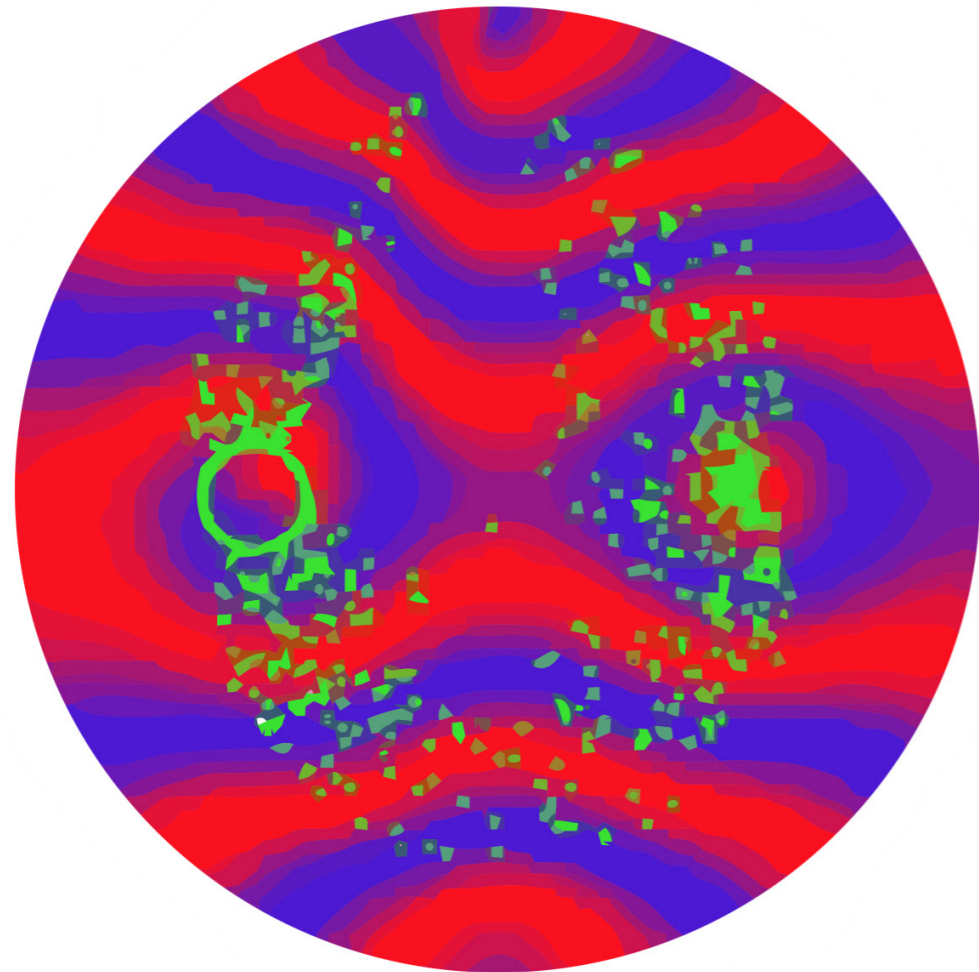
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[pedro.brogueira@tecnico.ulisboa.pt](mailto:pedro.brogueira@tecnico.ulisboa.pt)



*Opposite page: Image by Débora Rodrigues/Técnico Lisboa.*

# INTERDISCIPLINARY PHYSICS



The scientific field of Interdisciplinary Physics studies the behaviour of complex systems, microscopic and macroscopic.

The fields of study represented in the Department of Physics are: Dynamical Systems, Mathematical Physics, Biophysics, Biophysics Applied, Astrophysics, Globe Physics and Geophysics,

and Physics of Energy. To respond to a broad spectrum of the challenges of modern society, we specialized in the following areas:

Non-linear dynamics of microscopic and macroscopic physical systems. Celestial mechanics, theory of complexity and chaos, astrophysics and mathematical physics.

Dynamics, evolution and mechanisms of biological/biophysical systems. Multidisciplinary applications of biophysics.

Study of geophysical processes such as earthquakes, volcanic eruptions and the Earth's magnetic field.

Study and development of sustainable energy systems, from generation through renewable resources to the implementation of energy efficiency.

## Teaching activities

### MSc curricular units

Dynamical Systems

Biophysics

Solar Thermal Energy

Energy Technologies

Photovoltaic Solar Energy

Energy Services (MEFT, MEGE)

## Areas of current focus

Dynamical systems, mathematical physics and biophysics  
(Prof. Rui Dilão)

Biophysics  
(Prof. Teresa Pinheiro)

Geophysics prospection  
(Prof. Manuela Mendes)

Technologies for renewable energies  
(Prof. Filipe Mendes)

High energy dispersion reactions. Elasticity in special relativity with applications in astrophysics.  
(Prof. João Carlos Fernandes)

## Research units

CERENA, Center for Natural Resources and the Environment (<http://cerena.ist.utl.pt>)

IN+, Centre for Innovation, Technology and Policy Research (<http://in3.dem.ist.utl.pt>)

## Members

Rui Dilão  
Assistant Professor with *Agregação*  
(Area Coordinator)

Filipe Mendes  
Assistant Professor

João Carlos Fernandes  
Assistant Professor

João Fonseca  
Assistant Professor

Manuela Mendes  
Assistant Professor

Joana Sá  
Invited Assistant Professor

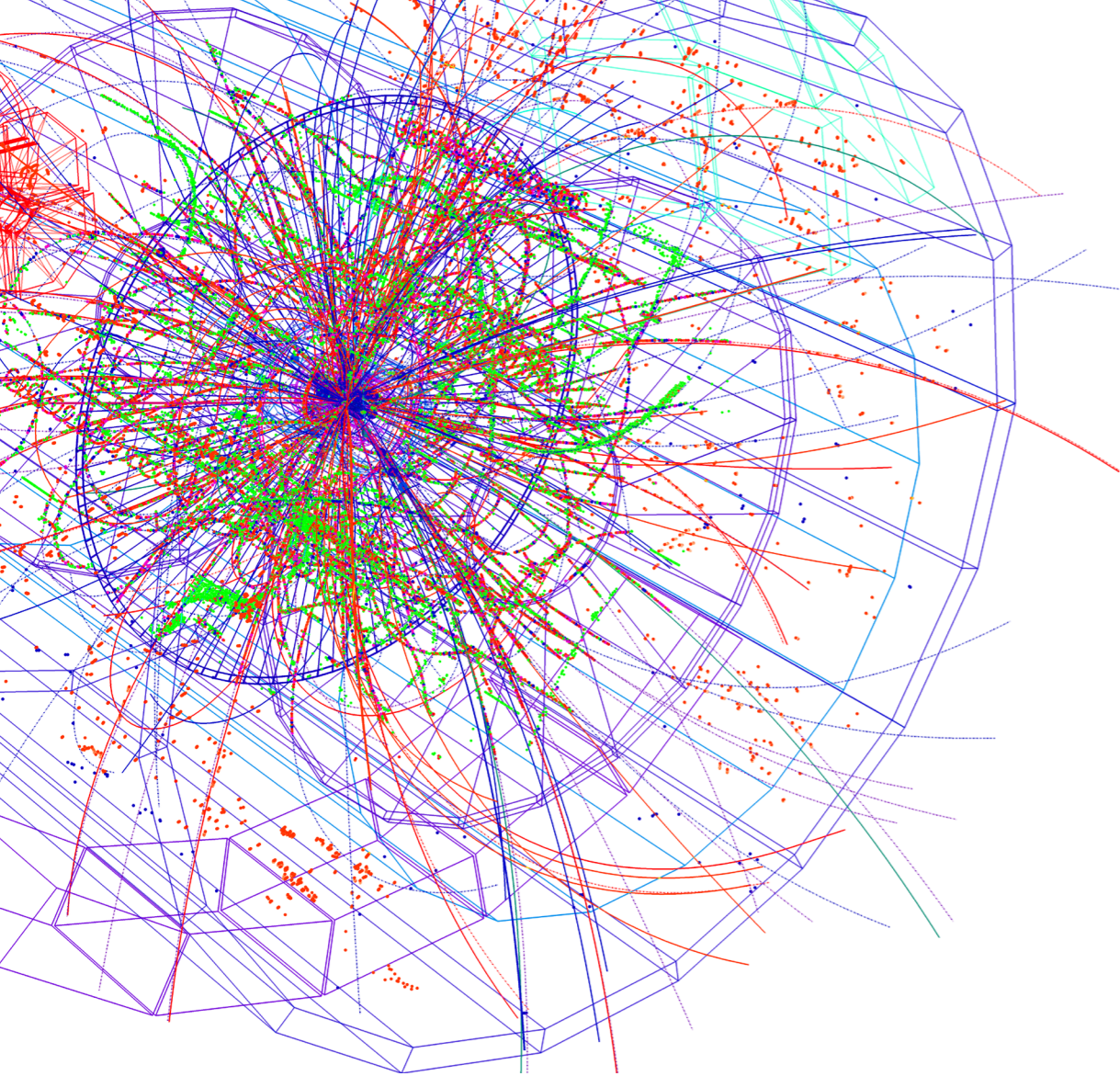
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*Opposite page: Adapted from an image by R. Dilão and M. Hauser*



# PARTICLE & NUCLEAR PHYSICS

Particle and Nuclear Physics (PNP) is a major area of scientific research at the Department of Physics (DF) at IST. Research and PhD programs/projects are done in collaboration with prominent international institutes, such as: CERN, the Pierre Auger Observatory, the SNOLAB, the Jefferson Lab, important universities of the Iberian Peninsula, and other big universities of Europe/USA/Japan/India.

Internationalization is also reflected in the fact that researchers and professors working in PNP also include many people from other nationalities. All researchers and professors belong to one of the Research Units associated with the DF and receiving funding support from FCT - Ministry of Science and from the EU. At IST these research units include LIP, CFTP, C2TN and a small part of the theory group at CeFEMA. The

experimental particle and nuclear physics and related technologies are developed at LIP, that participates in the big experiments at international research infra-structures like ATLAS and CMS at the Large Hadron Collider (LHC) at CERN, the Pierre Auger Observatory in Argentina, the Sudbury Neutrino Observatory (SNO) in Canada and a number of other experiments (COMPASS, LUX, etc). Researchers from LIP were involved in the experiments that led to the Nobel Prizes in Physics in 2013 (Higgs discovery) and 2015 (Neutrino oscillations). On the theoretical side most of the research in theoretical particle physics in Portugal is done at CFTP, including also some theoretical nuclear physics. Topics are related to the frontiers being pursued in the experimental side, Higgs Physics, Neutri-

no Physics, Dark Matter, just to name a few. This research is highly internationalized and CERN plays also a major role as a privileged place for the exchange of these ideas.

The scientific works are published in the major international journals for the area, such as: Physics Letters, Physical Review, Astroparticle Physics Journal, JHEP etc.

Studies in Particle and Nuclear Physics can be carried out either at the level of a Master of Science (2nd Bologna cycle), or a Ph.D. (3rd Bologna cycle). The usual way to initiate a study is to make first contact directly with one of our researchers/professors.

*Opposite page: Proton - lead ion collision from the pilot pA run at LHC 13.9.2012. Image by CERN.*

## Teaching activities

MSc curricular units	
Cosmic Rays Laboratory	Nuclear Reactors
Digital Logic Design and Control	Particle Physics
Experimental Methods in Particle Physics	Physics of Nuclear Reactors
Group Theory in Physics	Quantum Field Theory
Hadron Physics and Quantum Chromodynamics	Radiation Physics
Material Science for Nuclear Technologies	Radiation Physics and Technology
Material Science for the Nuclear	Radiological Protection and Dosimetry
Nuclear and Particle Physics Technology	Radiological Safety and Protection
Nuclear Energy	Simulation Methods for Particle Detectors
Nuclear Fission and Fusion Technologies	Standard Model and New Physics
Nuclear Instrumentation Techniques	Topics in Particle Physics, Astrophysics and Cosmology
Nuclear Physics	

The PhD Programme in Physics of the Department of Physics is designed to provide advanced knowledge and research capabilities in at least one of the scientific areas in which the department is organized. In the area of Particle and Nuclear Physics students can work in national and inter-

national scientific centres and laboratories, for instance, the reference laboratory for Particle Physics, the European Organization for Nuclear Research (CERN). They will also profit from the many international collaborations that expetitive area to start a successful career.

PhD curricular units	
Advanced Experimental Methods in Particle Physics I	Design and Simulation of Radiation Detectors
Advanced Experimental Methods in Particle Physics II	Nuclear Physics Methods in Science and Technology
Advanced Topics in Particle and Astroparticle Physics I	Particle Physics Techniques
Advanced Topics in Particle and Astroparticle Physics II	Project on Data Acquisition and Control in Detectors
Astroparticles	Topics in Particle Physics
Computational Methods in Radiation Technology	

#### National/international protocols

IDPASC international network. Includes:

CERN, CBPF, Doctoral School in Physics of the University of Padua, EGO, IFCA, MAP\_Fis, U. Algarve, U. Bari, U. Coimbra, U. Évora, U. Genova, U. Granada, U. Lisboa, U. Nova Gorica, UL-IST, U. Padova-STMS, U. Paris VI - Pierre et Marie Curie, U. Paris VII - Paris Diderot, U. Porto, U. Santiago Compostela, U. Savoie, U. Siena, U. Trento, U. Udine, U. Valencia, U. Salento, SPRACE - UNESP/UFABC, Doctoral School PHENIICS - Université Paris-Saclay.

IDPASC - Portugal PhD programme. Includes:

Universidade de Lisboa, Universidade de Coimbra, Universidade do Porto, Universidade do Minho, Universidade de Évora, Faculdade de Ciências da Universidade de Lisboa, Instituto Superior Técnico.

#### Research units

C2TN - Centre for nuclear sciences and technologies (c2tn.tecnico.ulisboa.pt).

CFTP - Centre for theoretical particle physics (cftp.tecnico.ulisboa.pt).

LIP - Laboratory of instrumentation and experimental particle physics (www.lip.pt).

#### Members

Jorge Manuel Rodrigues Crispim Romão  
Full Professor (Area Coordinator)

Mário João Martins Pimenta  
Full Professor

Maria Teresa Haderer de la Peña Stadler,  
Full Professor (Joint appointment with the Department of Nuclear Sciences and Engineering)

João Carlos Carvalho de Sá Seixas  
Associate Professor with *Agregação*

João Paulo Ferreira da Silva  
Associate Professor with *Agregação*

Pedro José de Almeida Bicudo  
Associate Professor with *Agregação*

Maria Raquel Nunes Pereira Crespo  
Assistant Professor with *Agregação*

Pedro Morais Salgueiro Teixeira de Abreu  
Assistant Professor with *Agregação*

Sérgio Eduardo de Campos Costa Ramos  
Assistant Professor with *Agregação*

Fernando José de Carvalho Barão  
Assistant Professor

Filipe Rafael Joaquim  
Assistant Professor

Pedro Jorge dos Santos Assis  
Assistant Professor

Samuel Rodrigues Martins Eleutério  
Assistant Professor

Alessandro de Angelis  
Invited Full Professor

José Emilio Fernandes Tavares Ribeiro  
Invited Full Professor

Enrico Maglione  
Invited Associate Professor

Luís Manuel Balio Lavoura  
Invited Associate Professor

Maria Margarida Nesbitt Rebelo da Silva  
Invited Associate Professor

Ricardo Jorge González Felipe  
Invited Associate Professor

Alfred Stadler  
Invited Assistant Professor

André David Tinoco Mendes  
Invited Assistant Professor

Bernardo António Neto Gomes Baptista Tomé  
Invited Assistant Professor

David Emanuel da Costa  
Invited Assistant Professor

Gernot Eichmann  
Invited Assistant Professor

Ivo Varzielas  
Invited Assistant Professor

Joaquim Inácio da Silva Marcos  
Invited Assistant Professor

José Guilherme Teixeira de Almeida Milhano  
Invited Assistant Professor

Liliana Marisa Cunha Apolinário  
Invited Assistant Professor

Luís Miguel Faria Pereira Lopes da Silva  
Invited Assistant Professor

Michele Gallinaro  
Invited Assistant Professor

Nuno Miguel Ribeiro Cardoso  
Invited Assistant Professor

Patrícia Carla Serrano Gonçalves  
Invited Assistant Professor

Pietro Faccioli  
Invited Assistant Professor

Ruben Maurício da Silva Conceição  
Invited Assistant Professor

#### Website

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+351 218419092 (Secretariat)

# PLASMA PHYSICS, LASERS & NUCLEAR FUSION

The faculty members of The Scientific Area of Plasmas, Lasers and Nuclear Fusion of the Physics Department of Instituto Superior Técnico (IST) are actively engaged in education, research and outreach programmes in a wide range of topics covered in that area, both from a fundamental and technological perspective.

Besides collaborating in the undergraduate Physics course for all IST 1st and 2nd cycle degrees, our faculty members are responsible for several courses in the Integrated Master Programme in Technological Physics Engineering in our topics of expertise. We are also strongly involved in the PhD degrees of Physics and Technological Physics Engineering, leading the FCT PhD programme APPLAuSE.

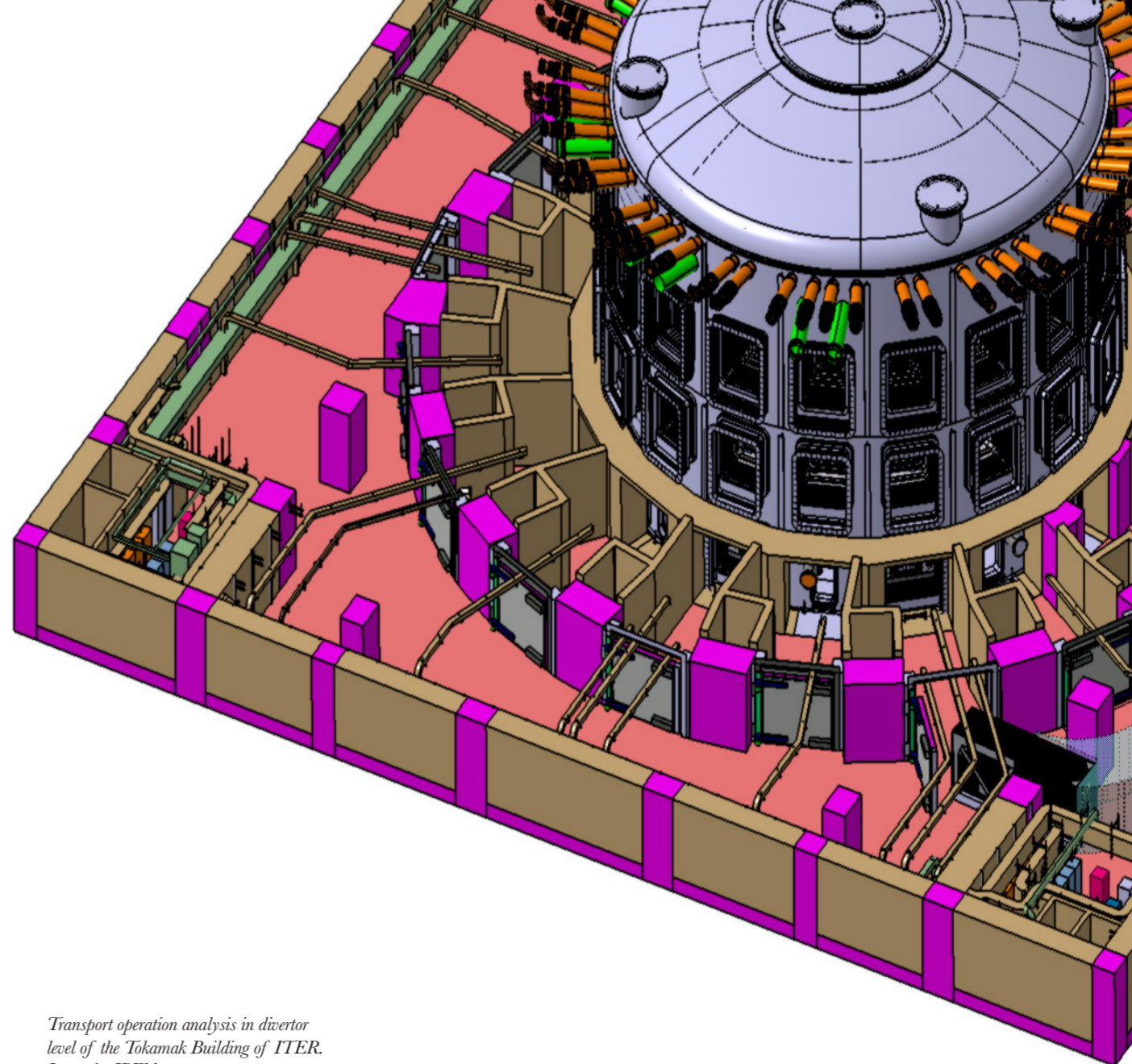
The research of the faculty members is developed at the Institute of Plasmas and Nuclear Fusion, an Associated Laboratory, and the only Physics (and IST) Research Unit evaluated as Outstanding. The vibrant research programmes of our faculty members have led to several high impact publications in general physics journals (e.g. 1

Nature Physics, 4 Nature Communications, 4 Physical Review Letters) and in the speciality journals in Plasma Physics, Optics and Nuclear Fusion, and to several high profile research grants at the national and at the international level. In particular, Professor Luis Oliveira e Silva was awarded a second Advanced Grant of the European Research Council in 2016.

Our faculty members have been recognised with several prizes and awards. Professor Vasco Guerra was awarded the 2016 William Crookes Prize, and Professor Luis Oliveira e Silva was elected as Fellow of the European Physical Society in 2017 and was distinguished as “Grande Oficial” of the “Ordem da Instrução Pública” by the President of the Portuguese Republic in 2016.

Several of our PhD students have received prizes at conferences, delivered invited talks at international conferences, and have secured post-doctoral positions in leading institutions worldwide.

During this period, Professors Vasco Guerra and João Pedro Bizarro were promoted to Associate



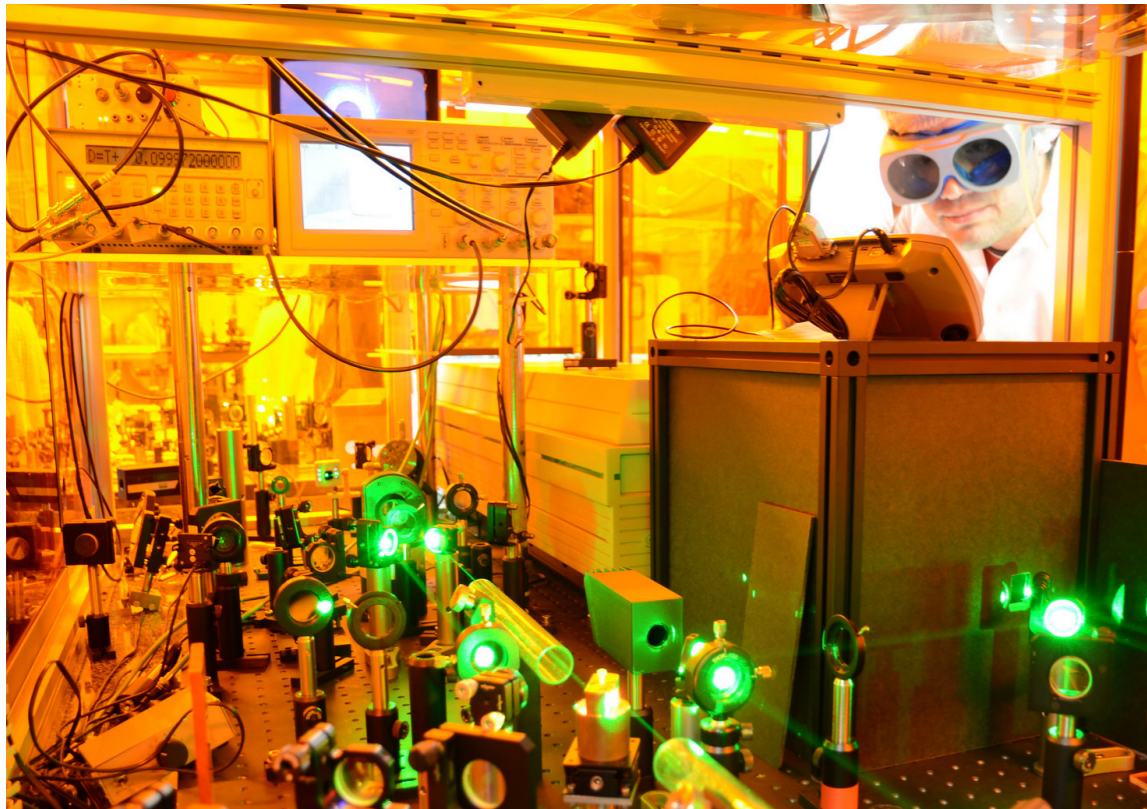
*Transport operation analysis in divertor level of the Tokamak Building of ITER.  
Image by IPFN*

Professors, Doutores Bruno Gonçalves and Carlos Silva promoted to Principal Researchers, Professor Marta Fajardo was recruited as Assistant Professor and Doutor Rui Coelho was recruited as Assistant Researcher.

The faculty members are also engaged in outreach programmes targeted at high school students, undergraduate students, and the general public. Examples of these activities include the Ciência Viva Summer Training, Mini courses for high school teachers in Nuclear Fusion and in Lasers, the PlasmaSurf Summer School, the

IAEA training on Tokamak Engineering and Operation, and the Athens Programme courses.

All these activities leverage on long standing international partnerships and research contracts with leading institutions in our fields of expertise. The renovated website of the scientific area (<http://plasmas.tecnico.ulisboa.pt>) was also launched during this period, now showcasing the key achievements of our faculty members, and providing information about the educational activities, research and opportunities.



*Ti:sapphire regenerative amplifier. Image by IPFN.*

### Members

Luís Miguel de Oliveira e Silva  
Full Professor (Area coordinator)

Luís Paulo da Mota Capitão Lemos Alves  
Full Professor

Horácio João Matos Fernandes  
Associate Professor with *Agregação*

João Pedro Saraiva Bizarro  
Associate Professor with *Agregação*

Vasco António Dinis Leitão Guerra  
Associate Professor with *Agregação*

Bruno Miguel Soares Gonçalves  
Principal Researcher with *Agregação*

Carlos Alberto Nogueira Garcia Silva  
Principal Researcher with *Agregação*

Mário José Gonçalves Pinheiro  
Assistant Professor with *Agregação*

David Pacheco Resendes  
Assistant Professor with *Agregação*

Artur Jorge Louzeiro Malaquias  
Assistant Professor

Bernardo Brotas de Carvalho  
Assistant Professor

Gonçalo Nuno Marmelo Foito Figueira  
Assistant Professor

João Alberto dos Santos Mendanha Dias  
Assistant Professor

Marta Leitão Mota Fajardo  
Assistant Professor

Rui Manuel Dias Alves Coelho  
Assistant Researcher

Nuno Filipe Gomes Loureiro  
Invited Associate Professor

Jorge Miguel Ramos Domingues Ferreira Vieira  
Invited Assistant Professor

Mário António Prazeres Lino da Silva  
Invited Assistant Professor

### Website

<https://plasmas.tecnico.ulisboa.pt/>

### Contact

infoFPLFN@fisica.tecnico.ulisboa.pt  
+351 218419336 (Area Coordinator)  
+351 218419329 (Secretariat)

### Teaching activities

MSc curricular units	PhD curricular units
Advanced Plasma Physics	Fundamentals of Plasma Physics
Advanced Topics in Computational Physics	Diagnostic Methods for Plasmas
Data Acquisition Systems	Advanced Topics in Plasma Physics
Diagnostic and Measurement Techniques	Advanced Computing in Physics and Engine
Low Temperature Plasmas	
Nuclear Fusion	
Optics and Lasers	
Plasma Physics and Technology	
Plasma Technologies for Materials Processing	
Real Time Control	



PART 4

# SCIENTIFIC ACTIVITIES





Professor Paolo de Bernardis gives a lecture at the invitation of the Physics Department. Image by Débora Rodrigues/Técnico Lisboa.

## DF COLLOQUIA

**March 2, 2016**

*Diffusion*

Simone Calogero  
Chalmers University of Technology

**March 9, 2016**

*Valorização do Conhecimento: desafios e oportunidades*

José Carlos Caldeira  
Presidente da Agência Nacional de Inovação

**March 16, 2016**

*Gravitational waves: the sound of the universe*

Victor Cardoso  
CENTRA & Dep. Física, IST

**March 30, 2016**

*All-electric spintronics in graphene*

Aires ferreira  
University of York, United Kingdom

**April 6, 2016**

*101 years of general relativity: from cosmology to black holes and fundamental theories*

José Sande Lemos  
CENTRA & Dep. Física, IST

**April 13, 2016**

*Microscopic black holes and (most) perfect fluid*

Elias Kiritsis  
University of Crete, Heraklion, Crete, Greece

**May 4, 2016**

*Novel approaches in photovoltaics: materials, devices and prospects*

Jorge Morgado  
Organic Electronics Group, IT-LX

**May 11, 2016**

*Clinical experience with the EDGE accelerator*

Sandra Vieira  
Department of Radiotherapy,  
Champalimaud Foundation, Lisbon

**May 18, 2016**

*Detection and characterization of other planets: results from high resolution spectroscopy*

Nuno C. Santos  
Instituto de Astrofísica e Ciências do Espaço,  
Universidade do Porto

**May 25, 2016**

*The bright side of dark matter*

Ilídio Lopes  
CENTRA & Dep. Física, IST

**June 8, 2016**

*Basic notions in graphene plasmonics*

Nuno Peres  
Universidade do Minho, Braga

**September 30, 2016**

*High-resolution Kelvin-probe force microscopy*

Regina Hoffmann-Vogel  
Karlsruhe Institute of Technology

**October 12, 2016**

*Matter meets topology - The physics behind the Nobel Prize*

Pedro Ribeiro  
CeFEMA & Dep. Física, IST

**October 19, 2016**

*Satellite remote sensing for hazard assessment and disaster response*

Sandra Heleno  
CERENA, IST

**October 26, 2016**

*From physics to safety critical engineering*

Luís Gargaté  
Critical Software

**November 2, 2016**

*Gene splicing in evolution and disease*

Nuno Barbosa Morais  
Instituto de Medicina Molecular  
Faculdade de Medicina da Universidade de Lisboa

**November 9, 2016**

*Some formal problems in studying evolutionary cell biology*

José Pereira Leal  
Instituto Gulbenkian de Ciência

**November 16, 2016**

*In silico plasmas under extreme conditions: from particle accelerators to pair plasmas in pulsars*

Luís Oliveira e Silva  
IPFN & Dep. Física, IST

## IST DISTINGUISHED LECTURES

**March 22, 2017**

*Observing the early Universe*

Paolo de Bernardis  
University of Rome “La Sapienza”, Italy  
(Invited by CENTRA and Instituto Italiano de Cultura, Lisboa)

**16 December, 2017**

*Landau Damping: Old and New*

Clément Mouhot  
Cambridge University, UK

**March 10, 2017**

*New (and new routes to) carbon materials*  
Rodney S. Ruoff  
Ulsan National Institute  
of Science & Technology

**April 5, 2017**

*The heart of matter*  
Teresa Peña  
CFTP & Dep. Física, IST

**April 26, 2017**

*Synthesising light pulses*  
Gonçalo Figueira  
IPFN & Dep. Física, IST

**May 3, 2017**

*From college to corporate*  
Lara Próspero  
Microsoft,  
WW Customer Service & Support

**May 10, 2017**

*Molecular biophysics:  
taking optics to the limit*  
Heinrich Hörber  
Dep. Física, IST

**May 24, 2017**

*Coherent x-ray sources for ultrafast science*  
Marta Fajardo  
IPFN & Dep. Física, IST

**September 20, 2017**

*The digital mind*  
Arlindo Oliveira  
IST President

**September 27, 2017**

*Shining light on hadrons*  
Gernot Eichmann  
CFTP, IST

**October 4, 2017**

*From physics to medicine*  
Uwe Oelfke  
Centre for Cancer Imaging, Joint  
Department of Physics at the Institute of Cancer  
Research & The Royal Marsden Hospital

**October 11, 2017**

*Nuclear spaces: museums, fun and banalization*  
Jaume Sastre  
Centro Interuniversitário de História  
das Ciências e da Tecnologia

# RESEARCH SEMINARS

**January 12, 2016**

*Gauge invariance and the physical spectrum  
in the two-Higgs-doublet model*  
Leonardo Pedro  
CFTP/IST and Uni Graz, Austria  
[CFTP Seminar]

**January 14, 2016**

*Higgs phenomenology group: lattice, perturbative  
and experimental Higgs physics*  
Leonardo Pedro  
CFTP/IST and Uni Graz, Austria  
[CFTP Seminar]

**February 16, 2016**

*Matrix product states formalism  
and exactly solvable spin models*  
Afsaneh Sadrolashrafi  
Georgia Institute of Technology, USA  
[CeFEMA Seminar]

**February 19, 2016**

*Elementary introduction into AdS holography*  
Prof. Yakov Shnir  
JINR, Dubna, and Oldenburg University,  
Germany  
[CFTP Seminar]

**February 22, 2016**

*Yang-Mills theories in the Coulomb gauge*  
Sofia Leitão  
IST, CFTP  
[CFTP Seminar]

**February 25, 2016**

*A multi-Higgs model with CP-half-odd scalars*  
Igor Ivanov  
IST, Dept. de Física  
[CFTP Seminar]

**February 25, 2016**

*Optimizing the  $\eta_{\{23\}}$  octant search  
in long baseline experiments*  
Sampsa Vihonen  
Uni. Jyväskylä, Finland  
[CFTP Seminar]

**March 1, 2016**

*Neutrino properties from cosmological  
observables after Planck*  
Sergio Pastor  
IFIC, CSIC - Univ. Valencia, Spain  
[CFTP Seminar]

**March 3, 2016**

*High energy scattering in QCD  
and gluon saturation*  
Tolga Altinoluk  
CENTRA-IST  
[CENTRA Seminar]

**March 3, 2016**

*Tight bounds on a hypothetical graviton screening  
mass from the gravitational wave observation  
GW150914 at LIGO*  
Pedro Bicudo  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**March 10, 2016**

*1D one-electron spectral behavior in defects  
of a 2D van der Waals*  
José Carmelo  
Department of Physics, University of Minho  
[CeFEMA Seminar]

**March 10, 2016**

*What Massive Galaxies tell us about  
the universe we live in?*  
Fernando Buitrago  
OAL  
[CENTRA Seminar]

**March 17, 2016**

*Renormalisation of Horava gravity*  
Diego Blas Temino  
CERN  
[CENTRA Seminar]

**March 17, 2016**

*Parton branching in a QCD medium*  
Liliana Apolinario  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**March 22, 2016**

*CP and other symmetries of symmetries*  
Andreas Trautner  
Technische Universität München, Germany  
[CFTP Seminar]

**March 31, 2016**

*Evidence for metallic zero energy modes  
in graphene with strong chiral disorder - GT*  
Aires Ferreira  
University of York  
[CeFEMA Seminar]

**March 31, 2016**

*Supernaturalness and  $U(1)B-L$  symmetry  
from trification breaking*  
António P. Morais  
Universidade de Aveiro  
[CENTRA Seminar]

**March 31, 2016**

*Spontaneous symmetry breaking  
in the  $S_3$ -symmetric scalar sector*  
David Emmanuel-Costa  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**April 7, 2016**

*Testing Lorentz and CPT symmetry  
in particle physics*  
Jacob Noordmans  
CENTRA - Algarve  
[CENTRA Seminar]

**April 7, 2016**

*What if the masses of the first two quark families  
are not generated by the standard Higgs?*  
Gustavo Branco  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**April 12, 2016**

*The screening tensor of a two-dimensional material and its relation to the material's conductivity*

Jaime Santos  
Centro de Física, University of Minho  
[CeFEMA Seminar]

**April 14, 2016**

*Effective boson stars*

Edgardo Franzin  
Università di Cagliari and CENTRA  
[CENTRA Seminar]

**April 14, 2016**

*3-3-1 model with right handed neutrinos*

Diego Cogollo  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**April 20, 2016**

*Black holes in Hořava gravity*

Daniele Vernieri  
IAP, Paris  
[CENTRA Seminar]

**April 21, 2016**

*Matching higher order gravity with higher dimensions: a top-down geometrization of matter*

Antonio Troisi  
University of Salerno  
[CENTRA Seminar]

**April 21, 2016**

*Flavour symmetries in a renormalizable  $SO(10)$  model*

Luis Lavoura  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**April 28, 2016**

*Ultrafast laser-matter interactions: mechanical properties and surface texturing*

Arnaud Weck  
Universidade de Ottawa, Canada  
[CeFEMA Seminar]

**April 28, 2016**

*Bridging cosmology and astrophysics with gravitational waves*

Ippocratis Saltas  
CAAUL, Lisbon  
[CENTRA Seminar]

**April 28, 2016**

*Discussion around 750 GeV diphoton signal*

Igor Ivanov  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**May 4, 2016**

*Covariant formulation of teleparallel and  $f(T)$  gravity theories*

Martin Krssak  
IFT, São Paulo  
[CENTRA Seminar]

**May 5, 2016**

*Hydrodynamic simulations of rotating black holes*

Silke Weinfurtner  
Nottingham University  
[CENTRA Seminar]

**May 12, 2016**

*Exotic matter inside neutron stars*

Constança Providência  
Coimbra University  
[CENTRA Seminar]

**May 12, 2016**

*Composite Higgs models: Flavour and other aspects*

Hugo Serôdio  
Korea University, Seoul  
[CFTP Seminar]

**May 19, 2016**

*Neutron stars in scalar-tensor theories of gravity*

Hector O. Silva  
Mississippi University  
[CENTRA Seminar]

**June 2, 2016**

*Nonlinear dynamics from the relativistic Boltzmann equation in the Friedmann-*

*Lemaître-Robertson-Walker spacetime*

Mauricio Martinez Guerrero  
Ohio State University  
[CENTRA Seminar]

**June 9, 2016**

*Localisation in  $AdS_5 \times S^2$*

Benson Way  
Cambridge  
[CENTRA Seminar]

**June 15, 2016**

*Testing general relativity using black-hole binaries*

Walter del Pozzo  
Birmingham  
[CENTRA Seminar]

**June 16, 2016**

*Development and modulation of magnetic responsive supported ionic liquid membranes*

Carla Daniel  
Faculdade de Ciências e Tecnologia, UNL  
[CeFEMA Seminar]

**June 22, 2016**

*Chaos of chiral condensate*

Keiju Murata  
Keio University  
[CENTRA Seminar]

**June 23, 2016**

*Gravitational scalar-tensor theory*

Atsushi Naruko  
Tokyo Tech  
[CENTRA Seminar]

**July 7, 2016**

*Extreme mass-ratio inspirals into a black hole*

Thomas Osburn  
Emory University  
[CENTRA Seminar]

**July 13, 2016**

*Unraveling the nature of the invisible neutrino - Latest results from the  $NO\alpha$  experiment*

Alexandre Sousa  
University of Cincinnati  
[CENTRA Seminar]

**July 29, 2016**

*Stability properties of black hole interiors and Strong Cosmic Censorship*

Anne Franzen  
CAMGSD  
[CENTRA Seminar]

**October 6, 2016**

*Dynamics of compact binary systems at the fourth post-Newtonian order*

Laura Bernard  
CENTRA  
[CENTRA Seminar]

**October 6, 2016**

*Playing with CP-half-odd scalars*

Igor Ivanov  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**October 13, 2016**

*Recent results on the AdS instability problem*

Juan Pedraza  
Amsterdam Univ.  
[CENTRA Seminar]

**October 13, 2016**

*2HDM with extra  $U(1)H$  gauge symmetry*

Diego Cogollo  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**October 18, 2016**

*Phonons, photons and electrons in 2D materials and layered structures*

Bruno Amorim  
CeFEMA  
[CeFEMA Seminar]

**October 20, 2016**

*Magnetic field: the puppeteer behind "short time" stellar dynamics*

Dário Passos  
CENTRA  
[CENTRA Seminar]

**October 20, 2016**

*Light quark masses and mixing from vector-like quarks*

Miguel Nebot  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**October 26, 2016**

*MOSAIC, the multi-object spectrograph of the European Extremely Large Telescope (E-ELT)*

Myriam Rodrigues  
Institute d'Astrophysique, Paris  
[CENTRA Seminar]

**October 27, 2016**

*The spacetime around neutron stars and astrophysical observables*

Georgios Pappas  
CENTRA, IST  
[CENTRA Seminar]

**November 2, 2016**

*Magnetic and structural properties of low dimensional oxy-borates*  
Mucio Continentino  
Centro Brasileiro de Pesquisas Físicas,  
Rio de Janeiro  
[CeFEMA Seminar]

**November 3, 2016**

*Time-dependent holographic spectral function*  
Lata Kh Joshi  
Indian Institute of Technology, Bombay  
[CENTRA Seminar]

**November 3, 2016**

*Weak and Higgs basis invariants, a powerful tool*  
Gui Rebelo  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**November 10, 2016**

*3D simulation of spindle gravitational collapse of a collisionless particle system*  
Chul-Moon Yoo  
Nagoya University  
[CENTRA Seminar]

**November 17, 2016**

*Theia: faint objects in motion, the new Astrometry frontier*  
Alberto Krone Martins  
SIM - CENTRA  
[CENTRA Seminar]

**November 17, 2016**

*Predictive textures for the neutrino mass matrix*  
Luis Cebola  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**November 18, 2016**

*Nonlinear quadratic response in three-fold symmetric crystals*  
Fábio Hipólito  
NGS and Graphene Research Centre  
[CeFEMA Seminar]

**November 21, 2016**

*Vertical transport in graphene/*h*-BN/graphene structures*  
Bruno Amorim  
CeFEMA  
[CeFEMA Seminar]

**November 24, 2016**

*Maybe black holes aren't so monstrous as we thought*  
Diego Rubiera-Garcia  
Institute of Astrophysics and Space Sciences  
[CENTRA Seminar]

**November 30, 2016**

*Quantum dragons: Fictional? Factual? Physics? Phantasy?*  
Mark A. Novotny  
Mississippi State University  
[CeFEMA Seminar]

**November 30, 2016**

*Consistency and predictivity of the EFT of LSS*  
Guido D'Amico  
CERN  
[CENTRA Seminar]

**December 2, 2016**

*Energy and effluent treatment technology development at SALAMC, South Africa*  
Vladimir Linkov  
University of the Western Cape  
[CeFEMA Seminar]

**December 5, 2016**

*Critical behavior of the domain wall collapse*  
Taishi Ikeda  
Nagoya University, Japan  
[CENTRA Seminar]

**December 7, 2016**

*Mass ladder operators from spacetime conformal symmetry*  
Masashi Kimura  
CENTRA  
[CENTRA Seminar]

**December 9, 2016**

*Plasma non-equilibrium at work: key to success of energy technologies?*  
Richard van de Sanden,  
DIFFER, The Netherlands  
[IPFN Seminar]

**December 13, 2016**

*Absorption, plasmons, and superlensing in two-dimensional*  
Tobias Stauber  
ICMM - CSIC  
[CeFEMA Seminar]

**December 13, 2016**

*Black hole horizon is a nest of chaos*  
Norihiro Tanahashi  
Osaka University  
[CENTRA Seminar]

**December 14, 2016**

*Field-theoretic simulations of cosmic strings*  
Takashi Hiramatsu  
Rikkyo University  
[CENTRA Seminar]

**December 15, 2016**

*Dynamic spacetimes in Einstein-Maxwell-dilaton theory and cosmic censorship*  
Jorge Rocha  
Barcelona  
[CENTRA Seminar]

**February 2, 2017**

*Near-horizon expansion of second-order black hole perturbations*  
Kei Yamada  
Kyoto University  
[CENTRA Seminar]

**February 9, 2017**

*Analytical self-force and extreme mass ratio inspirals*  
Chris Kavanagh  
IHES, Paris  
[CENTRA Seminar]

**February 21, 2017**

*Determination of the theta<sup>23</sup> octant in the Deep Underground Neutrino Experiment*  
Sampsa Vihonen  
University of Jyväskylä, Finland  
[CFTP Seminar]

**February 23, 2017**

*Instability of microstate geometries*  
Joe Keir  
University of Cambridge  
[CENTRA Seminar]

**March 9, 2017**

*Strongly interacting matter equation of state and its application to compact astrophysical objects*  
Violetta Sagun  
CENTRA, Bogolyubov Institute for Theoretical Physics  
[CENTRA Seminar]

**March 16, 2017**

*On the coalescence of non-standard compact objects*  
Carlos Palenzuela  
University of the Balearic Islands  
[CENTRA Seminar]

**March 21, 2017**

*The gravitational universe: a new vision of the cosmos*  
Shane L. Larson  
Northwestern University and Adler Planetarium, Chicago  
[CENTRA Seminar]

**March 21, 2017**

*Oddities in generalized CP*  
Enrique Jimenez  
University of Colima, Mexico  
[CFTP Seminar]

**March 22, 2017**

*Observing the Early Universe*  
Paolo de Bernardis  
University of Roma “La Sapienza”  
[CENTRA Seminar]

**March 23, 2017**

*Modeling of the neutron star interiors within the equation of state fitted to properties of hadron and nuclear matter*  
Oleksii Ivanytskyi  
Bogolyubov Institute for Theoretical Physics, Kyiv, Ukraine  
[CENTRA Seminar]

**March 28, 2017**

*Hybridized multiband superconductors*  
Tharnier Oliveira  
CSRC and CeFEMA  
[CeFEMA Seminar]

**March 29, 2017**

*Quantum field theory in curved spacetime*  
Gonçalo Quinta  
CENTRA, Instituto Superior Técnico  
[CENTRA Seminar]

**March 30, 2017**

*Chaotic lensing around boson stars and Kerr black holes with scalar hair*  
Pedro Cunha  
Universidade de Aveiro, CENTRA  
[CENTRA Seminar]

**April 5, 2017**

*Fermion condensation in strongly interacting Fermi liquids*  
Vladimir Stephanovich  
Opole University  
[CeFEMA Seminar]

**April 11, 2017**

*Toward a simple scheme of predicting neutrino CP violation*  
Morimitsu Tanimoto  
KITP and Niigata University  
[CFTP Seminar]

**April 13, 2017**

*Multimessenger astrophysics with binary neutron star mergers*  
Riccardo Giolfi  
INAF, Osservatorio Astronomico di Padova  
[CENTRA Seminar]

**April 20, 2017**

*NNLO QCD predictions for single jet inclusive production at the LHC*  
João Pires  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**April 27, 2017**

*Nonstandard entropic approaches in black hole thermodynamics and cosmology*  
Viktor Czimmer  
CENTRA  
[CENTRA Seminar]

**May 2, 2017**

*Superradiant effect in AdS charged hairy black holes*  
Lefteris Papantonopoulos  
National Technical University of Athens  
[CENTRA Seminar]

**May 4, 2017**

*Kerr black holes with bosonic hair: theory and phenomenology*  
Carlos Herdeiro  
University of Aveiro  
[CENTRA Seminar]

**May 10, 2017**

*Molecular engineering of low-dimensional systems: from 1D conductors to spin-ladders and 2D metals and superconductors*  
Manuel Almeida  
C2TN, IST  
[CeFEMA Seminar]

**May 11, 2017**

*Inflation: Is the simplest single-field scenario the best model?*  
Christian Byrnes  
University of Sussex  
[CENTRA Seminar]

**May 18, 2017**

*EFTCAMB: Exploring large scale structure observables with viable dark energy and modified gravity models*  
Noemi Frusciante  
Instituto de Astrofísica e Ciências do Espaço, Universidade de Lisboa  
[CENTRA Seminar]

**May 25, 2017**

*Exorcising Ostrogradsky ghost: Construction of healthy higher-derivative theories*  
Hayato Motohashi  
IFIC, University of Valencia  
[CENTRA Seminar]

**May 26, 2017**

*Improving gravitational wave detections: from noise characterization to data analysis*  
Filipe Da Silva Costa  
University of Florida  
[CENTRA Seminar]

**May 31, 2017**

*Status of Hořava gravity: theory, black holes and cosmology*  
Daniele Vernieri  
CENTRA, Instituto Superior Técnico  
[CENTRA Seminar]

**June 1, 2017**

*Dark couplings*  
Nelson Nunes  
Universidade de Lisboa  
[CENTRA Seminar]

**June 8, 2017**

*Astrometric detection of gravitational waves with Gaia*  
Chris Moore  
Cambridge  
[CENTRA Seminar]

**June 8, 2017**

*New physics in B-meson decays*  
Avelino Vicente  
IFIC, Valencia  
[CFTP Seminar]

**June 16, 2017**

*Chiral primordial gravitational waves from an axionic inflation*  
Ippei Obata  
Kyoto Univ  
[CENTRA Seminar]

**June 22, 2017**

*Piecewise linear quantum gravity*  
Aleksandar Miković  
Universidade Lusófona e GFM-UL  
[CENTRA Seminar]

**June 22, 2017**

*QCD bound states with functional methods*  
Gernot Eichmann  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**June 23, 2017**

*The static geometry of a black star*  
Raúl Carballo  
University of Cape Town  
[CENTRA Seminar]

**June 28, 2017**

*Probing topology by “heating”*  
Nathan Goldman  
FNRS Belgium and Université Libre de Bruxelles, Belgium  
[CeFEMA Seminar]

**June 29, 2017**

*Localized 4-Sigma and 5-Sigma dijet mass excesses in ALEPH LEP2 four-jet events*  
Jennifer Kile  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**July 3, 2017**

*Magnetic entanglement in spin-1/2 XY chain*  
Somayyeh Nemati  
Center of Physics of the University of Minho and University of Porto  
[CeFEMA Seminar]

**July 6, 2017**

*Young brown dwarfs: testing star formation across environments*  
Koraljka Muzic  
CENTRA  
[CENTRA Seminar]

**July 11, 2017**

*Very special relativity*  
Jorge Alfaro  
Pontificia Universidad Católica de Chile, Santiago  
[CFTP Seminar]

**July 27, 2017**

*Diagrammatic methods for strongly-coupled lattice QCD at finite temperature and density*  
Hélvio Vairinhos  
ETH Zurich  
[CENTRA Seminar]

**September 19, 2017**

*Long-range topological superconductivity*  
Oscar Viyuela  
MIT  
[CeFEMA Seminar]

**September 21, 2017**

*Dynamical localization and the effects of aperiodicity in Floquet systems*  
Tilen Cadez  
Beijing CSRC  
[CeFEMA Seminar]

**September 21, 2017**

*Rotating BTZ black hole assuming running couplings*  
Angel Rincon  
Pontificia Universidad Católica de Chile  
[CENTRA Seminar]

**September 28, 2017**

*Neutron star asteroseismology*  
Pablo Cerdá-Durán  
University of Valencia  
[CENTRA Seminar]

**September 28, 2017**

*Comparison of two Minkowski-space approaches to heavy quarkonia*  
Sofia Leitão  
CFTP, Instituto Superior Técnico  
[CFTP Seminar]

**October 2, 2017**

*Geometrical clusterization in spin, nuclear and gauge systems*  
Oleksii Ivanytskyi  
Bogolyubov Institute for Theoretical Physics, Kiev  
[CFTP Seminar]

**October 12, 2017**

*Electrodynamical effects of inflationary gravitons*  
 Drazen Glavan  
 University of Warsaw  
 [CENTRA Seminar]

**October 12, 2017**

*Fermion masses and Yukawa textures in a 3HDM limit of the pSHUT model*  
 Antonio Morais  
 Universidade de Aveiro  
 [CFTP Seminar]

**October 19, 2017**

*Primordial black holes*  
 Tomohiro Harada  
 Rikkyo University  
 [CENTRA Seminar]

**October 19, 2017**

*Three viable models of SM fermion mass generation*  
 Antonio Carcamo-Hernandez  
 Universidad Federico Santa Maria  
 [CFTP Seminar]

**October 26, 2017**

*Holographic collisions, phase transitions and inhomogeneous horizons*  
 Miguel Zilhao  
 CENTRA, IST  
 [CENTRA Seminar]

**October 26, 2017**

*Neutrino oscillations in quantum mechanics and quantum field theory*  
 Evgeny Akhmedov  
 Max Planck Institute f. Kernphysik, Heidelberg  
 [CFTP Seminar]

**November 2, 2017**

*Supersymmetry breaking and singularity in dynamical brane backgrounds*  
 Kunihito Uzawa  
 Kwansai Gakuin University  
 [CENTRA Seminar]

**November 9, 2017**

*Extinction studies towards type Ia supernovae*  
 Santiago Gonzalez Gaitan  
 CENTRA, IST  
 [CENTRA Seminar]

**November 10, 2017**

*Industry 4.0 and making new science observations accessible*  
 António Amorim  
 CENTRA/FCUL  
 [CENTRA Seminar]

**November 16, 2017**

*Exotic compact objects in the strong field regime*  
 Andrea Maselli  
 CENTRA, IST  
 [CENTRA Seminar]

**November 16, 2017**

*Spectral functions from the functional renormalization group*  
 Jochen Wambach  
 ECT, Trento  
 [CFTP Seminar]

**November 23, 2017**

*The interplay between source modeling and parameter estimation for gravitational waves from compact binaries*  
 Michael Puerrer  
 AEI Potsdam-Golm  
 [CENTRA Seminar]

**November 23, 2017**

*Light exotic Higgs bosons at the LHC*  
 Roberto Vega-Morales  
 Universidad de Granada  
 [CFTP Seminar]

**November 28, 2017**

*Amazonian contribution to the invention of the dirigible balloon: the history of Julio Cezar Ribeiro de Souza*  
 Luis Carlos Crispino  
 Universidade Federal de Belém do Pará  
 [CENTRA Seminar]

**November 30, 2017**

*Modelling binary systems of inspiraling compact objects in the post-Newtonian approximation framework*  
 Guillaume Faye  
 Institut d'Astrophysique de Paris  
 [CENTRA Seminar]

**December 5 & 7, 2017**

*Harnessing the Sun's energy - plasma magnetic control in tokamaks*  
 Gianmaria De Tommasi  
 University of Naples Federico II  
 [IPFN Seminar]

**December 6, 2017**

*JINR neutrino program*  
 Dmitry Naumov  
 JINR, Dubna  
 [CFTP Seminar]

**December 7, 2017**

*Long-lived inverse chirp signals from core-collapse in massive scalar-tensor gravity*  
 Ulrich Sperhake  
 The University of Cambridge  
 [CENTRA Seminar]

**December 14, 2017**

*Science with Gaia*  
 André Moitinho  
 CENTRA, IST  
 [CENTRA Seminar]

**December 14, 2017**

*Towards a standard model with massive neutrinos*  
 Pilar Hernandez  
 IFIC, Valencia  
 [CFTP Seminar]

**December 15, 2017**

*Stellar clusters: laboratories for understanding how stars form and evolve*  
 Koraljka Muzic  
 CENTRA/FCUL  
 [CENTRA Seminar]

**December 20, 2017**

*Anomalies in b to s transitions, or: how  $R_{K^*}$  stole Easter*  
 Antonio Coutinho  
 Roma 3  
 [CFTP Seminar]

**December 21, 2017**

*Dual foliation formulations of general relativity (or how i learned to stop worrying and love coordinates)*  
 David Hilditch  
 CENTRA, IST  
 [CENTRA Seminar]

**December 21, 2017**

*Tetraquarks in a Bethe-Salpeter Dyson-Schwinger approach*  
 Paul Wallbott  
 Universitaet Giessen  
 [CFTP Seminar]

# CONFERENCES & WORKSHOPS

**March 5, 2016**

CENTRA meeting  
 IST, Lisboa  
 [CENTRA]

**March 6-12, 2016**

Excited QCD 2016  
 Hotel Ever, Costa da Caparica  
 [CFTP]

**March 8-11, 2016**

EUROfusion joint working session on integrated plasma-wall modelling  
 IST, Lisboa  
 [IPFN]

**April 11-12, 2016**

EUROfusion general assembly  
 IST, Lisboa  
 [IPFN]

**May 23-27, 2016**

Initial stages 2016 - 3rd international conference on the initial stages in high-energy nuclear collisions  
IST, Lisboa  
[CENTRA]

**June 21-23, 2016**

EUROfusion goal oriented training on project & quality management  
IST, Lisboa

**December 12, 2016**

CeFEMA workshop  
IST, Lisboa  
[CeFEMA]

**March 25, 2017**

CENTRA meeting  
Rectory of the University of Lisboa  
[CENTRA]

**July 9-14, 2017**

XXXIII ICPiG - International conference on phenomena in ionized gases  
Estoril Congress Centre  
[IPFN]

**July 10, 2017**

Jorge Fest: Workshop in honour of Jorge Romão  
IST, Lisboa  
[CFTP]

**September 5-8, 2017**

ExHILP 2017 - Extremely high-intensity laser physics  
IST, Lisboa  
[IPFN]

**September 6-7, 2017**

Emílio Ribeiro conference on quantum chromodynamics and other matters  
Institute for Interdisciplinary Investigation, University of Lisboa  
[CeFEMA, CENTRA, IST/DF]

**September 6-9, 2017**

Workshop on multi-Higgs models  
IST, Lisboa  
[CFTP]

**November 20-24, 2017**

2nd EUPRAXIA Yearly Meeting  
IST, Lisboa  
[IPFN]

**November 24, 2017**

Black holes all over - A symposium celebrating José Sande Lemos' 60th birthday  
IST, Lisboa  
[CENTRA]



*Group photo of the participants in the 2017 EuPRAXIA Yearly Meeting.  
Image by EuPRAXIA/IPFN.*

# SCHOOLS

**February 2-4, 2016**

Lisbon mini-school on particle and astroparticle physics  
Hotel Ever, Costa da Caparica  
[CFTP + LIP]

**June 20-23, 2016**

Workshop on parallel computing for fusion  
IST  
[IPFN]

**July 10-15, 2016**

Plasmasurf 2016  
Oeiras  
[IPFN]

**September 1-6, 2016**

8th School on astrophysics and gravitation  
Physics Department, IST, Lisboa  
[CENTRA]

**November 12-18, 2016**

ATHENS course on plasma science and technology 2016  
IST, Lisboa  
[IPFN]

**February 6-8, 2017**

Lisbon mini-school on particle and astroparticle physics  
Hotel do Mar, Sesimbra  
[CFTP + LIP]

**February 21, 2017**

Theoretical condensed matter physics  
IST, Lisboa  
[CeFEMA]

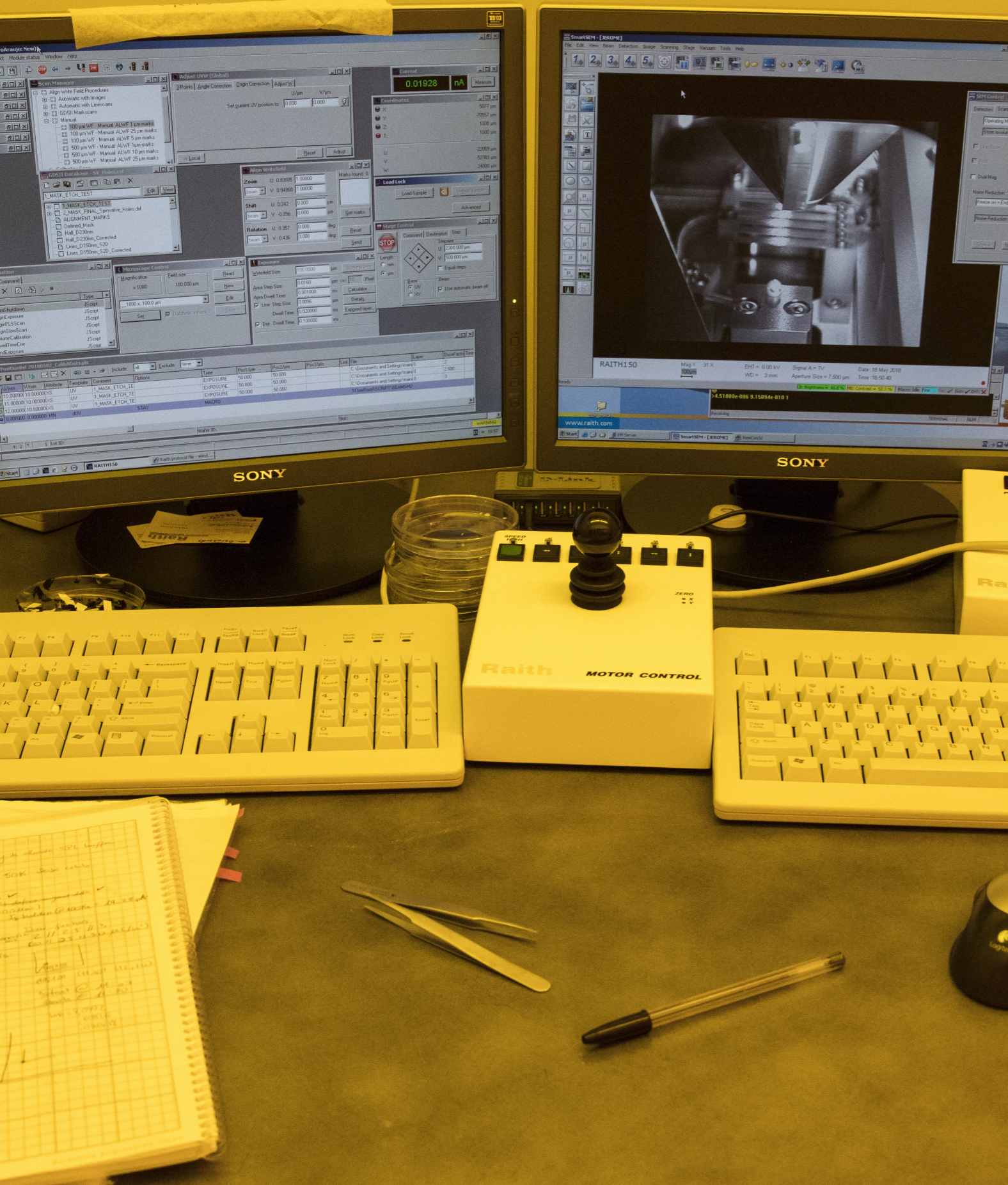
**July 3-7, 2017**

Plasmasurf 2017  
Almada  
[IPFN]

**November 11-17, 2017**

ATHENS course on plasma science and technology 2017  
IST, Lisboa  
[IPFN]





# SCIENTIFIC PUBLICATIONS

Feasibility study of a control system based on PLC and EPICS for the ESTHER combustion gas injection; D. E. Aguiam; B. B. de Carvalho; M. L. da Silva; Experiment@ International Conference (exp.at'15), (2015) 3rd; doi: 10.1109/EXPAT.2015.7463207

Chiral-symmetry breaking and confinement in Minkowski space. AIP Conference; L. Biernat, M. T. Peña, J. Ribeiro, A. Stadler, & F. Gross. (2016); Proceedings. 1701. 040003; doi: 10.1063/1.4938620.

Kinetics and spectroscopy of low temperature plasmas; J. Loureiro, J. Amorim; Book by Springer, ISBN 978-3-319-09 253-9; doi: 10.1007/978-3-319-09253-9

Measurement of transverse momentum relative to dijet systems in PbPb and pp collisions at  $\sqrt{s_{NN}}=2.76$  TeV; Journal of High Energy Physics; V. Khachatryan et al.; Journal of High Energy Physics January (2016) 6; doi: 10.1007/JHEP01(2016)006

Search for a very light NMSSM Higgs boson produced in decays of the 125 GeV scalar boson and decaying into tau leptons in pp collisions at root 8=TeV; V. Khachatryan et al.; Journal of High Energy Physics, January (2016) 79; doi: 10.1007/JHEP01(2016)079

Observation of top quark pairs produced in association with a vector boson in pp collisions at  $\sqrt{s}=8$  TeV; Journal of High Energy Physics; V. Khachatryan et al.; Journal of High Energy Physics January (2016) 96; doi: 10.1007/JHEP01(2016)096

Non-Abelian family symmetries as portals to dark matter; I. de Medeiros Varzielas, O. Fischer; Journal of High Energy Physics, January (2016) 2016:160; doi: 10.1007/JHEP01(2016)160

Search for the production of an excited bottom quark decaying to tW in proton- proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Journal of High Energy Physics. (2016) 2016:166; doi: 10.1007/JHEP01(2016)166

*Opposite page: Image by Débora Rodrigues/Técnico Lisboa.*

- Multiboson production in  $W'$  decays; J. A. Aguilar-Saavedra, F. R. Joaquim; *Journal of High Energy Physics*, January (2016)183; doi: 10.1007/JHEP01(2016)183
- Search for  $W^{\pm} \rightarrow tb$  in proton-proton collisions at  $\sqrt{s}=8$  TeV; *Journal of High Energy Physics*; V. Khachatryan et al.; *Journal of High Energy Physics*, February (2016) 122; doi: 10.1007/JHEP02(2016)122
- Search for a massive resonance decaying into a Higgs boson and a  $W$  or  $Z$  boson in hadronic final states in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, February (2016) 145; doi: 10.1007/JHEP02(2016)145
- Spontaneous symmetry breaking in the  $S_3$ -symmetric scalar sector; D. Emmanuel-Costa, O. M. Ogreid, P. Osland, M. N. Rebelo; *Journal of High Energy Physics*, February (2016) 2016:154; doi: 10.1007/JHEP02(2016)154
- Correlations between jets and charged articles in PbPb and pp collisions at  $\sqrt{s}(NN)=2.76$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, February (2016) 156; doi: 10.1007/JHEP02(2016)156
- Predictions for boson-jet observables and fragmentation function ratios from a hybrid strong/weak coupling model for jet quenching; J. Casado-Solana, D. C. Gulhan, J. G. Milhano, D. Pablos, K. Rajagopal; *Journal of High Energy Physics*, March (2016), 2016:53; doi: 10.1007/JHEP03(2016)053
- Search for excited leptons in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, March (2016) 125; doi: 10.1007/JHEP03(2016)125
- Measurement of differential and integrated fiducial cross sections for Higgs boson production in the four-lepton decay channel in pp collisions at  $\sqrt{s}=7$  and 8 TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, April (2016) 5; doi: 10.1007/JHEP04(2016)005
- Comparison of the  $Z/\gamma^* +$  jets to  $\gamma +$  jets cross sections in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, April (2016) 10; doi: 10.1007/JHEP04(2016)010
- Search for anomalous single top quark production in association with a photon in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, April (2016) 35; doi: 10.1007/JHEP04(2016)035
- Measurement of top quark polarisation in t-channel single top quark production; V. Khachatryan et al.; *Journal of High Energy Physics*, April (2016) 73; doi: 10.1007/JHEP04(2016)073
- Search for heavy Majorana neutrinos in  $e^{\pm}e^{\pm} +$  jets and  $e^{\pm}\mu^{\pm} +$  jets events in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, April (2016) 2016:169; doi: 10.1007/JHEP04(2016)169
- Search for the associated production of a Higgs boson with a single top quark in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, June (2016) 2016:177; doi: 10.1007/JHEP06(2016)177
- Scotogenic model for co-bimaximal mixing; P. M. Ferreira, W. Grimus, D. Jurčiukonis L. Lavoura; *Journal of High Energy Physics*, July (2016) 2016: 10; doi: 10.1007/JHEP07(2016)010
- Search for direct pair production of scalar top quarks in the single- and dilepton channels in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, July (2016) 2016:27; doi: 10.1007/JHEP07(2016)027
- Measurement of the  $t\bar{t}$  production cross section in the  $e\mu$  channel in proton-proton collisions at  $\sqrt{s}=7$  and 8 TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, August (2016) 2016:29; doi: 10.1007/JHEP08(2016)029
- Measurements of the Higgs boson production and decay rates and constraints on its couplings from a combined ATLAS and CMS analysis of the LHC pp collision data at  $\sqrt{s}=7$  and 8 TeV; G. Aad; *Journal of High Energy Physics*, August (2016) 2016:45; doi: 10.1007/JHEP08(2016)045
- Evidence for exclusive  $\gamma\gamma \rightarrow W + W -$  production and constraints on anomalous quartic gauge couplings in pp collisions at  $\sqrt{s}=7$  and 8 TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, August (2016) 2016:119; doi: 10.1007/JHEP08(2016)119
- Search for supersymmetry in pp collisions at  $\sqrt{s}=13$  TeV in the single-lepton final state using the sum of masses of large-radius jets; V. Khachatryan et al.; *Journal of High Energy Physics*, August (2016) 2016:122; doi: 10.1007/JHEP08(2016)122
- Azimuthal decorrelation of jets widely separated in rapidity in pp collisions at  $\sqrt{s}=7$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, August (2016) 2016:139; doi: 10.1007/JHEP08(2016)139
- Erratum to: Spontaneous symmetry breaking in the  $S_3$ -symmetric scalar sector; D. Emmanuel-Costa, O. M. Ogreid, P. Osland, M. N. Rebelo; *Journal of High Energy Physics*, August (2016) 2016:169; doi: 10.1007/JHEP08(2016)169
- Search for s channel single top quark production in pp collisions at  $\sqrt{s}=7$  and 8 TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, September (2016) 2016:27; doi: 10.1007/JHEP09(2016)027
- Vanadium pentoxide alloyed with graphite for thin-film thermal sensors; V. Khachatryan et al.; *Journal of High Energy Physics*, September (2016) 2016:51; doi: 10.1007/JHEP09(2016)051
- Erratum to: Search for direct pair production of scalar top quarks in the single- and dilepton channels in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, September (2016) 2016:56; doi: 10.1007/JHEP09(2016)056
- Search for new physics with the  $M_{T2}$  variable in all-jets final states produced in pp collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, October (2016) 2016:6; doi: 10.1007/JHEP10(2016)006
- Phenomenological MSSM interpretation of CMS searches in pp collisions at  $\sqrt{s}=7$  and 8 TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, October (2016) 2016:129; doi: 10.1007/JHEP10(2016)129
- Decomposing transverse momentum balance contributions for quenched jets in PbPb collisions at  $\sqrt{s}(NN)=2.76$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, November (2016) 2016:55; doi: 10.1007/JHEP11(2016)055
- Erratum to: Search for third-generation scalar leptoquarks in the  $\tau\tau$  channel in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, November (2016) 2016:56; doi: 10.1007/JHEP11(2016)056
- Measurement of electroweak production of a  $W$  boson and two forward jets in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, November (2016) 2016:147; doi: 10.1007/JHEP11(2016)147
- Search for new physics in final states with two opposite-sign, same-flavor leptons, jets, and missing transverse momentum in pp collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, December (2016) 2016:13; doi: 10.1007/JHEP12(2016)013
- Search for dark matter in proton-proton collisions at 8 TeV with missing transverse momentum and vector boson tagged jets; V. Khachatryan et al.; *Journal of High Energy Physics*, December (2016) 2016:83; doi: 10.1007/JHEP12(2016)083
- Search for dark matter particles in proton-proton collisions at  $\sqrt{s}=8$  TeV using the razor variables; V. Khachatryan et al.; *Journal of High Energy Physics*, December (2016) 2016:88; doi: 10.1007/JHEP12(2016)088
- Vanadium pentoxide alloyed with graphite for thin-film thermal sensors; V. Khachatryan et al.; *Journal of High Energy Physics*, December (2016) 2016:123; doi: 10.1007/JHEP12(2016)123
- Covariant spectator theory and hadron structure; M. T. Peña, S. Leitão, E. P. Biernat, A. Stadler, J. E. Ribeiro, F. Gross; *Few-Body Systems*, June (2016) Volume 57, Issue 6, pp 467-472; doi: 10.1007/s00601-016-1113-1



(2016) Pages 237-241; doi: 10.1016/j.physletb.2015.11.076

Search for exotic decays of a Higgs boson into undetectable particles and one or more photons; V. Khachatryan et al.; Physics Letters B, Volume 753, 10 February (2016) Pages 363-388; doi: 10.1016/j.physletb.2015.12.017

Angular analysis of the decay  $B-0 \rightarrow K^*(0) \mu^+ \mu^-$  from pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 753, 10 February (2016) Pages 424-448; doi: 10.1016/j.physletb.2015.12.020

Longitudinal double spin asymmetries in single hadron quasi-real photoproduction at high  $p_T$ ; C. Adolph et al.; Physics Letters B, Volume 753, 10 February (2016), Pages 573-579; doi: 10.1016/j.physletb.2015.12.035

Search for a Higgs boson decaying into  $\gamma^* \gamma \rightarrow l l \gamma$  with low dilepton mass in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 753, 10 February 2016 Pages 341-362; doi: 10.1016/j.physletb.2015.12.039

Interplay among transversity induced asymmetries in hadron lepton production; C. Adolph et al.; Physics Letters B, Volume 753, 10 February (2016), Pages 406-411; doi: 10.1016/j.physletb.2015.12.042

Transverse momentum spectra of inclusive b jets in pPb collisions at  $\sqrt{s}(NN)=5.02$  TeV; V. Khachatryan, A. M. Sirunyan, A. Tumasyan; Physics Letters B, Volume 754, 10 March (2016) Pages 59-80; doi: 10.1016/j.physletb.2016.01.010

Searches for a heavy scalar boson H decaying to a pair of 125 GeV Higgs bosons hh or for a heavy pseudoscalar boson A decaying to Zh, in the final states with  $h \rightarrow \tau\tau$ ; V. Khachatryan et al.; Physics Letters B, Volume 755, 10 April (2016) Pages 217-244; doi: 10.1016/j.physletb.2016.01.056

Search for new phenomena in monophoton final states in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 755, 10 April (2016) Pages 102-124; doi: 10.1016/j.physletb.2016.01.057

Search for  $W^+$  decaying to tau lepton and neutrino in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 755, 10 April (2016) Pages 196-216; doi: 10.1016/j.physletb.2016.02.002

Measurement of the ratio  $B(B_s^0 \rightarrow J/\psi f^0(980))/B(B_s^0 \rightarrow J/\psi \phi(1020))$  in pp collisions at  $\sqrt{s}=7$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 756, 10 May (2016) Pages 84-102; doi: 10.1016/j.physletb.2016.02.047

Search for supersymmetry in events with a photon, a lepton, and missing transverse momentum in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 757, 10 June (2016) Pages 6-31; doi: 10.1016/j.physletb.2016.03.039

Measurement of the CP-violating weak phase  $\phi(s)$  and the decay width difference  $\Delta\Gamma(s)$  using the  $B_s^0 \rightarrow J/\psi \phi(1020)$  decay channel in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 757, 10 June (2016) Pages 97-120; doi: 10.1016/j.physletb.2016.03.046

Inclusive and differential measurements of the  $t(\bar{t})$  charge asymmetry in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 757, 10 June (2016) Pages 154-179; doi: 10.1016/j.physletb.2016.03.060

Precision study of the  $\eta \rightarrow \mu^+ \mu^- \gamma$  and  $\omega \rightarrow \mu^+ \mu^- \pi^0$  electromagnetic transition form-factors and of the  $\rho \rightarrow \mu^+ \mu^-$  line shape in NA60; R. Arnaldi et al.; Physics Letters B, Volume 757, 10 June (2016) Pages 437-444; doi: 10.1016/j.physletb.2016.04.013

Charged-particle distributions in  $\sqrt{s}=13$  TeV pp interactions measured with the ATLAS detector at the LHC; G. Aad et al.; Physics Letters B, Volume 758, 10 July (2016) Pages 67-88; doi: 10.1016/j.physletb.2016.04.050

Search for single production of a vector-like quark via a heavy gluon in the 4b final state with the ATLAS detector in pp collisions at  $\sqrt{s}=8$  TeV; G. Aad et al.; Physics Letters B, Volume 758, 10 July (2016) Pages 249-268; doi: 10.1016/j.physletb.2016.04.061

Search for supersymmetry in the multijet and missing transverse momentum final state in pp collisions at 13 TeV; V. Khachatryan et al.; Physics Letters B, Volume 758, 10 July (2016) Pages 152-180; doi: 10.1016/j.physletb.2016.05.002

Search for a low-mass pseudoscalar Higgs boson produced in association with a  $b(\bar{b})$  pair in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 758, 10 July (2016) Pages 296-320; doi: 10.1016/j.physletb.2016.05.003

Measurement of spin correlations in tt production using the matrix element method in the muon plus jets final state in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 758, 10 July (2016) Pages 321-346; doi: 10.1016/j.physletb.2016.05.005

Search for supersymmetry in events with soft leptons, low jet multiplicity, and missing transverse energy in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 759, 10 August (2016) Pages 9-35; doi: 10.1016/j.physletb.2016.05.033

Study of Z boson production in pPb collisions at  $\sqrt{s} NN=5.02$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 759, 10 August (2016) Pages 36-57; doi: 10.1016/j.physletb.2016.05.044

Search for neutral resonances decaying into a Z boson and a pair of b jets or  $\tau$  leptons; V. Khachatryan et al.; Physics Letters B, Volume 759, 10 August (2016) Pages 369-394; doi: 10.1016/j.physletb.2016.05.087

Search for supersymmetry in electroweak production with photons and large missing transverse energy in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 759, 10 August (2016) Pages 479-500; doi: 10.1016/j.physletb.2016.05.088

Combined search for anomalous pseudoscalar HVV couplings in  $VH(H \rightarrow b\bar{b})$  production and  $H \rightarrow VV$  decay; V. Khachatryan et al.; Physics Letters B, Volume 759, 10 August (2016) Pages 672-696; doi: 10.1016/j.physletb.2016.06.004

Measurement of the inelastic cross section in proton-lead collisions at  $\sqrt{s} NN=5.02$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 759, 10 August (2016) Pages 641-662; doi: 10.1016/j.physletb.2016.06.027

Search for R-parity violating decays of a top squark in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 760, 10 September (2016) Pages 178-201; doi: 10.1016/j.physletb.2016.06.039

Measurement of the  $Z\gamma \rightarrow \nu\nu\gamma$  production cross section in pp collisions at  $\sqrt{s}=8$  TeV and limits on anomalous  $ZZ\gamma$  and  $Z\gamma\gamma$  trilinear gauge boson couplings; V. Khachatryan et al.; Physics Letters B, Volume 760, 10 September (2016) Pages 448-468; doi: 10.1016/j.physletb.2016.06.080

Measurements of tt charge asymmetry using dilepton final states in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 760, 10 September (2016) Pages 365-386; doi: 10.1016/j.physletb.2016.07.006

$Y(\sqrt{s})$  polarizations versus particle multiplicity in pp collisions at  $s=7$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 761, 10 October (2016) Pages 31-52; doi: 10.1016/j.physletb.2016.07.065

Evidence for a mixed mass composition at the ‘ankle’ in the cosmic-ray spectrum; A. Aab et al.; Physics Letters B, Volume 762, 10 November (2016) Pages 288-295; doi: 10.1016/j.physletb.2016.09.039

Search for lepton flavour violating decays of the Higgs boson to  $e\tau$  and  $e\mu$  in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 763, 10 December (2016) Pages 472-500; doi: 10.1016/j.physletb.2016.09.062

Measurement of the W boson helicity fractions in the decays of top quark  $\sqrt{q}\bar{q}$  pairs to lepton+ jets final states produced in pp collisions at  $s=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 762, 10 November (2016) Pages 512-53; doi: 10.1016/j.physletb.2016.10.007

Measurement of the ZZ production cross section and  $Z \rightarrow l^+ l^- l^+ l^-$  branching fraction in

- pp collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Physics Letters B*, Volume 763, 10 December (2016) Pages 280-303; doi: 10.1016/j.physletb.2016.10.054
- Through precision straits to next standard model height; A. David, G. Passarino; *Reviews in Physics*, Volume 1, November (2016) Pages 13-28; doi: 10.1016/j.revip.2016.01.001
- Tunneling magnetoresistance sensors for high fidelity current waveforms monitoring; M. Dąbek et al.; *Sensors and Actuators A: Physical*, Volume 251, 1 November (2016) Pages 142-147; doi: 10.1016/j.sna.2016.10.001
- Label-free disposable immunosensor for detection of atrazine; N. Belkhamssa et al.; *Talanta*, Volume 146, 1 January (2016), Pages 430-434; doi: 10.1016/j.talanta.2015.09.015
- Disposable biosensor for detection of iron (III) in wines; F. Cámara-Martos et al.; *Talanta*, Volume 154, 1 July (2016), Pages 80-84; doi: 10.1016/j.talanta.2016.03.057
- Development of an electrochemical biosensor for alkylphenol detection; N. Belkhamssa et al.; *Talanta*, Volume 158, 1 September (2016), Pages 30-34; doi: 10.1016/j.talanta.2016.05.044
- Theory of the formation of a collisionless Weibel shock: Pair vs. electron/proton plasmas; A. Bret, A. Stockem Novo, R. Narayan, C. Ruyer, M. E. Dieckmann and L. O. Silva; *Laser and Particle Beams* Volume 34 Issue 2, June (2016) pp. 362-367; doi: 10.1017/S0263034616000197
- Black holes in Einstein-Gauß-Bonnet-dilaton theory; J. L. Blázquez-Salcedo et al.; *Proceedings of the International Astronomical Union*, Volume 12, Issue S324 (New Frontiers in Black Hole Astrophysics) September (2016) pp. 265-272; doi: 10.1017/S1743921316012965
- H NMR relaxometric study of molecular dynamics in a “de Vries” Liquid Crystal; P. J. Sebastião; *J. Phys. Chem. B*, (2016) 120 (20), pp 4706-4714; doi: 10.1021/acs.jpcc.6b02224
- Power Transfer to Gas Heating in Pure N-2 and in N<sub>2</sub>-O<sub>2</sub> Plasmas; C. D. Pintassilgo, and V. Guerra; *J. Phys. Chem. C*, (2016), 120 (38), pp 21184-21201; doi: 10.1021/acs.jpcc.6b05463
- Amplification and generation of ultra-intense twisted laser pulses via stimulated Raman scattering; J. Vieira, R. M. G. M. Trines, E. P. Alves, R. A. Fonseca, J. T. Mendonça, R. Bingham, P. Norreys & L. O. Silva; *Nature Communications* volume 7, Article number: 10371 (2016); doi: 10.1038/ncomms10371
- Confirmation of the topology of the Wendelstein 7-X magnetic field to better than 1:100,000; T. Sunn Pedersen et al.; *Nature Communications* volume 7, Article number: 13493 (2016); doi: 10.1038/ncomms13493
- Chirped pulse amplification in an extreme-ultraviolet free-electron laser; D. Gauthier et al.; *Nature Communications* volume 7, Article number: 13688 (2016); doi: 10.1038/ncomms13688
- A compact tunable polarized X-ray source based on laser-plasma helical undulators; J. Luo, M. Chen, M. Zeng, J. Vieira, L. L. Yu, S. M. Weng, L. O. Silva, D. A. Jaroszynski, Z. M. Sheng & J. Zhang; *Scientific Reports* volume 6, Article number: 29101 (2016); doi: 10.1038/srep29101
- Implementing a strategy for on-chip detection of cell-free DNA fragments using GMR sensors: A translational application in cancer diagnostics using ALU elements; T. M. Dias et al.; *Analytical Methods*, Issue 1, (2016) 8, 119-128; doi: 10.1039/C5AY01587A
- The effect of ionic Co presence on the structural, optical and photocatalytic properties of modified cobalt-titanate nanotubes; B. Barrocas, A. J. Silvestre, A. G. Rolo and O. C. Monteiro; *Physica Scripta* Chemical Physics (2016)18, 18081-18093; doi: 10.1039/C6CP01889K
- A microfluidic, dual-purpose sensor for in vitro detection of Enterobacteriaceae and biotinylated antibodies; G. Kokkinis, B. Plochberger, S. Cardoso, F. Keplinger and I. Giouroudi; *Lab Chip*, (2016),16, 1261-1271; doi: 10.1039/C6LC00008H
- Correction: A novel approach for detection and quantification of magnetic nanomarkers using a spin valve GMR-integrated microfluidic sensor; J. Devkota et al.; *RSC Adv.*, (2016),6, 31135-31135; doi: 10.1039/C6RA90029A
- Non-parametric determination of H and He interstellar fluxes from cosmic-ray data; A. Ghelfi, F. Barao, L. Derome and D. Maurin; *A&A* 591, A94 (2016); doi: 10.1051/0004-6361/201527852
- Nearby supernova host galaxies from the CALIFA survey; L. Galbany et al.; *Astronomy and Astrophysics*, Volume 591, July (2016) 25; doi: 10.1051/0004-6361/201528045
- Quarkonia and heavy-light mesons in a covariant quark model; S. Leitão, A. Stadler, M. T. Peña, E. P. Biernat; *EPJ Web of Conferences* 113, 03013 (2016); doi: 10.1051/epjconf/201611303013
- Quark model with chiral-symmetry breaking and confinement in the Covariant Spectator Theory; E. P. Biernat, M. T. Peña, J. E. Ribeiro, A. Stadler and F. Gross; *EPJ Web of Conferences* 113, 05004 (2016); doi: 10.1051/epjconf/201611305004
- Self-consistent description of deformed nuclei at the proton drip line; L. S. Ferreira, E. Maglione and P. Ring; *EPJ Web of Conferences* 117, 06004 (2016); doi: 10.1051/epjconf/201611706004
- Dynamic guidance of gliders in planetary atmospheres *Journal of Aerospace Engineering*; R. Dilão and J. Fonseca; *Journal of Aerospace Engineering*, Volume 29 Issue 1 - January (2016); doi: 10.1061/(ASCE)AS.1943-5525.0000499
- Chiral-symmetry breaking and confinement in Minkowski space; E. P. Biernat, M. T. Peña, J. E. Ribeiro, A. Stadler, F. Gross; *AIP Conf. Proc.* 1701, 040003 (2016); doi: 10.1063/1.4938620
- Profile measurements of the electron temperature on the ASDEX Upgrade, COMPASS, and ISTTOK tokamak using Thomson scattering, triple, and ball-pen probes; J. Adamek et al.; *Review of Scientific Instruments* Volume 87, Issue 4 (2016) 043510; doi: 10.1063/1.4945797
- The generation of magnetic fields by the Biermann battery and the interplay with the Weibel instability; K. M. Schoeffler, N. F. Loureiro, R. A. Fonseca and L. O. Silva; *Physics of Plasmas* 23, 056304 (2016); doi: 10.1063/1.4946017
- Laser absorption via quantum electrodynamics cascades in counter propagating laser pulses; T. Grismayer, M. Vranic, J. L. Martins, R. A. Fonseca and L. O. Silva; *Physics of Plasmas* 23, 056706 (2016); doi: 10.1063/1.4950841
- Magnetic field generation during intense laser channelling in underdense plasma; A. G. Smyth et al.; *Physics of Plasmas* 23, 063121 (2016); doi: 10.1063/1.4953547
- Extreme ultraviolet radiation emitted by helium microwave driven plasmas; S. Espinho, E. Felizardo, E. Tatarova, and L. L. Alves; *Journal of Applied Physics* 119, 243305 (2016); doi: 10.1063/1.4954850
- Progresses in proton radioactivity studies; L. S. Ferreira and E. Maglione; *AIP Conference Proceedings* 1753, 030011 (2016); doi: 10.1063/1.4955352
- Electrostatic propulsion device for aerodynamics applications; Victor H. Granados, Mario J. Pinheiro and Paulo A. Sá; *Physics of Plasmas* 23, 073514 (2016); doi: 10.1063/1.4958815
- Implementation of the new multichannel X-mode edge density profile reflectometer for the ICRF antenna on ASDEX Upgrade; D. E. Aguiam; *Review of Scientific Instruments* 87, 11E722 (2016); doi: 10.1063/1.4961558
- MHD marking using the MSE polarimeter optics in ILW JET plasmas; S. Reyes Cortes et al.; *Review of Scientific Instruments* 87, 11E556 (2016); doi: 10.1063/1.4962244
- Ion temperature and toroidal rotation in JET's low torque plasmas; J. Bernardo et al.; *Review of Scientific Instruments* 87, 11E557 (2016); doi: 10.1063/1.4963714
- Plasma turbulence in the scrape-off layer of the ISTTOK; R. Jorge, P. Ricci, F. D. Halpern, N. F. Loureiro, and C. Silva; *Physics of Plasmas* 23, 102511 (2016); doi: 10.1063/1.4964783
- Modeling of laser wakefield acceleration in lorentz boosted frame using a quasi-3D OSIRIS algorithm; P. Yu et al.; *AIP conference proceedings* 1777, 040020 (2016); doi: 10.1063/1.4965622

Positron plasma wakefield acceleration in a self-driven hollow channel; L. D. Amorim, J. Vieira, R. A. Fonseca, and L. O. Silva; AIP Conference Proceedings 1777, 070001 (2016); doi: 10.1063/1.4965644

Positron acceleration in non-linear beam driven plasma wakefields; J. Vieira, J. T. Mendonça, and L. O. Silva; AIP Conference Proceedings 1777, 070012 (2016); doi: 10.1063/1.4965655

H NMR relaxometry in the TGBA\* and TGBC\* phases; V. Domenici, A. Gradišek, T. Apih, V. Hamplová, V. Novotná & P. J. Sebastião; Journal Ferroelectrics, Volume 495, 2016 - Issue 1: Proceedings of the Fifteenth International Conference on Ferroelectric Liquid Crystals (2015); doi: 10.1080/00150193.2016.1136725

Improvement of permanent memory effect in PDLC films using TX-100 as an additive; M. C. Coutinho Varela da Silva, J. L. M. Figueirinhas & J. C. da Silva Barbosa Sotomayor; Liquid Crystals, Volume 43 -Issue 1 (2016) 124-130; doi: 10.1080/02678292.2015.1061713

Synthesis of liquid crystals based on hydrogen-bonding of 4-(Octyloxy)benzoic acid with 4-alkylbenzoic acid; M. D. Miranda, F. Vaca Chávez, T. M. R. Maria, M. E. S. Eusébio, P. J. Sebastião, P. Martín-Ramos, J. L. Figueirinhas & M. Ramos Silva;

Molecular crystals and liquid crystals, Volume 630 - Issue 1, (2016) 87-101; doi: 10.1080/15421406.2016.1146881

Quantitative shadowgraphy for laser-plasma interactions; A. Boné, N. Lemos, G. Figueira and J. M. Dias; Journal of Physics D: Applied Physics, Volume 49, Number 15, (2016) 155204; doi: 10.1088/0022-3727/49/15/155204

Microwave air plasmas in capillaries at low pressure I. Self-consistent modeling; P. Coche, V. Guerra and L. L. Alves; J. Phys. D: Appl. Phys. 49 235207 (2016); doi: 10.1088/0022-3727/49/23/235207

Electron-neutral scattering cross sections for CO<sub>2</sub>: A complete and consistent set and an assessment of dissociation; M. Grofulović, L. L. Alves and V. Guerra; J. Phys. D: Appl.

Phys. 49 395207 (2016); doi: 10.1088/0022-3727/49/39/395207

Microwave air plasmas in capillaries at low pressure II. Experimental investigation; G. D. Stancu, O. Leroy, P. Coche, K. Gadonna, V. Guerra, T. Minea and L. L. Alves; J. Phys. D: Appl. Phys. 49 435202 (2016); doi: 10.1088/0022-3727/49/43/435202

Overview of the JET results; F. Romanelli et al.; Nuclear Fusion, Volume 55, Number 10 (2016) 104001; doi: 10.1088/0029-5515/55/10/104001

Experimental investigation of geodesic acoustic modes on JET using Doppler backscattering; C. Silva et al.; Nuclear Fusion, Volume 56, Number 10 (2016) 56 106026; doi: 10.1088/0029-5515/56/10/106026

Sensitivity of alpha-particle-driven Alfvén eigenmodes to q-profile variation in ITER scenarios; P. Rodrigues et al.; Nuclear Fusion, Volume 56, Number 11 (2017) 112006; doi: 10.1088/0029-5515/56/11/112006

Multi-scale study of the isotope effect in IST-TOK; B. Liu, C. Silva, H. Figueiredo et al.; Nuclear Fusion, Volume 56, Number 5 (2017) 056012; doi: 10.1088/0029-5515/56/5/056012

Comprehensive evaluation of the linear stability of Alfvén eigenmodes driven by alpha particles in an ITER baseline scenario; A. C. A. Figueiredo et al.; Nuclear Fusion, Volume 56, Number 7 (2016) 076007; doi: 10.1088/0029-5515/56/7/076007

Hawking-Hayward quasi-local energy under conformal transformations; A.s Prain, V. Vitagliano, V. Faraoni, and M. Lapiere-Léonard; Classical and Quantum Gravity, Volume 33, Number 14 (2016) 145008; doi: 10.1088/0264-9381/33/14/145008

Testing the black hole ‘no-hair’ hypothesis; V. Cardoso and L. Gualtieri; Classical and Quantum Gravity, Volume 33, Number 17 (2016) 174001; doi: 10.1088/0264-9381/33/17/174001

Modelling radiation emission in the transition from the classical to the quantum regime; J. L. Martins, M. Vranic, T. Grismayer, J. Vieira, R. A. Fonseca and L. O. Silva; Plasma

Physics and Controlled Fusion, Volume 58, Number 1 (2016) 014035; doi: 10.1088/0741-3335/58/1/014035

Modelling the Ohmic L-mode ramp-down phase of JET hybrid pulses using JETTO with Bohm-gyro-Bohm transport; J. P. S. Bizarro et al.; Plasma Physics and Controlled Fusion, Volume 58, Number 10 (2016) 105010; doi: 10.1088/0741-3335/58/10/105010

Multi-machine scaling of the main SOL parallel heat flux width in tokamak limiter plasmas; J. Horacek et al.; Physics and Controlled Fusion, Volume 58, Number 7 (2016) 074005; doi: 10.1088/0741-3335/58/7/074005

Influence of long-scale length radial electric field components on zonal flow-like structures in the TJ-II stellarator; U. Losada et al.; Plasma Physics and Controlled Fusion, Volume 58, Number 8 (2016) 084005; doi: 10.1088/0741-3335/58/8/084005

Experimental demonstration of a collinear triple pulse grazing-incidence pumping scheme for a transient collisional pumped x-ray laser; S. Künzel et al.; J. Phys. B: At. Mol. Opt. Phys. 49 (2016) 215601; doi: 10.1088/0953-4075/49/21/215601

Zero energy modes in a superconductor with ferromagnetic adatom chains and quantum phase transitions; T. Čadež and P. D. Sacramento; J. Phys.: Condens. Matter 28 495703 (2016); doi: 10.1088/0953-8984/28/49/495703

SO(10) models with flavour symmetries: classification and examples; P. Ivanov and L. Lavourea; Journal of Physics G: Nuclear and Particle Physics, Volume 43, Number 10, 105005; doi: 10.1088/0954-3899/43/10/105005

Electromagnetic structure of few-nucleon ground states; L. E. Marcucci et al.; Journal of Physics G: Nuclear and Particle Physics, Volume 43, Number 2 (2016) 023002; doi: 10.1088/0954-3899/43/2/023002

Dynamical Monte Carlo methods for plasma-surface reactions; V. Guerra and D. Marinov; Plasma Sources Science and Technology, Volume 25, Number 4 (2016) 045001; doi: 10.1088/0963-0252/25/4/045001

Tuning the afterglow plasma composition in Ar/N-2/O-2 mixtures: characteristics of a flowing surface-wave microwave discharge system; K. Kutasi, C. Noël, T. Belmonte and V. Guerra; Plasma Sources Science and Technology, Volume 25, Number 5 (2016) 055014; doi: 10.1088/0963-0252/25/5/055014

Modeling plasma-based CO<sub>2</sub> conversion: crucial role of the dissociation cross section; A. Bogaerts, W. Wang, A. Berthelot and V. Guerra; Plasma Sources Science and Technology, Volume 25, Number 5 (2016) 055016; doi: 10.1088/0963-0252/25/5/055016

The distribution of work performed on a NIS junction; F. Zamani, P. Ribeiro and S. Kirchner; New Journal of Physics, Volume 18, February (2016) 023007; doi: 10.1088/1367-2630/18/2/023007

Electroweak breaking and neutrino mass: ‘invisible’ Higgs decays at the LHC (type II seesaw); C. Bonilla, J. C. Romão and J. W. F. Valle; New Journal of Physics, Volume 18, March (2016); doi: 10.1088/1367-2630/18/3/033033

Mitigating the hosing instability in relativistic laser-plasma interactions; L. Ceurvorst et al.; New J. Phys. 18 053023 (2016); doi: 10.1088/1367-2630/18/5/053023

The functional integral formulation of the Schrieffer-Wolff transformation; F. Zamani, P. Ribeiro and S. Kirchner; New Journal of Physics, Volume 18, June (2016) 063024; doi: 10.1088/1367-2630/18/6/063024

Search for correlations between the arrival directions of IceCube neutrino events and ultrahigh-energy cosmic rays detected by the Pierre Auger Observatory and the Telescope Array; R. U. Abbas, et al.; Journal of Cosmology and Astroparticle Physics, Volume (2016) 037, January; doi: 10.1088/1475-7516/2016/01/037

Black holes and gravitational waves in models of minicharged dark matter; V. Cardoso, C. F. B. Macedo, P. Pani and V. Ferrari; Journal of Cosmology and Astroparticle Physics, Volume 2016, May (2016) 054; doi: 10.1088/1475-7516/2016/05/054

Cross-correlation frequency-resolved optical gating of white-light continuum (500-900 nm) generated in bulk media by 1053 nm laser pulses; T. Imran, M. Hussain and G. Figueira; *Laser Physics Letters*, Volume 13, Number 6 (2016) 066101; doi: 10.1088/1612-2011/13/6/066101

Constraints on asymmetric dark matter from asteroseismology; J. Casanellas and I. Lopes; *Journal of Physics: Conference Series*, Volume 665, conference 1 (2016) 012016; doi: 10.1088/1742-6596/665/1/012016

Proton emission from the deformed odd-odd nuclei near drip line; M. Patial, P. Arumugam, A. K. Jain, E. Maglione and L. S. Ferreira; *Journal of Physics: Conference Series*, Volume 665, conference 1 (2016) 012049; doi: 10.1088/1742-6596/665/1/012049

The sun as a probe of fundamental physics and cosmology; I. P. Lopes; *Journal of Physics: Conference Series*, Volume 665, conference 1, 012079 (2016); doi: 10.1088/1742-6596/665/1/012079

Perturbations in the upper layers of  $\alpha$  Centauri A; A. Brito, I. Lopes; *Journal of Physics: Conference Series*, Volume 665, conference 1 (2016) 012081; doi: 10.1088/1742-6596/665/1/012081

Few-body reaction frameworks for the study of light nuclei; R. Crespo; *Journal of Physics: Conference Series*, Volume 730, conference 1 (2016) 012008; doi: 10.1088/1742-6596/730/1/012008

Nanosecond-level time synchronization of autonomous radio detector stations for extensive air showers; A. Aab et al.; *Journal of Instrumentation* Volume 11, January (2016) P01018; doi: 10.1088/1748-0221/11/01/P01018

Reconstruction and identification of tau lepton decays to hadrons and  $\nu(\tau)$  at CMS; V. Khachatryan et al.; *Journal of Instrumentation*, Volume 11, January (2016) P01019; doi: 10.1088/1748-0221/11/01/P01019

Prototype muon detectors for the AMIGA component of the Pierre Auger Observatory; A. Aab et al.; *Journal of Instrumentation*, Volume 11, February (2016) P02012; doi: 10.1088/1748-0221/11/02/P02012

Beam test evaluation of electromagnetic calorimeter modules made from proton-damaged PbWO<sub>4</sub> crystals; T. Adams et al.; *Journal of Instrumentation*, Volume 11, April (2016) P04012; doi: 10.1088/1748-0221/11/04/P04012

Outdoor field experience with autonomous stations; L. Lopes et al.; *Instrumentation and Detectors* 30 Aug (2016); doi: 10.1088/1748-0221/11/09/C09011

A large area TOF-tracker device based on multi-gap Resistive Plate Chambers; P. Assis et al.; *Journal of Instrumentation*, Volume 11, October (2016) C10002; doi: 10.1088/1748-0221/11/10/C10002

Ambient noise tomography of the East African Rift in Mozambique; A. Domingues, G. Silveira, A. M. G. Ferreira, S.-J. Chang, S. Custódio, J. F. B. D. Fonseca; *Geophysical Journal International*, Volume 204, Issue 3, 1 March (2016) Pages 1565-1578; doi: 10.1093/gji/ggv538

Some effects of topological torsion currents on spacecraft dynamics and the flyby anomaly; M. J. Pinheiro; *Monthly Notices of the Royal Astronomical Society*, Volume 461, Issue 4 (2016) p.3948-3953; doi: 10.1093/mnras/stw1581

Nonequilibrium breakdown of a correlated insulator through pattern formation; P. Ribeiro, A. E. Antipov, and A. N. Rubtsov; *Phys. Rev. B* 93, 144305 - 25 April (2016); doi: 10.1103/PhysRevB.93.144305

Absence of localization in a class of topological systems; E. V. Castro, R. de Gail, M. P. López-Sancho, and M. A. H. Vozmediano; *Phys. Rev. B* 93, 245414 - 15 June (2016); doi: 10.1103/PhysRevB.93.245414

Strain-induced topological phase transition at zigzag edges of monolayer transition-metal dichalcogenides; L. Li, E. V. Castro, and P. D. Sacramento; *Phys. Rev. B* 94, 195419 - 14 November (2016); doi: 10.1103/PhysRevB.94.195419

Reduced density matrix and order parameter of a topological insulator; W. Chi Yu, Y. C. Li, P. D. Sacramento, and H. Q. Lin; *Phys. Rev. B* 94, 245123 - 16 December (2016); doi: 10.1103/PhysRevB.94.245123

Systematic investigation of projectile fragmentation using beams of unstable B and C isotopes; R. Thies et al.; *Phys. Rev. C* 93, 054601 - 2 May (2016); doi: 10.1103/PhysRevC.93.054601

Distortion effects on the neutron knockout from exotic nuclei in the collision with a proton target; E. Cravo, R. Crespo, and A. Deluva; *Phys. Rev. C* 93, 054612 - 16 May (2016); doi: 10.1103/PhysRevC.93.054612

Coulomb dissociation of  $^{20,21}\text{N}$ ; Marko Röder et al.; *Phys. Rev. C* 93, 065807 - 30 June (2016); doi: 10.1103/PhysRevC.93.065807

Evidence of strong dynamic core excitation in  $^{19}\text{C}$  resonant break-up; J. A. Lay, R. de Diego, R. Crespo, A. M. Moro, J. M. Arias, and R. C. Johnson; *Phys. Rev. C* 94, 021602(R) - 24 August (2016); doi: 10.1103/PhysRevC.94.021602

$\Lambda p$  interaction studied via femtoscopy in  $p + \text{Nb}$  reactions at  $\sqrt{s}(\text{NN}) = 3.18 \text{ GeV}$ ; J. Adamczewski-Musch et al.; *Phys. Rev. C* 94, 025201 - 4 August (2016); doi: 10.1103/PhysRevC.94.025201

Deformation of the proton emitter  $^{113}\text{Cs}$  from electromagnetic transition and proton-emission rates; D. Hodge et al.; *Phys. Rev. C* 94, 034321 - 21 September (2016); doi: 10.1103/PhysRevC.94.034321

Proton emission from  $^{125}\text{Pm}$  could be observed; E. Maglione and L. S. Ferreira; *Phys. Rev. C* 94, 044317 - 19 October (2016); doi: 10.1103/PhysRevC.94.044317

Search for resonant  $t\bar{t}$  production in proton-proton collisions at  $\sqrt{s} = 8 \text{ TeV}$ ; V. Khachatryan et al.; *Phys. Rev. D* 93, 012001 - 8 January (2016); doi: 10.1103/PhysRevD.93.012001

Search for vectorlike charge  $2/3$  T quarks in proton-proton collisions at  $\sqrt{s} = 8 \text{ TeV}$ ; V. Khachatryan et al.; *Phys. Rev. D* 93, 012003 - 19 January (2016); doi: 10.1103/PhysRevD.93.012003

Fermion and scalar phenomenology of a two-Higgs-doublet model with  $S_3$ ; A. E. C. Hernández, I. de Medeiros Varzielas, and E. Schu-

macher; *Phys. Rev. D* 93, 016003 - 11 January (2016); doi: 10.1103/PhysRevD.93.016003

Search for pair production of first and second generation leptoquarks in proton-proton collisions at  $\sqrt{s} = 8 \text{ TeV}$ ; V. Khachatryan et al.; *Phys. Rev. D* 93, 032004 - 24 February (2016); doi: 10.1103/PhysRevD.93.032004

Search for single production of scalar leptoquarks in proton-proton collisions at  $\sqrt{s} = 8 \text{ TeV}$ ; V. Khachatryan et al.; *Phys. Rev. D* 93, 032005 - 24 February (2016); Erratum *Phys. Rev. D* 95, 039906 (2017); doi: 10.1103/PhysRevD.93.032005

Role of the pion electromagnetic form factor in the  $\Delta(1232) \rightarrow \gamma^* N$  timelike transition; G. Ramalho, M. T. Peña, J. Weil, H. van Hees, and U. Mose; *Phys. Rev. D* 93, 033004 - 11 February (2016); doi: 10.1103/PhysRevD.93.033004

Measurement of the charge asymmetry in top quark pair production in pp collisions at  $\sqrt{s} = 8 \text{ TeV}$  using a template method; V. Khachatryan et al.; *Phys. Rev. D* 93, 034014 - 18 February (2016); doi: 10.1103/PhysRevD.93.034014

Gravity-dominated unequal-mass black hole collisions; U. Sperhake, E. Berti, V. Cardoso, and F. Pretorius; *Phys. Rev. D* 93, 044012 - 4 February (2016); doi: 10.1103/PhysRevD.93.044012

Interaction between bosonic dark matter and stars; R. Brito, V. Cardoso, C. F. B. Macedo, H. Okawa, and C. Palenzuela; *Phys. Rev. D* 93, 044045 - 16 February (2016); doi: 10.1103/PhysRevD.93.044045

Measurements of  $t(\bar{t})$  spin correlations and top quark polarization using dilepton final states in pp collisions at  $\sqrt{s} = 8 \text{ TeV}$ ; V. Khachatryan et al.; *Phys. Rev. D* 93, 052007 - 9 March (2016); doi: 10.1103/PhysRevD.93.052007

Search for dark matter and unparticles produced in association with a Z boson in proton-proton collisions at  $\sqrt{s} = 8 \text{ TeV}$ ; V. Khachatryan et al.; *Phys. Rev. D* 93, 052011 - 22 March (2016); doi: 10.1103/PhysRevD.93.052011

- Quasinormal modes of relativistic stars and interacting fields; C. F. B. Macedo, V. Cardoso, L. C. B. Crispino, and P. Pani; *Phys. Rev. D* 93, 064053 - 21 March (2016); doi: 10.1103/PhysRevD.93.064053
- Measurement of the top quark mass using proton-proton data at  $\sqrt{s}=7$  TeV and 8 TeV; V. Khachatryan et al.; *Phys. Rev. D* 93, 072004 - 7 April (2016); doi: 10.1103/PhysRevD.93.072004
- Azimuthal asymmetry in the risetime of the surface detector signals of the Pierre Auger Observatory; A. Aab et al.; *Phys. Rev. D* 93, Issue 7, 072006 - 7 April (2016); doi: 10.1103/PhysRevD.93.072006
- Collapsing shells, critical phenomena, and black hole formation; V. Cardoso and J. V. Rocha; *Phys. Rev. D* 93, 084034 - 20 April (2016); doi: 10.1103/PhysRevD.93.084034
- Measurement of the top quark mass using charged particles in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 93, 092006 - 18 May (2016); doi: 10.1103/PhysRevD.93.092006
- Search for supersymmetry in pp collisions at  $\sqrt{s}=8$  TeV in final states with boosted W bosons and b jets using razor variables; V. Khachatryan et al.; *Phys. Rev. D* 93, 092009 - 26 May (2016); doi: 10.1103/PhysRevD.93.092009
- CP-conserving multi-Higgs model with irremovable complex coefficients; I. P. Ivanov and J. P. Silva; *Phys. Rev. D* 93, 095014 - 20 May (2016); doi: 10.1103/PhysRevD.93.095014
- Two Higgs doublet models with an  $S_3$  symmetry; D. Cogollo and J. P. Silva; *Phys. Rev. D* 93, 095024 - 26 May (2016); doi: 10.1103/PhysRevD.93.095024
- Search for pair-produced vectorlike B quarks in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 93, 112009 - 15 June (2016); doi: 10.1103/PhysRevD.93.112009
- Energy estimation of cosmic rays with the Engineering Radio Array of the Pierre Auger Observatory; A. Aab et al.; *Phys. Rev. D* 93, 122005 - 14 June (2016); doi: 10.1103/PhysRevD.93.122005
- Towards a complete  $\Delta(27)\times\text{SO}(10)$  SUSY GUT; Fredrik Björkeröth, F. J. de Anda, I. de Medeiros Varzielas, and S. F. King; *Phys. Rev. D* 94, 016006 - 29 July (2016); doi: 10.1103/PhysRevD.94.016006
- Interacting shells in AdS spacetime and chaos; R. Brito, V. Cardoso, and J. V. Rocha; *Phys. Rev. D* 94, 024003 - 5 July (2016); doi: 10.1103/PhysRevD.94.024003
- Novel Randall-Sundrum model with  $S_3$  flavor symmetry; A. E. Cárcamo Hernández, I. de Medeiros Varzielas, and Nicolás A. Neill; *Phys. Rev. D* 94, 033011 - 30 August (2016); doi: 10.1103/PhysRevD.94.033011
- Measurement of the differential cross sections for top quark pair production as a function of kinematic event variables in pp collisions at  $\sqrt{s}=7$  and 8 TeV; V. Khachatryan et al.; *Phys. Rev. D* 94, 052006 - 8 September (2016); doi: 10.1103/PhysRevD.94.052006
- Search for two Higgs bosons in final states containing two photons and two bottom quarks in proton-proton collisions at 8 TeV; V. Khachatryan et al.; *Phys. Rev. D* 94, 052012 - 29 September (2016); doi: 10.1103/PhysRevD.94.052012
- Mapping chiral symmetry breaking in the excited baryon spectrum; P. Bicudo, M. Cardoso, F. J. Llanes-Estrada, and T. Van Cauteren; *Phys. Rev. D* 94, 054006 - 7 September (2016); doi: 10.1103/PhysRevD.94.054006
- CP-odd invariants for multi-Higgs models: Applications with discrete symmetry; I. de Medeiros Varzielas, S. F. King, C. Luhn, and T. Neder; *Phys. Rev. D* 94, 056007 - 20 September (2016); doi: 10.1103/PhysRevD.94.056007
- Measurement of the integrated and differential top-antitop production cross sections for high- $p_T$  top quarks in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 94, 072002 - 12 October (2016); doi: 10.1103/PhysRevD.94.072002
- Constraining wrong-sign hbb couplings with  $h \rightarrow \text{Upsilon} \gamma$ ; T. Modak, J. C. Romão, S. Sadhukhan, J. P. Silva and R. Srivastava; *Phys. Rev. D* 94, 075017 - 27 October (2016); doi: 10.1103/PhysRevD.94.075017
- Search for ultrarelativistic magnetic monopoles with the Pierre Auger Observatory; A. Aab et al.; *Phys. Rev. D* 94, 082002 - 3 October (2016); doi: 10.1103/PhysRevD.94.082002
- Perturbed black holes in Einstein-dilaton-Gauss-Bonnet gravity: Stability, ringdown, and gravitational-wave emission; J. L. Blázquez-Salcedo, C. F. B. Macedo, V. Cardoso, V. Ferrari, L. Gualtieri, F. S. Khoo, J. Kunz, and P. Pani; *Phys. Rev. D* 94, 104024 - 10 November (2016); doi: 10.1103/PhysRevD.94.104024
- Search for long-lived charged particles in proton-proton collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 94, 112004 - 7 December (2016); doi: 10.1103/PhysRevD.94.112004
- Studies of inclusive four-jet production with two b-tagged jets in proton-proton collisions at 7 TeV; V. Khachatryan et al.; *Phys. Rev. D* 94, 112005 - 8 December (2016); doi: 10.1103/PhysRevD.94.112005
- Searches for R-parity-violating supersymmetry in pp collisions at  $\sqrt{s}=8$  TeV in final states with 0-4 leptons; V. Khachatryan et al.; *Phys. Rev. D* 94, 112009 - 29 December (2016); doi: 10.1103/PhysRevD.94.112009
- What if the masses of the first two quark families are not generated by the standard model Higgs boson?; F. J. Botella, G. C. Branco, M. N. Rebelo, and J. I. Silva-Marcos; *Phys. Rev. D* 94, 115031 - 29 December (2016); doi: 10.1103/PhysRevD.94.115031
- Ultrahigh-energy neutrino follow-up of gravitational wave events GW150914 and GW151226 with the Pierre Auger Observatory; A. Aab et al.; *Phys. Rev. D* 94, 122007 - 30 December (2016); doi: 10.1103/PhysRevD.94.122007
- Edge mode dynamics of quenched topological wires; P. D. Sacramento; *Phys. Rev. E* 93, 062117 - 13 June (2016); doi: 10.1103/PhysRevE.93.062117
- Experimental measurements of the collisional absorption of XUV radiation in warm dense aluminium; B. Kettle et al.; *Phys. Rev. E* 94, 023203 - 5 August (2016); doi: 10.1103/PhysRevE.94.023203
- Study of B meson production in p+Pb collisions at  $\sqrt{s(NN)}=5.02$  TeV using exclusive hadronic decay; V. Khachatryan et al.; *Phys. Rev. Lett.* 116, 032301 - 22 January (2016); doi: 10.1103/PhysRevLett.116.032301
- Measurement of the top quark pair production cross section in proton-proton collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Phys. Rev. Lett.* 116, 052002 - 5 February (2016); doi: 10.1103/PhysRevLett.116.052002
- Search for narrow resonances decaying to dijets in proton-proton collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Phys. Rev. Lett.* 116, 071801 - 18 February (2016); doi: 10.1103/PhysRevLett.116.071801
- Magnetic reconnection onset via disruption of a forming current sheet by the tearing instability; D. A. Uzdensky and N. F. Loureiro; *Phys. Rev. Lett.* 116, 105003 - 9 March (2016); doi: 10.1103/PhysRevLett.116.105003
- Is the gravitational-wave ringdown a probe of the event horizon?; V. Cardoso, E. Franzin, and P. Pani; *Phys. Rev. Lett.* 116, 171101 (2016); Erratum *Phys. Rev. Lett.* 117, 089902 (2016); doi: 10.1103/PhysRevLett.116.171101
- Measurement of long-range near-side two-particle angular correlations in pp collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Phys. Rev. Lett.* 116, 172302 - 27 April (2016); doi: 10.1103/PhysRevLett.116.172302
- Structure of a magnetic flux annihilation layer formed by the collision of supersonic, magnetized plasma flows; L. G. Suttle et al.; *Phys. Rev. Lett.* 116, 225001 - 31 May (2016); doi: 10.1103/PhysRevLett.116.225001
- Measurement of the radiation energy in the radio signal of extensive air showers as a universal estimator of cosmic-ray energy; A. Aab et al.; *Phys. Rev. Lett.* 116, 241101 - 14 June (2016); doi: 10.1103/PhysRevLett.116.241101



Search for narrow resonances in dijet final states at  $\sqrt{s}=8$  TeV with the novel CMS technique of data scouting; V. Khachatryan et al.; *Phys. Rev. Lett.* 117, 031802 - 14 July (2016); doi: 10.1103/PhysRevLett.117.031802

Search for resonant production of high-mass photon pairs in proton-proton collisions at  $\sqrt{s}=8$  and 13 TeV; V. Khachatryan et al.; *Phys. Rev. Lett.* 117, 051802 - 28 July (2016); doi: 10.1103/PhysRevLett.117.051802

Antiproton flux, antiproton-to-proton flux ratio, and properties of elementary particle fluxes in primary cosmic rays measured with the alpha magnetic spectrometer on the International Space Station; M. Aguilar et al.; *Phys. Rev. Lett.* 117, 091103 - 26 August (2016); doi: 10.1103/PhysRevLett.117.091103

Spectroscopy of Kerr black holes with earth- and space-based interferometers; Emanuele Berti, Alberto Sesana, Enrico Barausse, Vitor Cardoso, and Krzysztof Belczynski; *Phys. Rev. Lett.* 117, 101102 - 2 September (2016); doi: 10.1103/PhysRevLett.117.101102

Testing hadronic interactions at ultrahigh energies with air showers measured by the Pierre Auger Observatory; A. Aab et al.; *Phys. Rev. Lett.* 117, 192001 - 31 October (2016); doi: 10.1103/PhysRevLett.117.192001

Precision measurement of the boron to carbon flux ratio in cosmic rays from 1.9 Gv to 2.6 Tv with the alpha magnetic spectrometer on the International Space Station; M. Aguilar et al.; *Phys. Rev. Lett.* 117, 231102 - 28 November (2016); doi: 10.1103/PhysRevLett.117.231102

High orbital angular momentum harmonic generation; J. Vieira, R. M. G. M. Trines, E. P. Alves, R. A. Fonseca, J. T. Mendonça, R. Bingham, P. Norreys, and L. O. Silva; *Phys. Rev. Lett.* 117, 265001 - 20 December (2016); doi: 10.1103/PhysRevLett.117.265001

Detecting rotational superradiance in fluid laboratories; V. Cardoso, A. Coutant, M. Richartz, and S. Weinfurter; *Phys. Rev. Lett.* 117, 271101 - 29 December (2016); doi: 10.1103/PhysRevLett.117.271101

Fast radiation monitoring in FPGA-based designs; C. Leong et al.; *Design of Circuits and*

*Integrated Systems (DCIS)*, (2015) Conference on; doi: 10.1109/DCIS.2015.7388590

High power microwave diagnostic for the fusion energy experiment ITER; S. B. Korsholm et al.; *Infrared, Millimeter, and Terahertz waves (IRMMW-THz)*, (2016) 41st International Conference on; doi: 10.1109/IRMMW-THz.2016.7758537

Spintronic sensors; P. P. Freitas; R. Ferreira; S. Cardoso; *Proceedings of the IEEE* (2016) Volume: 104 Issue: 10, Page(s): 1894 - 1918; doi: 10.1109/JPROC.2016.2578303

The gas injection control and diagnostic system for the ESTHER shock tube; Bernardo B. Carvalho; Mário L. da Silva; Sérgio Dias; *Real Time Conference (RT)*, (2016) IEEE-NPSS; doi: 10.1109/rtc.2016.7543159

A single magnetic nanocomposite cilia force sensor; A. Alfadhel, M. Asadullah Khan, S. Cardoso; *Sensors Applications Symposium (SAS)*, 2016 IEEE; doi: 10.1109/SAS.2016.7479828

Magnetic microfluidic biosensor for the detection and quantification of biomolecules; G. Kokkinis; M.-H. Phan; H. Srikanth; S. Cardoso; I. Giouroudi; *Biomedical Engineering Conference (SBEC)*, 2016 32nd Southern (2016); doi: 10.1109/SBEC.2016.13

Development of high-availability ATCA/PCIe data acquisition instrumentation; M. Correia et al.; *IEEE Transactions on Nuclear Science* Volume: 63, Issue: 3, June (2016) Pages 1620 - 1624; doi: 10.1109/TNS.2016.2531421

FPGA remote update for nuclear environments; A. Fernandes, R. C. Pereira, J. Sousa, P. F. Carvalho, M. Correia, A. P. Rodrigues, B. B. Carvalho, C. M. B. A. Correia, B. Gonçalves; *IEEE Transactions on Nuclear Science*, Volume: 63, Issue: 3, June (2016) Pages 1645 - 1649; doi: 10.1109/TNS.2016.2559478

JET program for closing gaps to fusion energy; X. Litaudon et al.; *IEEE Transactions on Plasma Science - Vol. 44*, Issue: 9, 1481 - 1488, Sept. (2016); doi: 10.1109/TPS.2016.2572158

Measurement of differential cross sections for Higgs boson production in the diphoton decay

channel in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, January (2016) 76:13; doi: 10.1140/epjc/s10052-015-3853-3

Measurement of the  $t\bar{t}$  production cross section in the all-jets final state in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, March (2016) 76:128; doi: 10.1140/epjc/s10052-016-3956-5

Event generator tunes obtained from underlying event and multiparton scattering measurements; V. Khachatryan et al.; *The European Physical Journal C*, March (2016) 76:155; doi: 10.1140/epjc/s10052-016-3988-x

Flavour-changing Higgs couplings in a class of two Higgs doublet models; F. J. Botella, G. C. Branco, M. Nebot, M. N. Rebelo; *The European Physical Journal C*, March (2016) 76:16; doi: 10.1140/epjc/s10052-016-3993-0

Neutrino observables from predictive flavour patterns; L. M. Cebola, D. Emmanuel-Costa, R. González Felipe; *The European Physical Journal C*, March (2016) 76:156; doi: 10.1140/epjc/s10052-016-3995-y

Search for massive WH resonances decaying into the  $l\nu b(\bar{b})$  final state at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, May (2016) 76:237; doi: 10.1140/epjc/s10052-016-4067-z

Measurement of the inclusive jet cross section in pp collisions at  $\sqrt{s}=2.76$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, May (2016) 76:265; doi: 10.1140/epjc/s10052-016-4083-z

Measurement of  $t\bar{t}$  production with additional jet activity, including b quark jets, in the dilepton decay channel using pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, July (2016) 76:379; doi: 10.1140/epjc/s10052-016-4105-x

Origins of the di-jet asymmetry in heavy-ion collisions; J. G. Milhano, K. C. Zapp; *The European Physical Journal C*, May (2016) 76:288; doi: 10.1140/epjc/s10052-016-4130-9

Search for lepton flavour violating decays of heavy resonances and quantum black holes

to an  $e\mu\mu$  pair in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, June (2016) 76:317; doi: 10.1140/epjc/s10052-016-4149-y

Forward-backward asymmetry of Drell-Yan lepton pairs in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, June (2016) 76:325; doi: 10.1140/epjc/s10052-016-4156-z

Constraints on the braneworld from compact stars; R. González Felipe et al.; *The European Physical Journal C*, June (2016) 76:337; doi: 10.1140/epjc/s10052-016-4177-7

Measurement of inclusive jet production and nuclear modifications in pPb collisions at  $\sqrt{s(NN)}=5.02$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, July (2016) 76:372; doi: 10.1140/epjc/s10052-016-4205-7

Search for heavy resonances decaying to two Higgs bosons in final states containing four b quarks; V. Khachatryan et al.; *The European Physical Journal C*, July (2016) 76:371; doi: 10.1140/epjc/s10052-016-4206-6

Measurement of the  $W+W^-$  cross section in pp collisions at  $\sqrt{s}=8$  TeV and limits on anomalous gauge couplings; V. Khachatryan et al.; *The European Physical Journal C*, July (2016) 76:401; doi: 10.1140/epjc/s10052-016-4219-1

Search for new physics in same-sign dilepton events in proton-proton collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, August (2016) 76:439; doi: 10.1140/epjc/s10052-016-4261-z

Measurement of the double-differential inclusive jet cross section in proton-proton collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, August (2016) 76:451; doi: 10.1140/epjc/s10052-016-4286-3

Search for direct pair production of supersymmetric top quarks decaying to all-hadronic final states in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, August (2016) 76:460; doi: 10.1140/epjc/s10052-016-4292-5

Measurement of the differential cross section and charge asymmetry for inclusive  $pp \rightarrow W\pm$

- + X production at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, August (2016) 76:469; doi: 10.1140/epjc/s10052-016-4293-4
- Measurement of dijet azimuthal decorrelation in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, October (2016) 76:536; doi: 10.1140/epjc/s10052-016-4346-8
- Electron scattering cross sections for the modeling of oxygen-containing plasmas; L. L. Alves, P. Coche, M. A. Ridenti, V. Guerra; *The European Physical Journal D*, June (2016) 70:124; doi: 10.1140/epjd/e2016-70102-1
- Numerical relativity and high energy physics: Recent developments; E. Berti et al.; *Int. J. Mod. Phys. D* 25, 1641022 (2016); doi: 10.1142/S0218271816410224
- Ru-based thin film temperature sensor for space environments: Microfabrication and characterization under total ionizing dose; S. I. Ravelo Arias, D. Ramírez Muñoz, S. Cardoso, and P. P. Freitas; *Journal of Sensors*, Volume (2016), Article 6086752; doi: 10.1155/2016/6086752
- Conventional and fast field cycling relaxometry study of the molecular dynamics in polymer nanocomposites for use as drug delivery systems; P. J. Sebastião et al.; *Journal of Nanoscience and Nanotechnology*, Volume 16, Number 7, July (2016) pp. 7539-7545(7); doi: 10.1166/jnn.2016.12476
- Evaluation of epsilon-net calculated equilibrium reconstruction error bars in the european integrated modeling platform; R. Coelho, et al.; *Journal Fusion Science and Technology*, Volume 69, (2016) - Issue 3; doi: 10.13182/FST15-177
- A predictive model for yeast cell polarization in pheromone gradient; N. Muller, M. Piel, V. Calvez, R. Voituriez, J. Gonçalves-Sá, C.-L. Guo, X. Jiang, A. Murray, N. Meunier; *PLoS Comput Biol* 12(4) 2016; doi: 10.1371/journal.pcbi.1004795
- SPARK: A Software Package for Aerodynamics, Radiation and Kinetics; B. Lopez and M. L. da Silva; 46th AIAA Thermophysics Conference, AIAA AVIATION Forum, (AIAA 2016-4025); doi: 10.2514/6.2016-4025
- High-pressure H<sub>2</sub>/He/O<sub>2</sub> combustion experiments for the design of the ESTHER shock-tube driver; M. L. da Silva and B. Carvalho; 46th AIAA Thermophysics Conference, AIAA AVIATION Forum, (AIAA 2016-4156); doi: 10.2514/6.2016-4156
- Semi-quantitative method for streptococci magnetic detection in raw milk; C. Duarte et al.; *Biosensors* (2016), 6(2), 19; doi: 10.3390/bios6020019
- Hybrid integration of magnetoresistive sensors with MEMS as a strategy to detect ultra-low magnetic fields; J. Valadeiro, S. Cardoso, R. Macedo, A. Guedes, J. Gaspar, and P. P. Freitas; *Micromachines* (2016), 7(5), 88; doi: 10.3390/mi7050088
- A magnetoresistive tactile sensor for harsh environment applications; A. Alfadhel, M. Asadullah Khan, S. Cardoso, D. Leitão and J. Kosel; *Sensors* (2016), 16(5), 650; doi: 10.3390/s16050650
- Integration of GMR sensors with different technologies; M.-D. Cubells-Beltrán, C. Reig, J. Madrenas, A. De Marcellis, J. Santos, S. Cardoso and P. P. Freitas; *Sensors* (2016) 16(6), 939; doi: 10.3390/s16060939
- Sensitivity and 3 dB bandwidth in single and series-connected tunneling magnetoresistive sensors; M. Dąbek et al.; *Sensors* (2016) 16(11), 1821; doi: 10.3390/s16111821
- New limits on thermally annihilating dark matter from neutrino telescopes; J. Lopes and I. Lopes; *The Astrophysical Journal*, Volume 827, Number 2 (2016) 130; doi: 10.3847/0004-637X/827/2/130
- Flux tubes at finite temperature; N. Cardoso, M. Cardoso, P. Bicudo; *Acta Physica Polonica B Proceedings Supplement*, Vol. 9 (2016) n 3; doi: 10.5506/APhysPolBSupp.9.447
- Numerical study of the baryon spectrum and chiral symmetry restoration; M. Cardoso, P. Bicudo, F. J. Llanes-Estrada, T. Van Cauteren; *Acta Physica Polonica B Proceedings Supplement*, Vol. 9 (2016) n 3, pág. 345; doi: 10.5506/APhysPolBSupp.9.543
- Heavy-light mesons in Minkowski space; S. Leitão, A. Stadler, M. T. Peña, E. P. Biernat; *Acta Phys. Polon. Supp.* 9 (2016) 641; doi: 10.5506/APhysPolBSupp.9.641
- Chiral-symmetry breaking and pion structure in the Covariant Spectator Theory; E. P. Biernat, M. T. Peña, F. Gross, A. Stadler, E. Ribeiro; *Acta Physica Polonica B, Proceedings Supplement* 9 (3) June (2016); doi: 10.5506/APhysPolBSupp.9.647
- NMR of liquid crystal dendrimers; C. R. da Cruz, J. L. Figueirinhas, P. J. Sebastiao; Book published by Pan Stanford Publishing Pte Ltd (Verlag), ISBN-978-981-4745-72-7; 978-981-4745-72-7
- Highly efficient rubrene-graphene charge-transfer interfaces as phototransistors in the visible regime; G. F. Jones, R. M. Pinto, A. De Sanctis, V. Karthik Nagareddy, C. D. Wright, H. Alves, M. F. Craciun, S. Russo; *Advanced Materials*, Volume 29, Issue 41, November 6, (2017), 1702993; doi: 10.1002/adma.201702993
- Wavefront spatial-phase modulation in visible optical communications; J. Sabino, G. Figueira, P. André; *Microwave and Optical Technology Letters*, Volume 59, Issue 7, July (2017), Pages 1538-1541; doi: 10.1002/mop.30583
- Computer controlled multi-shot frequency-resolved optical gating diagnostic system for femtosecond optical pulse measurement; T. Imran, M. Hussain, G. Figueira; *Microwave and Optical Technology Letters*, Volume 59, Issue 12, December (2017), Pages 3155-3160; doi: 10.1002/mop.30894
- LXCat: an open-access, web-based platform for data needed for modeling low temperature plasmas; L. C. Pitchford et al.; *Plasma Process. Polym.* (2017) 14, 1600098; doi: 10.1002/ppap.201600098
- Special issue on numerical modelling of low-temperature plasmas for various applications - Part I: review and tutorial papers on numerical modelling approaches; L. L. Alves, A. Bogaerts; *Plasma Process Polym.* (2017) 14, 1690011; doi: 10.1002/ppap.201690011
- Special issue on numerical modelling of low-temperature plasmas for various applications — part II: Research papers on numerical modelling for various plasma applications; A. Bogaerts, L. L. Alves; *Plasma Process Polym.* (2017) 14, 1790041; doi: 10.1002/ppap.201790041
- Search for high-mass  $Z\gamma$  resonances in  $e^+e^- \gamma$  and  $\mu^+ \mu^- \gamma$  final states in proton-proton collisions at  $\sqrt{s}=8$  TeV and  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, January (2017) 2017:76; doi: 10.1007/JHEP01(2017)076
- Leptogenesis in a  $\Delta(27) \times SO(10)$  SUSY GUT; F. Björkeröth et al.; *Journal of High Energy Physics*, January (2017) 2017:77; doi: 10.1007/JHEP01(2017)077
- Search for anomalous  $Wtb$  couplings and flavour-changing neutral currents in t-channel single top quark production in pp collisions at  $\sqrt{s}=7$  TeV and  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, February (2017) 2017:28; doi: 10.1007/JHEP02(2017)028
- Search for heavy resonances decaying to tau lepton pairs in proton-proton collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, February (2017) 2017:48; doi: 10.1007/JHEP02(2017)048
- Search for top quark decays via Higgs-boson-mediated flavor-changing neutral currents in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, February (2017) 2017:79; doi: 10.1007/JHEP02(2017)079
- Measurement of the transverse momentum spectra of weak vector bosons produced in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, February (2017) 2017:96; doi: 10.1007/JHEP02(2017)096
- Searches for invisible decays of the Higgs boson in pp collisions at  $\sqrt{s}=7, 8,$  and  $13$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, February (2017) 2017:135; doi: 10.1007/JHEP02(2017)135

- Measurement of the transverse momentum spectrum of the Higgs boson produced in pp collisions at  $\sqrt{s}=8$  TeV using  $H \rightarrow WW$  decays; V. Khachatryan et al.; *Journal of High Energy Physics*, March (2017) 2017:32; doi: 10.1007/JHEP03(2017)032
- Search for dark matter and unparticles in events with a Z boson and missing transverse momentum in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, March (2017) 2017:61; doi: 10.1007/JHEP03(2017)061
- Search for heavy neutrinos or third-generation leptoquarks in final states with two hadronically decaying  $\tau$  leptons and two jets in proton-proton collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, March (2017) 2017:77; doi: 10.1007/JHEP03(2017)077
- Search for CP violation in  $t\bar{t}$  production and decay in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, March (2017) 2017:101; doi: 10.1007/JHEP03(2017)101
- Measurement and QCD analysis of double-differential inclusive jet cross sections in pp collisions at  $\sqrt{s}=8$  TeV and cross section ratios to 2.76 and 7 TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, March (2017) 2017:156; doi: 10.1007/JHEP03(2017)156
- Search for massive resonances decaying into WW, WZ or ZZ bosons in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, March (2017) 2017:162; doi: 10.1007/JHEP03(2017)162
- Search for electroweak production of charginos in final states with two  $\tau$  leptons in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, April (2017) 2017:18; doi: 10.1007/JHEP04(2017)018
- Measurements of differential production cross sections for a Z boson in association with jets in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, April (2017) 2017:22; doi: 10.1007/JHEP04(2017)022
- Charged-particle nuclear modification factors in PbPb and pPb collisions at  $\sqrt{s}(NN)=5.02$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, April (2017) 2017:39; doi: 10.1007/JHEP04(2017)039
- Search for electroweak production of a vector-like quark decaying to a top quark and a Higgs boson using boosted topologies in fully hadronic final states; A. M. Sirunyan et al.; *Journal of High Energy Physics*, April (2017) 2017:136; doi: 10.1007/JHEP04(2017)136
- Observation of  $Y(1S)$  pair production in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Journal of High Energy Physics*, May (2017) 2017:13; doi: 10.1007/JHEP05(2017)013
- Search for single production of vector-like quarks decaying to a Z boson and a top or a bottom quark in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, May (2017) 2017:29; doi: 10.1007/JHEP05(2017)029
- Measurement of electroweak-induced production of  $W\gamma$  with two jets in pp collisions at  $\sqrt{s}=8$  TeV and constraints on anomalous quartic gauge couplings; V. Khachatryan et al.; *Journal of High Energy Physics*, June (2017) 2017:106; doi: 10.1007/JHEP06(2017)106
- Search for  $t\bar{t}$  resonances in highly boosted lepton+jets and fully hadronic final states in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, July (2017) 2017:1; doi: 10.1007/JHEP07(2017)001
- Search for associated production of a Z boson with a single top quark and for  $tZ$  flavour-changing interactions in pp collisions at  $\sqrt{s}=8$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, July (2017) 2017:3; doi: 10.1007/JHEP07(2017)003
- Search for new physics with dijet angular distributions in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, July (2017) 2017:13; doi: 10.1007/JHEP07(2017)013
- Search for dark matter produced with an energetic jet or a hadronically decaying W or Z boson at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, July (2017) 2017:14; doi: 10.1007/JHEP07(2017)014
- Search for third-generation scalar leptoquarks and heavy right-handed neutrinos in final states with two tau leptons and two jets in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, July (2017) 2017:121; doi: 10.1007/JHEP07(2017)121
- A simple method to detect spontaneous CP violation in multi-Higgs models; O. M. Ogreid, P. Osland, M. N. Rebelo; *Journal of High Energy Physics*, August (2017) 2017:5; doi: 10.1007/JHEP08(2017)005
- Searches for  $W'$  bosons decaying to a top quark and a bottom quark in proton-proton collisions at 13 TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, August (2017) 2017:29; doi: 10.1007/JHEP08(2017)029
- Erratum to: search for dark matter in proton-proton collisions at 8 TeV with missing transverse momentum and vector boson tagged jets; V. Khachatryan et al.; *Journal of High Energy Physics*, August (2017) 2017:35; doi: 10.1007/JHEP08(2017)035
- Measurement of the inclusive energy spectrum in the very forward direction in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, August (2017) 2017:46; doi: 10.1007/JHEP08(2017)046
- Search for top quark partners with charge  $5/3$  in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, August (2017) 2017:73; doi: 10.1007/JHEP08(2017)073
- Measurement of the  $t\bar{t}$  production cross section using events with one lepton and at least one jet in pp collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, September (2017) 51; doi: 10.1007/JHEP09(2017)051
- Search for a heavy resonance decaying to a top quark and a vector-like top quark at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, September (2017) 53; doi: 10.1007/JHEP09(2017)053
- Erratum to: Search for dark matter and unparticles in events with a Z boson and missing transverse momentum in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, September (2017) 2017:106; doi: 10.1007/JHEP09(2017)106
- Search for direct production of supersymmetric partners of the top quark in the all-jets final state in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, October (2017) 5; doi: 10.1007/JHEP10(2017)005
- Measurement of the semileptonic  $t\bar{t} + \gamma$  production cross section in pp collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, October (2017) 6; doi: 10.1007/JHEP10(2017)006
- Search for top squark pair production in pp collisions at  $\sqrt{s}=13$  TeV using single lepton events; A. M. Sirunyan et al.; *Journal of High Energy Physics*, October (2017) 19; doi: 10.1007/JHEP10(2017)019
- Measurements of the  $pp \rightarrow W\gamma\gamma$  and  $pp \rightarrow Z\gamma\gamma$  cross sections and limits on anomalous quartic gauge couplings at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, October (2017) 72; doi: 10.1007/JHEP10(2017)072
- Search for new physics in the monophoton final state in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, October (2017) 73; doi: 10.1007/JHEP10(2017)073
- Search for light bosons in decays of the 125 GeV Higgs boson in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, October (2017) 76; doi: 10.1007/JHEP10(2017)076
- Measurements of jet charge with dijet events in pp collisions at  $\sqrt{s}=8$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, October (2017) 131; doi: 10.1007/JHEP10(2017)131
- Search for associated production of dark matter with a Higgs boson decaying to  $b\bar{b}$  or  $\gamma\gamma$  at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, (2017) 180; doi: 10.1007/JHEP10(2017)180

- Leptonic invariants, neutrino mass-ordering and the octant of  $\theta$  23; G. C. Branco, M. N. Rebelo, J. I. Silva-Marcos; *Journal of High Energy Physics*, November (2017) 2017:1; doi: 10.1007/JHEP11(2017)001
- Search for a light pseudoscalar Higgs boson produced in association with bottom quarks in pp collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, November (2017) 10; doi: 10.1007/JHEP11(2017)010
- Search for electroweak production of charginos and neutralinos in WH events in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, November (2017) 29; doi: 10.1007/JHEP11(2017)029
- Measurements of properties of the Higgs boson decaying into the four-lepton final state in pp collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, November (2017) 47; doi: 10.1007/JHEP11(2017)047
- Search for pair production of vector-like T and B quarks in single-lepton final states using boosted jet substructure in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, November (2017) 85; doi: 10.1007/JHEP11(2017)085
- Multi-Higgs doublet models: physical parametrization, sum rules and unitarity bounds; M. P. Bento, H. E. Haber, J. C. Romão, J. P. Silva; *Journal of High Energy Physics*, November (2017) 95; doi: 10.1007/JHEP11(2017)095
- Spontaneous CP violation in multi-Higgs potentials with triplets of  $\Delta(3n^2)$  and  $\Delta(6n^2)$ ; I. de Medeiros Varzielas, S. F. King, C. Luhn, T. Neder; *Journal of High Energy Physics*, November (2017) 2017:136; doi: 10.1007/JHEP11(2017)136
- Search for supersymmetry in events with at least one photon, missing transverse momentum, and large transverse event activity in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *Journal of High Energy Physics*, December (2017) 142; doi: 10.1007/JHEP12(2017)142
- Comment on Omira, Baptista and Matias (2015), “probabilistic tsunami hazard in the Northeast Atlantic from near- and far-field tectonic sources”; J. F. B. D. Fonseca; *Pure and Applied Geophysics*, March (2017) Volume 174, Issue 3, pp 1121-1125; doi: 10.1007/s00024-016-1425-6
- In-medium parton branching beyond eikonal approximation; L. Apolinário; *Few-Body Systems*, March (2017) 58:69; doi: 10.1007/s00601-017-1236-z
- Application of the covariant spectator theory to the study of heavy and heavy-light mesons; S. Leitão, A. Stadler, M. T. Peña, E. P. Biernat; *Few-Body Systems*, March (2017), 58:91; doi: 10.1007/s00601-017-1251-0
- Confinement at finite temperature; P. Bicudo, N. Cardoso, M. Cardoso; *Few-Body Systems*, May (2017) 58:117; doi: 10.1007/s00601-017-1276-4
- Gluons at finite temperature; P. J. Silva, O. Oliveira, D. Dudal, P. Bicudo, N. Cardoso; *Few-Body Systems*, May (2017) 58:127; doi: 10.1007/s00601-017-1281-7
- LIGHT-CONE 2016: Challenges for theory and experiment in hadron and nuclear physics on the light front; M. T. Peña, A. Stadler; *Few-Body Systems*, July (2017), 58:145; doi: 10.1007/s00601-017-1309-z
- Rieger-type periodicities on the Sun and the Earth during solar cycles 21 and 22; H. G. Silva, I. Lopes; *Astrophysics and Space Science*, March (2017) 362:44; doi: 10.1007/s10509-017-3020-4
- Exploring the extreme Universe with gamma rays in the MeV - GeV range; A. De Angelis et al.; *Experimental Astronomy*, October (2017) Volume 44, Issue 1, pp 25-82; doi: 10.1007/s10686-017-9533-6
- Bipolar resistive switching in Si/Ag nanostructures; C. Dias et al.; *Applied Surface Science*, Volume 424, Part 1, 1 December (2017), Pages 122-126; doi: 10.1016/j.apsusc.2017.01.140
- Sensitivity of EAS measurements to the energy spectrum of muons; J. Espadanal, L. Cazon, R. Conceição; *Astroparticle Physics*, Volume 86, January (2017) Pages 32-40; doi: 10.1016/j.astropartphys.2016.11.003
- Spectral calibration of the fluorescence telescopes of the Pierre Auger Observatory; A. Aab et al.; *Astroparticle Physics*, Volume 95, October (2017) Pages 44-56; doi: 10.1016/j.astropartphys.2017.09.001
- Co and (Co,Mo) doping effects on the properties of highly reduced TiO<sub>2</sub> anatase thin films; A. J. Silvestre, S. Rout, S. Daluic, L. C. J. Pereira, A. S. Viana, O. Conde; *Current Applied Physics*, Volume 17, Issue 2, February (2017) 174-180; doi: 10.1016/j.cap.2016.11.015
- Enhancing alkane oxidation using Co-doped SnO<sub>2</sub> nanoparticles as catalysts; T. F. S. Silva, A. J. Silvestre, B. G. M. Rocha, M. R. Nunes, O. Monteiro, L. M. D. R. S. Martins; *Catalysis Communications*, Volume 96, June (2017) 19-22; doi: 10.1016/j.catcom.2017.03.012
- 3D imaging of P-waves velocity as a tool for evaluation of heat induced limestone decay; E. Martinho, M. Mendes, A. Dionísio; *Construction and Building Materials*, Volume 135, 15 March (2017) Pages 119-128; doi: 10.1016/j.conbuildmat.2016.12.192
- F4E prototype of a chopper digital integrator for the ITER magnetics; Antonio J. N. Batista; *Fusion Engineering and Design*, Volume 123, November (2017) Pages 1025-1028; doi: 10.1016/j.fusengdes.2017.02.024
- Real-time software tools for the performance analysis of the ITER Radial Neutron Camera; N. Cruz et al.; *Fusion Engineering and Design*, Volume 123, November (2017) Pages 1001-1005; doi: 10.1016/j.fusengdes.2017.02.071
- Real-Time data acquisition Prototype proposal of the ITER radial neutron camera and gamma-ray spectrometer; R. C. Pereira et al.; *Fusion Engineering and Design*, Volume 123, November (2017) Pages 901-905; doi: 10.1016/j.fusengdes.2017.03.096
- 90° cylindrical analyzer for the plasma potential fluctuations measurements by heavy ion beam diagnostic on the tokamak ISTTOK; I. S. Nedzelskiy, A. Malaquias, R. Sharma, R. Henriques; *Fusion Engineering and Design*, Volume 123, November (2017) 897-900; doi: 10.1016/j.fusengdes.2017.03.097
- SEU mitigation exploratory tests in a ITER related FPGA; A. J. N. Batista et al.; *Fusion Engineering and Design*, Volume 118, May (2017) Pages 111-116; doi: 10.1016/j.fusengdes.2017.03.106
- EPICS device support for an ATCA CDAQ Board with hot-plug capabilities; Bruno Santos et al.; *Fusion Engineering and Design*, Volume 123, November (2017) Pages 732-736; doi: 10.1016/j.fusengdes.2017.03.174
- X-mode raw data analysis of the new AUG ICRF antenna edge density profile reflectometer; D. E. Aguiam et al.; *Fusion Engineering and Design*, Volume 123, November (2017), Pages 816-819; doi: 10.1016/j.fusengdes.2017.04.019
- RAMI analysis of the ITER LFS CTS system; V. Infante et al.; *Fusion Engineering and Design*, Volume 123, November (2017) Pages 663-668; doi: 10.1016/j.fusengdes.2017.05.001
- Interfacing ATCA Hot-Swap with PCIe Hot-Plug for high-availability instrumentation in critical systems; Miguel Correia, J. Sousa, B. Santos, A. P. Rodrigues, P. F. Carvalho, A. M. Combo, B. B. Carvalho, C. M. B. A. Correia, B. Gonçalves; *Fusion Engineering and Design*, Volume 124, November (2017) Pages 1187-1190; doi: 10.1016/j.fusengdes.2017.05.076
- PCIe hot-plug event handling tasks using PICMG standard interrupt mechanism for ATCA based instrumentation; P. F. Carvalho et al.; *Fusion Engineering and Design*, Volume 123, November (2017) Pages 703-706; doi: 10.1016/j.fusengdes.2017.05.122
- Robustness of raman plasma amplifiers and their potential for attosecond pulse generation; High Energy Density Physics; J. D. Sadler et al.; *High Energy Density Physics* 23, 212-216 (2017); doi: 10.1016/j.hedp.2017.05.007
- A reformulation of mechanics and electrodynamics; M. J. Pinheiro; *Heliyon*, Volume 3, Issue 7, July (2017) e00365; doi: 10.1016/j.heliyon.2017.e00365
- Deuterium retention in tin (Sn) and lithium-tin (Li-Sn) samples exposed to ISTTOK plasmas;

- J. P. S. Loureiro et al.; Nuclear Materials and Energy, Volume 12, August (2017) Pages 709-713; doi: 10.1016/j.nme.2016.12.026
- Main chamber wall plasma loads in JET-ITER-like wall at high radiated fraction; C. Guillemaut et al.; Nuclear Materials and Energy, Volume 12, August (2017) Pages 234-240; doi: 10.1016/j.nme.2017.02.010
- Physics with ions at the Future Circular Collider; L. Apolinário et al.; Nuclear Physics A, Volume 967, November (2017) Pages 888-891; doi: 10.1016/j.nuclphysa.2017.06.029
- Factorization of in-medium parton branching beyond the eikonal approximation; L. Apolinário, N. Armesto, J. G. Milhano, C. A. Salgado; Nuclear and Particle Physics Proceedings, Volumes 289-290, August-September (2017) Pages 117-120; doi: 10.1016/j.nuclphysbps.2017.05.023
- Observation of the decay  $B^+ \rightarrow \psi(2S)\phi(1020)K^+$  in pp collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 764, 10 January (2017) Pages 66-86; doi: 10.1016/j.physletb.2016.11.001
- Covariant Spectator Theory of heavy-light and heavy mesons and the predictive power of covariant interaction kernels; S. Leitão, A. Stadler, M. T. Peña, E. P. Biernat; Physics Letters B, Volume 764, 10 January (2017), Pages 38-41; doi: 10.1016/j.physletb.2016.11.013
- More about unphysical zeroes in quark mass matrices; D. Emmanuel-Costa, R. G. Felipe; Physics Letters B, Volume 764, 10 January (2017) Pages 150-156; doi: 10.1016/j.physletb.2016.11.019
- Evidence for collectivity in pp collisions at the LHC; V. Khachatryan et al.; Physics Letters B, Volume 765, 10 February (2017) Pages 193-220; doi: 10.1016/j.physletb.2016.12.009
- Measurement of the WZ production cross section in pp collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 766, 10 March (2017) Pages 268-290; doi: 10.1016/j.physletb.2017.01.011
- Search for high-mass diphoton resonances in proton-proton collisions at 13 TeV and combination with 8 TeV search; V. Khachatryan et al.; Physics Letters B, Volume 767, 10 April (2017) Pages 147-170; doi: 10.1016/j.physletb.2017.01.027
- Search for new phenomena in events with high jet multiplicity and low missing transverse momentum in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 770, 10 July (2017) Pages 257-267; doi: 10.1016/j.physletb.2017.01.073
- Multiplicity and rapidity dependence of strange hadron production in pp, pPb, and PbPb collisions at the LHC; V. Khachatryan et al.; Physics Letters B, Volume 768, 10 May (2017) Pages 103-129; doi: 10.1016/j.physletb.2017.01.075
- Search for top squark pair production in compressed-mass-spectrum scenarios in proton-proton collisions at  $\sqrt{s}=8$  TeV using the  $\alpha_T$  variable; V. Khachatryan et al.; Physics Letters B, Volume 767, 10 April (2017) Pages 403-430; doi: 10.1016/j.physletb.2017.02.007
- Search for narrow resonances in dilepton mass spectra in proton-proton collisions at  $\sqrt{s}=13$  TeV and combination with 8 TeV data; V. Khachatryan et al.; Physics Letters B, Volume 768, 10 May (2017) Pages 57-80; doi: 10.1016/j.physletb.2017.02.010
- Search for dijet resonances in proton-proton collisions at  $\sqrt{s}=13$  TeV and constraints on dark matter and other models; A. M. Sirunyan et al.; Physics Letters B, Volume 769, 10 June (2017) Pages 520-542; doi: 10.1016/j.physletb.2017.02.012
- Search for heavy resonances decaying into a vector boson and a Higgs boson in final states with charged leptons, neutrinos, and b quarks; V. Khachatryan et al.; Physics Letters B, Volume 768, 10 May (2017) Pages 137-162; doi: 10.1016/j.physletb.2017.02.040
- Charged-lepton decays from soft flavour violation; E. H. Aeikens, W. Grimus, L. Lavoura; Physics Letters B, Volume 768, 10 May (2017), Pages 365-372; doi: 10.1016/j.physletb.2017.03.012
- Search for supersymmetry in events with photons and missing transverse energy in pp collisions at 13 TeV; V. Khachatryan et al.; Physics Letters B, Volume 769, 10 June (2017) Pages 391-412; doi: 10.1016/j.physletb.2017.04.005
- Measurement of the mass difference between top quark and antiquark in pp collisions at  $\sqrt{s}=8$  TeV; S. Chatrchyan et al.; Physics Letters B, Volume 770, 10 July (2017) Pages 50-71; doi: 10.1016/j.physletb.2017.04.028
- Suppression of  $\Upsilon(1S)$ ,  $\Upsilon(2S)$ , and  $\Upsilon(3S)$  quarkonium states in PbPb collisions at  $\sqrt{s(NN)}=2.76$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 770, 10 July (2017) Pages 357-379; doi: 10.1016/j.physletb.2017.04.031
- Search for heavy gauge  $W'$  bosons in events with an energetic lepton and large missing transverse momentum at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 770, 10 July (2017) Pages 278-301; doi: 10.1016/j.physletb.2017.04.043
- Measurement of the cross section for electroweak production of  $Z\gamma$  in association with two jets and constraints on anomalous quartic gauge couplings in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 770, 10 July (2017) Pages 380-402; doi: 10.1016/j.physletb.2017.04.071
- Search for single production of a heavy vector-like T quark decaying to a Higgs boson and a top quark with a lepton and jets in the final state; V. Khachatryan et al.; Physics Letters B, Volume 771, 10 August (2017) Pages 80-105; doi: 10.1016/j.physletb.2017.05.019
- Measurement of the differential inclusive  $B^+$ hadron cross sections in pp collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; Physics Letters B, Volume 771, 10 August (2017) Pages 435-456; doi: 10.1016/j.physletb.2017.05.074
- Search for anomalous couplings in boosted  $WW/WZ \rightarrow l\nu qq$  production in proton-proton collisions at  $\sqrt{s}=8$  TeV; A. M. Sirunyan et al.; Physics Letters B, Volume 772, 10 September (2017) Pages 21-42; doi: 10.1016/j.physletb.2017.06.009
- Measurements of the charm jet cross section and nuclear modification factor in pPb collisions at  $\sqrt{s(NN)}=5.02$  TeV; A. M. Sirunyan et al.; Physics Letters B, Volume 772, 10 September (2017) Pages 306-329; doi: 10.1016/j.physletb.2017.06.053
- Search for high-mass  $Z\gamma$  resonances in proton-proton collisions at  $\sqrt{s}=8$  and 13 TeV using jet substructure techniques; A. M. Sirunyan et al.; Physics Letters B, Volume 772, 10 September (2017) Pages 363-387; doi: 10.1016/j.physletb.2017.06.062
- Search for standard model production of four top quarks in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; Physics Letters B, Volume 772, 10 September (2017) Pages 336-358; doi: 10.1016/j.physletb.2017.06.064
- Coherent  $J/\psi$  photoproduction in ultra-peripheral PbPb collisions at  $\sqrt{s(NN)}=2.76$  TeV with the CMS experiment; V. Khachatryan et al.; Physics Letters B, Volume 772, 10 September (2017) Pages 489-511; doi: 10.1016/j.physletb.2017.07.001
- Search for single production of vector-like quarks decaying into a b quark and a W boson in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; Physics Letters B, Volume 772, 10 September (2017) Pages 634-656; doi: 10.1016/j.physletb.2017.07.022
- Quarkonium production at the LHC: A data-driven analysis of remarkably simple experimental patterns; P. Faccioli et al.; Physics Letters B, Volume 773, 10 October (2017) Pages 476-486; doi: 10.1016/j.physletb.2017.07.047
- Search for leptophobic  $Z'$  bosons decaying into four-lepton final states in proton-proton collisions at  $\sqrt{s}=8$  TeV; Khachatryan et al.; Physics Letters B, Volume 773, 10 October (2017) Pages 563-584; doi: 10.1016/j.physletb.2017.08.069
- Quarkonium production at the LHC: A data-driven analysis of remarkably simple experimental patterns; P. Faccioli et al.; Physics Letters B, Volume 773, 10 October (2017) Pages 476-486; doi: 10.1016/j.physletb.2017.09.006
- Cobimaximal lepton mixing from soft symmetry breaking; Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics; W. Grimus, L. Lavoura; Physics Letters B, Volume 773, 10 October (2017) Pages 476-486; doi: 10.1016/j.physletb.2017.09.006

ters B, Volume 774, 10 November (2017), Pages 325-331; doi: 10.1016/j.physletb.2017.09.082

Combination of searches for heavy resonances decaying to WW, WZ, ZZ, WH, and ZH boson pairs in proton-proton collisions at  $\sqrt{s}=8$  and 13 TeV; A. M. Sirunyan et al.; Physics Letters B, Volume 774, 10 November (2017) Pages 533-558; doi: 10.1016/j.physletb.2017.09.083

Measurement of vector boson scattering and constraints on anomalous quartic couplings from events with four leptons and two jets in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; Physics Letters B, Volume 774, 10 November (2017) Pages 682-705; doi: 10.1016/j.physletb.2017.10.020

Constraints on anomalous Higgs boson couplings using production and decay information in the four-lepton final state; A. M. Sirunyan, A. Tumasyan et al.; Physics Letters B, Volume 775, 10 December (2017) Pages 1-24; doi: 10.1016/j.physletb.2017.10.021

Search for a heavy composite Majorana neutrino in the final state with two leptons and two quarks at  $\sqrt{s}=13$  TeV; A. M. Sirunyan, A. Tumasyan et al.; Physics Letters B, Volume 775, 10 December (2017) Pages 315-337; doi: 10.1016/j.physletb.2017.11.001

Minima of multi-Higgs potentials with triplets of  $\Delta(3n^2)$  and  $\Delta(6n^2)$ ; Ivo de Medeiros Varzielas et al.; Physics Letters B, Volume 775, 10 December (2017) Pages 303-310; doi: 10.1016/j.physletb.2017.11.005

H time domain NMR real time monitoring of polyacrylamide hydrogels synthesis; E. J. R. Rodrigues, P. J. O. Sebastião, M. I. B. Tavares; Polymer Testing, Volume 60, July (2017) Pages 396-404; doi: 10.1016/j.polymertesting.2017.04.028

Tetrahymena cilia cap is built in a multi-step process: a study by atomic force microscopy; C. Seixas, J. Gonçalves, L. V. Melo, H. Soares; Protist, Volume 168, Issue 6, December (2017) Pages 697-717; doi: 10.1016/j.protis.2017.10.001

Unveiling the Third Secret of Fátima:  $\mu$ -XRF quantitative characterization and 2D elemental mapping; M. Manso, S. Pessanha, M. Guerra,

J. L. Figueirinhas, J. P. Santos, M. L. Carvalho; Spectrochimica Acta Part B: Atomic Spectroscopy, Volume 130, 1 April (2017) Pages 35-38; doi: 10.1016/j.sab.2017.02.006

Microfluidic platform with integrated GMR sensors for quantification of cancer cells; G. Kokkinis, S. Cardoso, F. Keplinger, I. Giouroudi, Sensors and Actuators, B: Chemical, 2017, 241, 438-445 (2017); doi: 10.1016/j.snb.2016.09.189

Monolithic integration of GMR sensors for standard CMOS current sensing; A. De Marcellis et al.; Solid-State Electronics, Volume 135, September (2017) Pages 100-104; doi: 10.1016/j.sse.2017.06.034

Improved thermoelectric properties of nanocrystalline hydrogenated silicon thin films by post-deposition thermal annealing; J. Loureiro, T. Mateus, S. Filonovich, M. Ferreira, J. Figueira, A. Rodrigues, B. F. Donovan, P. E. Hopkins, I. Ferreira; Thin Solid Films, Volume 642, 30 November (2017) Pages 276-280; doi: 10.1016/j.tsf.2017.09.047

Ultrashort pulse capability at the L2I high intensity laser facility; G. Figueira et al.; High Power Laser Science and Engineering Volume 5 (2017), e2; doi: 10.1017/hpl.2017.2

Semi-quantitative method for Staphylococci magnetic detection in raw milk; C. M. Duarte, C. Carneiro, S. Cardoso, P. P. Freitas, R. Bexiga; Journal of Dairy Research, (2017) Feb; 84(1):80-88; doi: 10.1017/S0022029916000741

H NMR relaxometry and diffusometry study of magnetic and nonmagnetic ionic liquid-based solutions: Cosolvent and Temperature Effects; P. J. Sebastião; J. Phys. Chem. B, (2017) 121 (51), pp 11472-11484; doi: 10.1021/acs.jpcc.7b07929

Lab-on-chip devices: Gaining ground losing size; V. C. Romão et al.; ACS Nano, (2017) 11 (11), pp 10659-10664; doi: 10.1021/acs.nano.7b06703

Magnetic turbulence in a table-top laser-plasma relevant to astrophysical scenarios; G. Chatterjee et al.; Nature Communications Volume 8, Article number: 15970 (2017); doi: 10.1038/ncomms15970

Efficient generation of energetic ions in multi-ion plasmas by radio-frequency heating; Ye. O. Kazakov et al.; Nature Physics volume 13, pages 973-978 (2017); doi: 10.1038/nphys4167

Tests for the existence of black holes through gravitational wave echoes; V. Cardoso & P. Pani; Nature Astronomy volume 1, pages 586-591 (2017); doi: 10.1038/s41550-017-0225-y

An ultra-high gain and efficient amplifier based on Raman amplification in plasma; G. Vieux et al.; Scientific Reports, Volume 7, Article number: 2399 (2017); doi: 10.1038/s41598-017-01783-4

Towards conductive textiles: coating polymeric fibres with graphene; A. I. S. Neves et al.; Scientific Reports, Volume 7, number: 4250 (2017); doi: 10.1038/s41598-017-04453-7

Stable multi-GeV electron accelerator driven by waveform-controlled PW laser pulses; H. T. Kim et al.; Scientific Reports 7, 10203 (2017); doi: 10.1038/s41598-017-09267-1

Towards large-scale in free-standing graphene and N-graphene sheets; E. Tatarova et al.; Scientific Reports volume 7, number: 10175 (2017); doi: 10.1038/s41598-017-10810-3

Human sexual cycles are driven by culture and match collective moods; I. B. Wood, P. L. Varela, J. Bollen, L. M. Rocha & J. Gonçalves Sá; Scientific Reports Volume 7, Article number: 17973 (2017); doi: 10.1038/s41598-017-18262-5

Rapid and specific detection of cell-derived microvesicles using a magnetoresistive biochip; S. Cherré et al.; Analyst, (2017)142, 979-986; doi: 10.1039/c6an02651f

Spin relaxation studies of Li<sup>+</sup> ion dynamics in polymer gel electrolytes; M. Brinkkötter, M. Gouverneur, P. J. Sebastião, F. Vaca Chávez and M. Schönhoff; Phys. Chem. Chem. Phys. (2017)19, 7390-7398; doi: 10.1039/c6cp08756f

Relaxation of heavy species and gas temperature in the afterglow of a N<sub>2</sub> microwave discharge; C. D. Pintassilgo, and V. Guerra; Eur. Phys. J. Appl. Phys. 80, 10803 (2017); doi: 10.1051/epjap/2017170216

Astrophysical interpretation of Pierre Auger Observatory measurements of the UHECR energy spectrum and mass composition; A. di Matteo et al.; EPJ Web of Conferences 136, 02002 (2017); doi: 10.1051/epjconf/201713602002

The Pierre Auger Observatory Upgrade; G. Marsella, for the Pierre Auger Collaboration; EPJ Web of Conferences 136, 02003 (2017); doi: 10.1051/epjconf/201713602003

Exploiting the radio signal from air showers: The AERA progress; B. Revenua et al.; EPJ Web of Conferences 136, 02013 (2017); doi: 10.1051/epjconf/201713602013

The Pierre Auger Observatory status and latest results; Corinne Berat for the Pierre Auger Collaboration; EPJ Web of Conferences 136, 02017 (2017); doi: 10.1051/epjconf/201713602017

LATTES: a new gamma-ray detector concept for South America; P. Assis et al.; EPJ Web of Conferences 136, 03013 (2017); doi: 10.1051/epjconf/201713603013

Relativistic phenomenology of meson spectra with a covariant quark model in Minkowski space; S. Leitão, A. Stadler, M. T. Peña, and E. P. Biernat; EPJ Web Conf., Volume 137, 06014 (2017); doi: 10.1051/epjconf/201713706014

Recent progress on the understanding of the medium-induced jet evolution and energy loss in pQCD; L. Apolinário; EPJ Web Conf., 137 (2017) 07002; doi: 10.1051/epjconf/201713707002

Nuclear instrumentation and measurement: a review based on the ANIMMA conferences; M. Giot et al.; EPJ Nuclear Sci. Technol., Volume 3, n 33 (2017) page 49; doi: 10.1051/epjn/2017023

Analytical study of growth estimates, control of fluctuations, and conservative structures in a two-field model of the scrape-off layer; R. Vilela Mendes and J. P. S. Bizarro; Physics of Plasmas 24, 012303 (2017); doi: 10.1063/1.4973222

Formation of collisionless shocks in magnetized plasma interaction with kinetic-scale

- obstacles; F. Cruz, E. P. Alves, R. A. Bamford, R. Bingham, R. A. Fonseca, and L. O. Silva; *Physics of Plasmas* 24, 022901 (2017); doi: 10.1063/1.4975310
- Single-stage EHD thruster response to several simulation conditions in nitrogen gas; V. H. Granados, M. J. Pinheiro and P. A. Sá; *Physics of Plasmas* 24, 093508 (2017); doi: 10.1063/1.4986219
- Enhancement of spin-orbit torques in Ta/Co<sub>20</sub>Fe<sub>60</sub>B<sub>20</sub>/MgO structures induced by annealing; Y. Zheng, T. Wang, X. Su, Y. Chen, Y. Wang, H. Lv, S. Cardoso, D. Yang, and J. Cao; *AIP Advances*, Volume 7, Issue 7 (2017) 075305; doi: 10.1063/1.4993765
- Effect of CoFeB electrode compositions on low frequency magnetic noise in tunneling magnetoresistance sensors; P. Wisniowski, M. Dabek, J. Wrona, S. Cardoso, and P. P. Freitas; *Journal of Applied Physics* 122, 213906 (2017); doi: 10.1063/1.5004249
- Ponderomotive beatwave ion acceleration using twisted light; *Physics of Plasmas*; H. Saberi, J. Vieira and L. O. Silva; *Physics of Plasmas* 24, 103131 (2017); doi: 10.1063/1.5005093
- Study of the design and efficiency of single stage EHD thrusters at the sub-atmospheric pressure of 1.3 kPa; V. H. Granados, M. J. Pinheiro and P. A. Sá; *European Physical Society (EPS)*, Vol. 40A; doi: 10.1063/1.5018424
- Axisymmetric oscillations at L-H transitions in JET: M-mode; E. R. Solano et al.; *Nuclear Fusion*, Volume 57, Number 2 (2016) 022021; doi: 10.1088/0029-5515/57/2/022021
- Study of large-angle anharmonic oscillations of a physical pendulum using an acceleration sensor; J. C. Fernandes, P. J. Sebastião, L. N. Gonçalves and A. Ferraz; *European Journal of Physics*, Volume 38, Number 4 (2017) 045004; doi: 10.1088/1361-6404/aa6c52
- Group-theoretical search for rows or columns of the lepton mixing matrix; D. Jurčiukonis and L. Lavoura; *Journal of Physics G: Nuclear and Particle Physics*, Volume 44, Number 4 (2017) 045003; doi: 10.1088/1361-6471/aa5f44
- Maximally restrictive leptonic texture zeros in two-Higgs-doublet models; R. González Felipe and H. Serôdio; *Journal of Physics G: Nuclear and Particle Physics*, Volume 44, Number 6 (2017) 065002; doi: 10.1088/1361-6471/aa659b
- Isotope effects on L-H threshold and confinement in tokamak plasmas; C. F. Maggi et al.; *Plasma Physics and Controlled Fusion*, Volume 60, Number 1 (2017) 014045; doi: 10.1088/1361-6587/aa9901
- Modelling of the temporal evolution of the gas temperature in N<sub>2</sub> discharges; C. D. Pintassilgo, and V. Guerra; *Plasma Sources Science and Technology*, Volume 26, Number 5 (2017) 055001; doi: 10.1088/1361-6595/aa5db2
- The case for in situ resource utilisation for oxygen production on Mars by non-equilibrium plasmas; V. Guerra, T. Silva, P. Ogloblina, M. Grofulović, L. Terraz, M. L. da Silva, C. D. Pintassilgo, L. L. Alves and O. Guitella; *Plasma Sources Science and Technology*, 18 October (2017) Volume 26, Number 11; doi: 10.1088/1361-6595/aa8dcc
- Search for photons with energies above 10e18 eV using the hybrid detector of the Pierre Auger Observatory; A. Aab et al.; *Journal of Cosmology and Astroparticle Physics*, Apr 2017 (2017), 009; doi: 10.1088/1475-7516/2017/04/009
- Combined fit of spectrum and composition data as measured by the Pierre Auger Observatory; A. Aab et al.; *Journal of Cosmology and Astroparticle Physics*, Volume 2017, April 2017, 038, erratum *ibid.*, Volume 2018, March 2018, E02; doi: 10.1088/1475-7516/2017/04/038, erratum 10.1088/1475-7516/2018/03/E02
- Multi-resolution anisotropy studies of ultrahigh-energy cosmic rays detected at the Pierre Auger Observatory; A. Aab et al.; *Journal of Cosmology and Astroparticle Physics*, 06 (2017) 026; doi: 10.1088/1475-7516/2017/06/026
- The DEMO wall load challenge; R. Weninger et al.; *Nuclear Fusion*, Volume 57, Number 4 (2017) 046002; doi: 10.1088/1741-4326/aa4fb4
- Overview of the JET results in support to ITER; X. Litaudon et al.; *Nuclear Fusion*, Volume 57, Number 10 - June (2017), 102001; doi: 10.1088/1741-4326/aa5e28
- Overview of progress in European medium sized tokamaks towards an integrated plasma-edge/wall solution; H. Meyer et al.; *Nuclear Fusion*, Volume 57, Number 10 (2017) 102014; doi: 10.1088/1741-4326/aa6084
- Overview of ASDEX Upgrade results; A. Kallenbach et al.; *Nuclear Fusion*, Volume 57, Number 10 (2017) 102015; doi: 10.1088/1741-4326/aa64f6
- Investigation of the transition of multicycle AC operation in ISTTOK under edge electrode biasing; A. Malaquias, R. B. Henriques, C. Silva, H. Figueiredo, I. S. Nedzelskiy, H. Fernandes, R. Sharma and V. V. Plyusnin; *Nuclear Fusion*, Volume 57, Number 11-July (2017), 116002; doi: 10.1088/1741-4326/aa7c9c
- Testing strong gravity with gravitational waves and Love numbers; E. Franzin, V. Cardoso, P. Pani and G. Raposo; *Journal of Physics: Conference Series*, Volume 841, conference 1 (2017) 012035; doi: 10.1088/1742-6596/841/1/012035
- Spontaneous symmetry breaking in three-Higgs-doublet S<sub>3</sub>-symmetric models; D. Emmanuel-Costa, O. M. Ogreid, P. Osland and M. N. Rebelo; *Journal of Physics: Conference Series*, Volume 873, conference 1 (2017) 012007; doi: 10.1088/1742-6596/873/1/012007
- CP-odd invariants for multi-Higgs models and applications with discrete symmetry; I. de Medeiros Varzielas; *Journal of Physics: Conference Series*, Volume 873, conference 1 (2017) 012035; doi: 10.1088/1742-6596/873/1/012035
- Horizon 2020 EuPRAXIA design study; P. A. Walker et al.; *Journal of Physics: Conference Series*, Volume 874, conference 1(2016) 012029; doi: 10.1088/1742-6596/874/1/012029
- The CMS trigger system; V. Khachatryan; *Journal of Instrumentation*, Volume 12, January (2017) P01020; doi: 10.1088/1748-0221/12/01/P01020
- Impact of atmospheric effects on the energy reconstruction of air showers observed by the surface detectors of the Pierre Auger Observatory; A. Aab et al.; *Journal of Instrumentation* Volume 12 (2017) P02006; doi: 10.1088/1748-0221/12/02/P02006
- Jet energy scale and resolution in the CMS experiment in pp collisions at 8 TeV; V. Khachatryan; *Journal of Instrumentation*, Volume 12, February (2017) P02014; doi: 10.1088/1748-0221/12/02/P02014
- Muon counting using silicon photomultipliers in the AMIGA detector of the Pierre Auger observatory; A. Aab et al.; *Journal of Instrumentation*, vol.12 (2017) P03002; doi: 10.1088/1748-0221/12/03/P03002
- Mechanical stability of the CMS strip tracker measured with a laser alignment system; A. M. Sirunyan et al.; *Journal of Instrumentation*, Volume 12, April (2017) P04023; doi: 10.1088/1748-0221/12/04/P04023
- Particle-flow reconstruction and global event description with the CMS detector; A. M. Sirunyan et al.; *Journal of Instrumentation*, Volume 12, October (2017) P10003; doi: 10.1088/1748-0221/12/10/P10003
- Calibration of the Logarithmic-Periodic Dipole Antenna (LPDA) radio stations at the Pierre Auger Observatory using an Octocopter; A. Aab et al.; *Journal of Instrumentation*, Volume 12, October (2017) T10005; doi: 10.1088/1748-0221/12/10/T10005
- Design and optimization of the electrostatic input module for the ISTTOK Tokamak HIBD cylindrical energy analyzer; R. Sharma, I. S. Nedzelskiy, A. Malaquias and R. B. Henriques; *Journal of Instrumentation*, Volume 12, November (2017), C11018; doi: 10.1088/1748-0221/12/11/C11018
- Boltzmann-Gibbs states in topological quantum walks and associated many-body systems: Fidelity and Uhlmann parallel transport analysis of phase transitions; B. Mera, C. Vlachou, N. Paunković, and V. R. Vieira; *Journal of Physics A: Mathematical and Theoretical*, Volume 50, Number 36 (2017) 365302; doi: 10.1088/1751-8121/aa820e

- The CoRoT target HD 49933: a possible seismic signature of heavy elements ionization in the deep convective zone; A. Brito, I. Lopes; *Monthly Notices of the Royal Astronomical Society*, Volume 466, Issue 2, 11 April (2017) Pages 2123-2130; doi: 10.1093/mnras/stw3241
- GAP listing of the finite subgroups of  $U(3)$  of order smaller than 2000; D. Jurčiukonis and L. Lavoura; *Progress of Theoretical and Experimental Physics*, Volume 2017, Issue 5, 1 May (2017), 053A03; doi: 10.1093/ptep/ptx064
- Measurements of differential cross sections for associated production of a  $W$  boson and jets in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 95, 052002 - Published 13 March 2017; doi: 10.1103/PhysRevD.95.052002
- Quantum dark solitons as qubits in Bose-Einstein condensates; M. I. Shaukat, E. V. Castro, and H. Terças; *Phys. Rev. A* 95, 053618 - 18 May (2017); doi: 10.1103/PhysRevA.95.053618
- $4\pi$  Josephson currents in junctions of hybridized multiband superconductors; T. O. Puel, P. D. Sacramento, and M. A. Continentino; *Phys. Rev. B* 95, 094509 - 15 March (2017); doi: 10.1103/PhysRevB.95.094509
- Collapse of Landau levels in Weyl semimetals; V. Arjona, E. V. Castro, and M. A. H. Vozmediano; *Phys. Rev. B* 96, 081110(R) - 17 August (2017); doi: 10.1103/PhysRevB.96.081110
- Dynamical localization and the effects of aperiodicity in Floquet systems; T. Čadež, R. Mondaini, and P. D. Sacramento; *Phys. Rev. B* 96, 144301 - 2 October (2017); doi: 10.1103/PhysRevB.96.144301
- Haldane model under nonuniform strain; Yen-Hung Ho, Eduardo V. Castro, and Miguel A. Cazalilla; *Phys. Rev. B* 96, 155446 - 26 October (2017); doi: 10.1103/PhysRevB.96.155446
- Raise and collapse of pseudo Landau levels in graphene; E. V. Castro, M. A. Cazalilla, and M. A. H. Vozmediano; *Phys. Rev. B* 96, 241405(R) - 8 December (2017); doi: 10.1103/PhysRevB.96.241405
- Determination of the neutron-capture rate of  $^{17}\text{C}$  for  $r$ -process nucleosynthesis; M. Heine et al.; *Phys. Rev. C* 95, 014613 - 30 January (2017); doi: 10.1103/PhysRevC.95.014613
- Nonadiabatic quasiparticle approach for rotation-particle coupling in triaxial odd-A nuclei; S. Modi, M. Patial, P. Arumugam, E. Maglione, and L. S. Ferreira; *Phys. Rev. C* 95, 024326 - 27 February (2017); doi: 10.1103/PhysRevC.95.024326
- Extracting three-body breakup observables from continuum-discretized coupled-channels calculations with core excitations; R. de Diego, R. Crespo, and A. M. Moro; *Phys. Rev. C* 95, 044611 - 20 April (2017); doi: 10.1103/PhysRevC.95.044611
- Triaxiality in the proton emitter I 109; Swati Modi, M. Patial, P. Arumugam, E. Maglione, and L. S. Ferreira; *Phys. Rev. C* 95, 054323 - 25 May (2017); doi: 10.1103/PhysRevC.95.054323
- Pseudorapidity dependence of long-range two-particle correlations in  $p$  Pb collisions at  $\sqrt{s_{NN}}=5.02$  TeV; V. Khachatryan et al.; *Phys. Rev. C* 96, 014915 - 31 July (2017); doi: 10.1103/PhysRevC.96.014915
- Measurement of inclusive jet cross sections in  $pp$  and  $PbPb$  collisions at  $\sqrt{s_{NN}}=2.76$  TeV; V. Khachatryan et al.; *Phys. Rev. C* 96, 015202 - 17 July (2017); doi: 10.1103/PhysRevC.96.015202
- Effective proton-neutron interaction near the drip line from unbound states in  $^{25,26}\text{F}$ ; M. Vandebrouck et al.; *Phys. Rev. C* 96, 054305 - 8 (2017); doi: 10.1103/PhysRevC.96.054305
- Principal-component analysis of two-particle azimuthal correlations in  $PbPb$  and  $pPb$  collisions at CMS; A. M. Sirunyan et al.; *Phys. Rev. C* 96, 064902 - 5 December (2017); doi: 10.1103/PhysRevC.96.064902
- BB interactions with static bottom quarks from lattice QCD; P. Bicudo, K. Cichy, A. Peters, and M. Wagner; *Phys. Rev. D* 93, 034501 - 4 February 2016; doi: 10.1103/PhysRevD.93.034501
- Inclusive search for supersymmetry using razor variables in  $pp$  collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 95, 012003 - 6 January (2017); doi: 10.1103/PhysRevD.95.012003
- Search for  $R$ -parity violating supersymmetry with displaced vertices in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 95, 012009 - 25 January (2017); doi: 10.1103/PhysRevD.95.012009
- Search for supersymmetry in events with one lepton and multiple jets in proton-proton collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 95, 012011 - Published 27 January (2017); doi: 10.1103/PhysRevD.95.012011
- $\Gamma^*N \rightarrow N^*$  (1520) form factors in the timelike regime; G. Ramalho and M. T. Peña; *Phys. Rev. D* 95, 014003 - 5 January (2017); doi: 10.1103/PhysRevD.95.014003
- New neutrino physics and the altered shapes of solar neutrino spectra; I. Lopes; *Phys. Rev. D* 95, 015023 - 26 January (2017); doi: 10.1103/PhysRevD.95.015023
- Asteroseismic constraints on asymmetric dark matter: Light particles with an effective spin-dependent couplin; A. Martins, I. Lopes, and J. Casanellas; *Phys. Rev. D* 95, 023507-11 January (2017); doi: 10.1103/PhysRevD.95.023507
- Ultralight scalars and resonances in black-hole physics; Ryuichi Fujita and Vitor Cardoso; *Phys. Rev. D* 95, 044016 - 15 February (2017); doi: 10.1103/PhysRevD.95.044016
- Measurements of differential cross sections for associated production of a  $W$  boson and jets in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 95, 052002 - 13 March (2017); doi: 10.1103/PhysRevD.95.052002
- Testing strong-field gravity with tidal Love numbers; V. Cardoso, E. Franzin, A. Maselli, P. Pani, and G. Raposo; *Phys. Rev. D* 95, 084014 - Published 10 April 2017; Erratum *Phys. Rev. D* 95, 089901 (2017); doi: 10.1103/PhysRevD.95.084014
- Measurement of differential cross sections for top quark pair production using the lepton+jets final state in proton-proton collisions at 13 TeV; V. Khachatryan et al.; *Phys. Rev. D* 95, 092001 - 1 May (2017); doi: 10.1103/PhysRevD.95.092001
- Covariantly quantum Galileon; I. D. Saltas and V. Vitagliano; *Phys. Rev. D* 95, 105002 - 17 May (2017); doi: 10.1103/PhysRevD.95.105002
- Quadrupole stellar oscillations: The impact of gravitational waves from the Galactic Center; I. Lopes; *Phys. Rev. D* 95, 123015 - 29 June (2017); doi: 10.1103/PhysRevD.95.123015
- Superradiance in rotating stars and pulsar-timing constraints on dark photons; V. Cardoso, P. Pani, and T.-T. Yu; *Phys. Rev. D* 95, 124056 - 30 June (2017); doi: 10.1103/PhysRevD.95.124056
- Search for supersymmetry in the all-hadronic final state using top quark tagging in  $pp$  collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *Phys. Rev. D* 96, 012004 - 25 July (2017); doi: 10.1103/PhysRevD.96.012004
- Gravitational effects of condensed dark matter on strange stars; G. Panotopoulos and I. Lopes; *Phys. Rev. D* 96, 023002 - 14 July (2017); doi: 10.1103/PhysRevD.96.023002
- Constraining the scalar singlet and inert dark matter models using neutron stars; G. Panotopoulos and I. Lopes; *Phys. Rev. D* 96, 023016 - 31 July (2017); doi: 10.1103/PhysRevD.96.023016
- Raychaudhuri equation in spacetimes with torsion; P. Luz and V. Vitagliano; *Phys. Rev. D* 96, 024021 - 14 July (2017); doi: 10.1103/PhysRevD.96.024021
- Mass ladder operators from spacetime conformal symmetry; Vitor Cardoso, Tsuyoshi Houri, and Masashi Kimura; *Phys. Rev. D* 96, 024044 -24 July (2017); doi: 10.1103/PhysRevD.96.024044
- Self-gravitating oscillons and new critical behavior; T. Ikeda, C.-M. Yoo, and V. Cardoso; *Phys. Rev. D* 96, 064047 - 25 September (2017); doi: 10.1103/PhysRevD.96.064047
- Gravitational wave searches for ultralight bosons with LIGO and LISA; R. Brito, S. Ghosh, E. Barausse, E. Berti, V. Cardoso, I. Dvorkin,



- A. Klein, and P. Pani; Phys. Rev. D 96, 064050 - 27 September (2017); doi: 10.1103/PhysRevD.96.064050
- Search for Higgs boson pair production in the  $b\bar{b}\tau^+\tau^-$  final state in proton-proton collisions at  $\sqrt{s}=8$  TeV; A. M. Sirunyan et al.; Phys. Rev. D 96, 072004 - 20 October (2017); doi: 10.1103/PhysRevD.96.072004
- Measurement of the differential cross sections for the associated production of a W boson and jets in proton-proton collisions at  $\sqrt{s}=13$  TeV; CMS Collaboration; Phys. Rev. D 96, 072005 - 27 October (2017); doi: 10.1103/PhysRevD.96.072005
- Exploring the quark flavor puzzle within the three-Higgs doublet model; D. Emmanuel-Costa, J. I. Silva-Marcos, and N. R. Agostinho; Phys. Rev. D 96, 073006 - 23 October (2017); doi: 10.1103/PhysRevD.96.073006
- Covariant spectator theory of quark-antiquark bound states: Mass spectra and vertex functions of heavy and heavy-light mesons; S. Leitão, A. Stadler, M. T. Peña, and E. P. Biernat; Phys. Rev. D 96, 074007 - Published 6 October (2017); doi: 10.1103/PhysRevD.96.074007
- Orbital fingerprints of ultralight scalar fields around black holes; Miguel C. Ferreira, Caio F. B. Macedo, and Vitor Cardoso; Phys. Rev. D 96, 083017 - 25 October (2017); doi: 10.1103/PhysRevD.96.083017
- Gravitational wave signatures of highly compact boson star binaries; C. Palenzuela, P. Pani, M. Bezares, V. Cardoso, L. Lehner, and S. Liebling; Phys. Rev. D 96, 104058 - 30 November (2017); doi: 10.1103/PhysRevD.96.104058
- Measurement of charged pion, kaon, and proton production in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; Phys. Rev. D 96, 112003 - 5 December (2017); doi: 10.1103/PhysRevD.96.112003
- Inferences on mass composition and tests of hadronic interactions from 0.3 to 100 EeV using the water-Cherenkov detectors of the Pierre Auger Observatory; A. Aab et al.; Phys. Rev. D 96, 122003 - 8 December (2017); doi: 10.1103/PhysRevD.96.122003
- Black-hole head-on collisions in higher dimensions; W. G. Cook, U. Sperhake, E. Berti, and V. Cardoso; Phys. Rev. D 96, 124006 - 6 December (2017); doi: 10.1103/PhysRevD.96.124006
- Search for dark matter and supersymmetry with a compressed mass spectrum in the vector boson fusion topology in proton-proton collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; Phys. Rev. Lett. 118, 021802 - 12 January (2017); doi: 10.1103/PhysRevLett.118.021802
- Observation of charge-dependent azimuthal correlations in p-Pb collisions and its implication for the search for the Chiral Magnetic Effect; V. Khachatryan et al.; Phys. Rev. Lett. 118, 122301 - 24 March 2017; doi: 10.1103/PhysRevLett.118.122301
- Relative modification of prompt  $\psi(2S)$  and  $J/\psi$  Yields from pp to PbPb collisions at  $\sqrt{s}(NN)=5.02$  TeV; A. M. Sirunyan et al.; Phys. Rev. Lett. 118, 162301 - 20 April (2017); doi: 10.1103/PhysRevLett.118.162301
- Mitigation of the hose instability in plasma-wakefield accelerators; T. J. Mehrling, R. A. Fonseca, A. Martinez de la Ossa, and J. Vieira; Phys. Rev. Lett. 118, 174801 - 26 April (2017); doi: 10.1103/PhysRevLett.118.174801
- Uhlmann connection in fermionic systems undergoing phase transitions; B. Mera, C. Vlachou, N. Paunković, and V. R. Vieira; Phys. Rev. Lett. 119, 015702 - 7 July (2017); doi: 10.1103/PhysRevLett.119.015702
- Study of jet quenching with Z+jet correlations in Pb-Pb and ppcollisions at  $\sqrt{s}(NN)=5.02$  TeV; A. M. Sirunyan et al.; Phys. Rev. Lett. 119, 082301 - 23 August (2017); doi: 10.1103/PhysRevLett.119.082301
- Search for low mass vector resonances decaying to quark-antiquark pairs in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; Phys. Rev. Lett. 119, 111802 - 15 September (2017); doi: 10.1103/PhysRevLett.119.111802
- Stochastic and resolvable gravitational waves from ultralight bosons; R. Brito, S. Ghosh, E. Barausse, E. Berti, V. Cardoso, I. Dvorkin, A. Klein, and P. Pani; Phys. Rev. Lett. 119, 131101 - 27 September (2017); doi: 10.1103/PhysRevLett.119.131101
- Search for charged Higgs bosons produced via vector boson fusion and decaying into a pair of w and z bosons using pp collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; Phys. Rev. Lett. 119, 141802 - 4 October (2017); doi: 10.1103/PhysRevLett.119.141802
- Search for supersymmetry in pp Collisions at  $\sqrt{s}=13$  TeV in the single-lepton final state using the sum of masses of large-radius jets; A. M. Sirunyan et al.; Phys. Rev. Lett. 119, 151802 - 13 October (2017); doi: 10.1103/PhysRevLett.119.151802
- Measurement of the  $B^{\pm}$  Meson Nuclear Modification Factor in Pb-Pb Collisions at  $\sqrt{s}(NN)=5.02$  TeV; A. M. Sirunyan et al.; Phys. Rev. Lett. 119, 152301 - 13 October (2017); doi: 10.1103/PhysRevLett.119.152301
- Search for evidence of the type-III seesaw mechanism in multilepton final states in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; Phys. Rev. Lett. 119, 221802 - 1 December (2017); doi: 10.1103/PhysRevLett.119.221802
- Observation of top quark production in proton-nucleus collisions; A. M. Sirunyan et al.; Phys. Rev. Lett. 119, 242001 - 14 December (2017); doi: 10.1103/PhysRevLett.119.242001
- Deep-UV plasma emission in hollow-core photonic crystal fiber; Foued Amrani; F. Delahaye; B. Debord; L. L. Alves; F. Gérôme; F. Benabid; Transparent Optical Networks (ICTON), (2017) 19th International Conference on; doi: 10.1109/ICTON.2017.8024814
- Flexible magnetoresistive sensors designed for conformal integration; J. Gaspar et al.; IEEE Transactions on Magnetics, Volume: 53, Issue: 4, April (2017); doi: 10.1109/TMAG.2016.2623669
- Numerical evaluation of bacterial cell concentration by magnetoresistive cytometry; A. Jitariu; C. Duarte; S. Cardoso; P. P. Freitas; H. Chiriac; IEEE Transactions on Magnetics, Volume: 53, Issue: 4, April (2017); doi: 10.1109/TMAG.2016.2623675
- Toward pTesla detectivities maintaining minimum sensor footprint with vertical packaging of spin valves; M. Silva, D. C. Leitão, S. Cardoso, P. P. Freitas; IEEE Transactions on Magnetics Volume: 53 Issue: 4 (2017); doi: 10.1109/TMAG.2016.2634021
- Advanced NDT inspection tools for titanium surfaces based on high-performance magnetoresistive sensors; F. Franco; F. A. Cardoso; L. S. Rosado; R. Ferreira; S. Cardoso; M. Piedade; P. P. Freitas; IEEE Transactions on Magnetics Volume: 53, Issue: 4, April (2017); doi: 10.1109/TMAG.2016.2636807
- Thermal FMR spectral characterization of very low RA in-plane MgO magnetic tunnel junctions; A. V. Silva, R. Ferreira, E. Paz, D. C. Leitão, T. Devolder, S. Cardoso, P. P. Freitas; IEEE Transactions on Magnetics, Volume: 53, Issue: 11, Nov. (2017) 1401005; doi: 10.1109/TMAG.2017.2707798
- Improved efficiency of tapered magnetic flux concentrators with double-layer architecture; J. Valadeiro, D. C. Leitão, S. Cardoso, P. P. Freitas; IEEE Transactions on Magnetics, Volume: 53, Issue: 11, Nov. (2017) 4003805; doi: 10.1109/TMAG.2017.2712860
- Real-time vertical plasma position control using the heavy ion beam diagnostic; R. B. Henriques et al.; IEEE Transactions on Nuclear Science, Vol.64, Issue: 6, June (2017) 1431 - 1438; doi: 10.1109/TNS.2017.2684139
- SEP protons in GEO measured with the ESA MultiFunctional Spectrometer; L. Arruda et al.; IEEE Transactions on Nuclear Science, Volume: 64, Issue: 8, Aug. (2017); doi: 10.1109/TNS.2017.2714461
- Comment on “Not all counterclockwise thermodynamic cycles are refrigerators”; J. P. S. Bizarro; American Journal of Physics, 85, 861 (2017); doi: 10.1119/1.5005928
- Observation of a large-scale anisotropy in the arrival directions of cosmic rays above  $8 \times 10^{18}$  eV; A. Aab et al.; Science 22 Sep (2017), Vol. 357, Issue 6357 pp. 1266-1270; doi: 10.1126/science.aan4338
- Measurements of the  $t\bar{t}$  production cross section in lepton+jets final states in pp collisions

- sions at 8 TeV and ratio of 8 to 7 TeV cross sections; V. Khachatryan et al.; *The European Physical Journal C*, January (2017) 77:15; doi: 10.1140/epjc/s10052-016-4504-z
- Measurement of the production cross section of a  $W$  boson in association with two  $b$  jets in  $pp$  collisions at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, February (2017) 77:92; doi: 10.1140/epjc/s10052-016-4573-z
- Measurement of the  $t\bar{b}$  production cross section using events in the  $e\mu\mu$  final state in  $pp$  collisions at  $\sqrt{s}=13$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, March (2017) 77:172; doi: 10.1140/epjc/s10052-017-4718-8
- Measurement of the  $WZ$  production cross section in  $pp$  collisions at  $\sqrt{s}=7$  and 8 TeV and search for anomalous triple gauge couplings at  $\sqrt{s}=8$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, April (2017) 77:236; doi: 10.1140/epjc/s10052-017-4730-z
- Higgs EFT for 2HDM and beyond; H. Bélusca-Maïto, A. Falkowski, D. Fontes, J. C. Romão, J. P. Silva; *The European Physical Journal C*, March (2017) 77:176; doi: 10.1140/epjc/s10052-017-4745-5
- Suppression and azimuthal anisotropy of prompt and nonprompt  $J/\psi$  production in  $PbPb$  collisions at  $\sqrt{s}(NN)=2.76$  TeV; V. Khachatryan et al.; *The European Physical Journal C*, April (2017) 77:252; doi: 10.1140/epjc/s10052-017-4781-1
- A search for new phenomena in  $pp$  collisions at  $\sqrt{s}=13$  TeV in final states with missing transverse momentum and at least one jet using the  $\alpha_T$  variable; V. Khachatryan et al.; *The European Physical Journal C*, May (2017) 77:294; doi: 10.1140/epjc/s10052-017-4787-8
- Measurement of prompt and nonprompt  $J/\psi$  production in  $pp$  and  $pPb$  collisions at  $\sqrt{s}(NN) = 5.02$  TeV; A. M. Sirunyan et al.; *The European Physical Journal C*, April (2017) 77:269; doi: 10.1140/epjc/s10052-017-4828-3
- Searches for pair production of third-generation squarks in  $\sqrt{s}=13$  TeV  $pp$  collisions; A. M. Sirunyan et al.; *The European Physical Journal C*, May (2017), 77:327; doi: 10.1140/epjc/s10052-017-4853-2
- Measurement of the top quark mass using single top quark events in proton-proton collisions at  $\sqrt{s}=8$  TeV; A. M. Sirunyan et al.; *The European Physical Journal C*, May (2017) 77:354; doi: 10.1140/epjc/s10052-017-4912-8
- Vector-like quarks at the origin of light quark masses and mixing; F. J. Botella, G. C. Branco, M. Nebot, M. N. Rebelo, J. I. Silva-Marcos; *The European Physical Journal C*, June (2017) 77:408; doi: 10.1140/epjc/s10052-017-4933-3
- Measurement of double-differential cross sections for top quark pair production in  $pp$  collisions at  $\sqrt{s}=8$  TeV and impact on parton distribution functions; A. M. Sirunyan et al.; *The European Physical Journal C*, July (2017) 77:459; doi: 10.1140/epjc/s10052-017-4984-5
- Measurement of the jet mass in highly boosted  $t\bar{b}$  events from  $pp$  collisions at  $\sqrt{s}=8$  TeV; A. M. Sirunyan et al.; *The European Physical Journal C*, July (2017) 77:467; doi: 10.1140/epjc/s10052-017-5030-3
- Search for physics beyond the standard model in events with two leptons of same sign, missing transverse momentum, and jets in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *The European Physical Journal C*, September (2017) 77:578; doi: 10.1140/epjc/s10052-017-5079-z
- Measurements of the associated production of a  $Z$  boson and  $b$  jets in  $pp$  collisions at  $\sqrt{s}=8$  TeV; Khachatryan et al.; *The European Physical Journal C*, November (2017) 77:751; doi: 10.1140/epjc/s10052-017-5140-y
- Search for new phenomena with multiple charged leptons in proton-proton collisions at  $\sqrt{s}=13$  TeV; Khachatryan et al.; *The European Physical Journal C*, September (2017) 77:635; doi: 10.1140/epjc/s10052-017-5182-1
- Search for heavy resonances that decay into a vector boson and a Higgs boson in hadronic final states at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *The European Physical Journal C*, September (2017) 77:636; doi: 10.1140/epjc/s10052-017-5192-z
- Measurement of the jet mass in highly boosted  $t\bar{b}$  events from  $pp$  collisions at  $\sqrt{s}=8$  TeV; A. M. Sirunyan et al.; *The European Physical Journal C*, July (2017) 77:467; doi: 10.1140/epjc/s10052-017-5248-0
- Search for new phenomena with the  $M_{[T2]}$  variable in the all-hadronic final state produced in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *The European Physical Journal C*, October (2017) 77:710; doi: 10.1140/epjc/s10052-017-5267-x
- Measurement of the triple-differential dijet cross section in proton-proton collisions at  $\sqrt{s}=8$  TeV and constraints on parton distribution functions; A. M. Sirunyan et al.; *The European Physical Journal C*, November (2017) 77:746; doi: 10.1140/epjc/s10052-017-5286-7
- Search for dark matter produced in association with heavy-flavor quark pairs in proton-proton collisions at  $\sqrt{s}=13$  TeV; A. M. Sirunyan et al.; *The European Physical Journal C*, December (2017) 77:845; doi: 10.1140/epjc/s10052-017-5317-4
- On quasidegeneracy of Majorana neutrinos and the observed pattern of leptonic mixing; M. N. Rebelo; *Particle Physics at the Year of Light, Proceedings of the 17th Lomonosov Conference on Elementary Particle Physics* (2017); doi: 10.1142/9789813224568\_0019
- Bottom-up discrete symmetries for Cabibbo mixing; Ivo de Medeiros Varzielas, Rasmus W. Rasmussen, and Jim Talbert; *Int. J. Mod. Phys. A* 32, 1750047 (2017); doi: 10.1142/S0217751X17500476
- Unipolar nonvolatile resistive switching in Pt/MgO/Ta/Ru structures deposited by magnetron sputtering; L. M. Guerra, C. Dias, J. Pereira, H. Lv, S. Cardoso, P. P. Freitas, J. Ventura; *Journal of Nanoscience and Nanotechnology*, Volume 17, Number 1, January 2017, pp. 564-567(4); doi: 10.1166/jnn.2017.12333
- Gas mixture for deep-UV plasma emission in a hollow-core photonic crystal fiber; F. Amrani, F. Delahaye, B. Debord, L. L. Alves, F. Grome, and F. Benabid; *Optics Letters* Vol. 42, Issue 17, pp. 3363-3366 (2017); doi: 10.1364/OL.42.003363
- Early and real-time detection of seasonal influenza onset; M. Won, M. Marques-Pita, C. Louro, J. Gonçalves-Sá; *PLoS Comput Biol* 13(2) 2017; doi: 10.1371/journal.pcbi.1005330
- LATTES: A new gamma-ray detector concept for South America; P. Assis et al.; *Il Nuovo Cimento C*, Year 2017 - Issue 3 - MAY-JUNE, SciNeGHE (2016); doi: 10.1393/ncc/i2017-17116-4
- Electronic energy meter based on a tunnel magnetoresistive effect (TMR) current sensor; E. García Vidal et al.; *Materials* (2017), 10(10), 1134; doi: 10.3390/ma10101134
- Optimization and characterization of high-harmonic generation for probing solid density plasmas; J. C. P. Koliyadu et al.; *Photonics* (2017) 4 (2), 25; doi: 10.3390/photonics4020025
- Generation and applications of extreme-ultraviolet vortices; C. Hernández-García, J. Vieira, J. T. Mendonça, L. Rego, J. San Román, L. Plaja, P. R. Ribic, D. Gauthier and A. Picón; *Photonics* (2017) 4(2), 28; doi: 10.3390/photonics4020028
- A theoretical study of the outer layers of eight KeplerF-stars: the relevance of ionization processes; A. Brito and I. Lopes; *The Astrophysical Journal*, Volume 843, Number 1 (2017) 75; doi: 10.3847/1538-4357/aa7463
- Gravitational waves from stellar black hole binaries and the impact on nearby sun-like stars; I. Lopes and J. Silk; *The Astrophysical Journal*, Volume 844, Number 1 (2017) 39; doi: 10.3847/1538-4357/aa7758
- Magnetohydrodynamic turbulence mediated by reconnection; S. Boldyrev and N. F. Loureiro; *The Astrophysical Journal*, Volume 844, Number 2 (2017) 125; doi: 10.3847/1538-4357/aa7d02
- Fully kinetic versus reduced-kinetic modeling of collisionless plasma turbulence; D. Grošelj, S. S. Cerri, A. Bañón Navarro, C. Willmott, D. Told, N. F. Loureiro, F. Califano, and F. Jenko; *The Astrophysical Journal*, Volume 847, Number 1 (2017) 28; doi: 10.3847/1538-4357/aa894d

Neutron stars: a novel equation of state with induced surface tension; V. V. Sagun and I. Lopes; *The Astrophysical Journal*, Vol. 850, n1 página (2017) 75; doi: 10.3847/1538-4357/aa92cf

Collisionless reconnection in magnetohydrodynamic and kinetic turbulence; Nuno F. Loureiro and Stanislav Boldyrev; *The Astrophysical Journal*, Volume 850, Number 2 (2017) 182; doi: 10.3847/1538-4357/aa9754

A targeted search for point sources of EeV photons with the Pierre Auger Observatory; A. Aab et al.; *The Astrophysical Journal Letters*, Volume 837, Number 2, L25 (2017); doi: 10.3847/2041-8213/aa61a5

Multi-messenger observations of a binary neutron star merger; B. P. Abbott et al.; *The Astrophysical Journal Letters*, Volume 848, Number 2, L12; doi: 10.3847/2041-8213/aa91c9

Evidence for a time lag in solar modulation of galactic cosmic rays; N. Tomassetti, M. Or-

cinha, F. Barão, and B. Bertucci; *The Astrophysical Journal Letters*, Volume 849, Number 2 (2017) L32; doi: 10.3847/2041-8213/aa9373

Search for high-energy neutrinos from binary neutron star merger GW170817 with ANTARES, IceCube, and the Pierre; A. Albert et al.; *The Astrophysical Journal Letters* 850 L35 (2017); doi: 10.3847/2041-8213/aa9aed

Heavy and heavy-light mesons and the Lorentz structure of the quark-antiquark interaction; S. Leitão, A. Stadler, M. T. Peña, E. P. Biernat; *Acta Physica Polonica B Proceedings Supplement*, Vol. 10 (2017) n 4; doi: 10.5506/APhysPolBSupp.10.939

Simulation of a Portuguese limestone masonry structure submitted to fire: 3D ultrasonic tomography approach; E. Martinho, M. Mendes, A. Dionísio; *International Journal of Conservation Science*, Oct-Dec (2017) Vol. 8 Issue 4, p565-580. 16p.

## BOOKS

Cruz, C. R., Figueirinhas, J. L., Sebastião, P. J. (2017). *MR of Liquid Crystal Dendrimers* Pan Stanford Publishing Pte. Ltd., Singapore 038988. ISBN: 978-981-4745-72-7

Bicudo, P., Sacramento, P. D., Cardoso, M., Correia, M. M., Martins, S. F., Monteiro, R., Paulos, M. F., João Gomes Rosa, Santos, Jorge E. (2017). *Mecânica Quântica - 2ª Edição revista e aumentada*, IST Press, IST, Lisboa. ISBN: 978-989-8481-54-2



*Professor Luís Oliveira e Silva is honored by the President of the Portuguese Republic Marcelo Rebelo de Sousa. Image by Débora Rodrigues/Técnico Lisboa.*

## SCIENTIFIC HONOURS & AWARDS

**The following members of the DF were recognized for their outstanding scientific achievement with the following honours and awards:**

In 2016, Prof. Luís Oliveira e Silva was awarded with the honour “Grande Oficial da Ordem da Instrução Pública” by the President of the Portuguese Republic.

Prof. Luís Oliveira e Silva was elected Fellow of the European Physics Society in 2017.

Prof. Teresa Peña was elected in 2017 to the Executive Committee of the European Physics Society.



PART 5

# SCIENCE & SOCIETY



Students test a Van de Graaff generator at NFIST's "Semana da Física".  
Image by Débora Rodrigues/Técnico.

The DF is also increasing its links to industry and companies, with the help of the network of Alumni and of those Research Units more oriented towards technologies and physics applications. With these links, we reinforce the possibilities for placing our students in temporary internships and we bridge the gap between research and society.

The following is a selection of regular outreach activities involving the DF, presented per chronological order of the events along the year, that ends with the statistics of visits to secondary schools during the period reported. This period was particularly special for the DF, because in 2016-2017 the MEFT has celebrated 30 years after his foundation.

## SUPPORT TO NFIST ACTIVITIES

The DF supports NFIST - Núcleo de Física do IST - the association of physics' students at IST, and both institutions are involved in several joint activities. The DF supported the organization of the NFIST's 19th and 20th "Semana da Física", from 15 to 20 February 2016 (sf19.nfist.pt) and from 20 to 25 February 2017 (sf20.nfist.

pt), respectively, which attracted more than 2300 students from basic and secondary schools each year, and the organization of NFIST's 3rd and 4th "Jornadas de Engenharia Física" (JEF) on the 2nd and 3rd march 2016 (jef.nfist.pt/2016/programa.php) and on the 1st and 2nd march 2017 (jef.nfist.pt/2017/programa.php), respectively.

## MASTERCLASSES

IPPOG - International Particle Physics Outreach Group (ippog.org) - is an international collaboration dedicated to the promotion of particle physics and associated technologies within the young and in the society. Among the flagship activities of IPPOG it stands out the International Masterclasses in Particle Physics (IMCs), started in 2005 with the participation of DF/IST and LIP (Laboratório de Instrumentação e Física Experimental de Partículas) as one of the founding partners, whose Portuguese representative and national coordinator is a faculty member of the DF.

In the IMCs, now taking place in 15 locations in Portugal, high-school students go to the university to "Be a Scientist for a day... with the Hands-on Particles". During a full day, students have introductory talks, analyse real data from CERN experiments and participate in an international video-conference based at CERN.

In 2016 and 2017, the DF co-organized with LIP two sessions, in March/April of each year at IST, attracting more than 240 students/session. These constitute the largest groups ever present in an

The Department of Physics (DF) is strongly committed to promote scientific literacy in the society and to engage the young in pursuing careers in science, technology, engineering, arts and mathematics, particularly in physics and engineering physics related subjects. Many faculty have an important role in the dissemination of knowledge to society, either scientifically or in outreach activities; scientifically, by publishing in peer reviewed journals and by serving as members of editorial boards, of conference/workshop committees, and of professional societies with selected membership; in outreach activities, as active organizers and participants of widespread events, as speakers in talks for undergraduate students and for the general public, as coordinators/members of communication bodies and educational projects, as authors of books and press articles for the general public, and as authors/participants in programmes

and interviews broadcasted via TV, radio, internet or in printed media. In particular, members of the DF prepared the following outreach videos regarding the discovery of gravitational waves:

*Discovery of gravitational waves and electromagnetic waves from the collision of two neutron stars* ([www.youtube.com/watch?v=IUMpuh-9too](http://www.youtube.com/watch?v=IUMpuh-9too))

*The attribution of the 2017 Nobel Prize in Physics to the Gravitational Waves* ([www.youtube.com/watch?v=4DwrYbUkH9E](http://www.youtube.com/watch?v=4DwrYbUkH9E))

*What are gravitational waves and the LIGO discovery* ([www.youtube.com/watch?v=w8EIXKL6IGU](http://www.youtube.com/watch?v=w8EIXKL6IGU))

*LIGO discovered gravitational waves* ([www.youtube.com/watch?v=-j5K-3Fpn2U](http://www.youtube.com/watch?v=-j5K-3Fpn2U))

IMC day worldwide and, with the support of IST, these sessions have contributed largely to the total number of 1800 participants/year in Portugal, about 15% of the world participation

## PHYSICS OLYMPIADS

Since 2010, the regional phase of the southern Physics Olympiads takes place at IST/Taguspark, in a co-organization by the Portuguese Physics Society and the DF. In these Olympiads, students from schools can compete at two levels to solve theoretical problems and an experimental problem: the A-level (9th grade; groups of up to three students) and the B-level (11th grade, individual competition). In 2016 (and 2017) the regional Physics Olympics happened on April 16th (April 29th) and had the participation of 34 teams (43 teams) at the A-level and 129 students (129 students) at the B-level.

## IST DAY/ KEEP IN TOUCH

In 2016 and 2017, the DF joined the celebrations of IST Day, and the corresponding “Keep In Touch” activities proposed by IST. In 2016, several alumni presented their post-graduated experience, spanning testimonials from industry to research, in physics and applied physics/engineering, as well as in energy and economy.

in these activities. Also, members of the DF helped coordinating and provided support to the IMCs in Azores, Bragança, Vila Real, Évora, Beja and Faro.

In addition to the students, we have also welcomed nearly 80 accompanying teachers, who have followed an outreach seminar while the students were doing the exams.

In 2016 we acknowledge Prof. Paulo Crawford, who spoke about the discovery of gravitational waves, and in 2017 we acknowledge Prof. Paulo André, who spoke about communications in dark optical fibers.

In 2017, the event was integrated in the celebration of MEFT’s 30th anniversary. The DF presented a class with demonstration experiments in the auditorium Abreu Faro, which attracted dozens of people, showing also experiments prepared by NFIST at the entrance to the auditorium.



*High school students attend a masterclass.  
Image by Técnico Lisboa.*

## THE MEFT WORKSHOPS

### MEFT - Challenging the limits of science and technology

The 5th and 6th Workshops to promote the MEFT to high-school students, especially those in the 12th grade, took place at IST on June 2016 and June 2017, respectively, right after the last national exams. Since 2012, the DF and the MEFT coordination co-organize this two-days’ workshop ([meft-desafiarlimites.weebly.com](http://meft-desafiarlimites.weebly.com)) that brings to the audience many hot topics in very-short talks (10 minutes), showcasing the best of the DF and of the different activities carried out by MEFT alumni. The workshop includes also visits to the labora-

tories of the DF and its associated research units. During the workshop the students pose questions of both scientific and practical nature, related with physics and the physics course at IST. This key activity has helped shaping the profile of the candidates to MEFT and has greatly contributed to the increase in the minimum grade to access the course. The number of participants was 75 (34 women and 41 men) in 2016, and 57 (23 women and 34 men) in 2017.

### **MEFT - Extending the limits of science and technology**

The DF and the MEFT Coordination launched in 2017 the Workshop MEFT - Extending the limits of Science and Technology, as part of the celebration of the 30th anniversary of MEFT, aiming to promote the 2nd cycle of the MEFT to the students

of its 1st cycle. The event presented the numerous opportunities for research and innovation available in the five scientific areas of the DF and its associated research units, maintaining cooperation programmes with several excellent research facilities around the world, and promoted a debate about the MEFT and the expectations and suggestions of the students.

was presented by Prof. José Sande Lemos, evoking Isaac Newton. The first edition of Newtonmas was chosen to present the new logo for the MEFT [MEFT - Boosting the future]. In total, 221 people (55 women and 166 men) participated in the event.

In 2017, the DF invited Prof. Clément Mouhot (University of Cambridge, UK), an expert mathematician in statistical physics, to deliver a “IST Distinguished Lecture” on his work about “Landau damping”, which granted the Fields Medal

in 2010. The celebration of the 30th anniversary of MEFT was closed during this event, with the announcement of several distinctions granted to the students by the DF and the Coordination of the MEFT: the Awards for Academic Excellence in the MEFT and the Distinctions for the Best Master Theses per scientific area, which included a brief presentation of the results achieved by the awardees. A total of 198 people (53 women and 145 men) participated in the event.

## PHYSICS TECHNOLOGY DAY

This one-day workshop was launched in 2017, as part of the celebration of the 30th anniversary of MEFT. It gathered companies, small and medium enterprises and research institutes that presented their activities related with applied physics and technologies. The event provided a great opportunity for sharing with the students the state-of-the-art technologies and challenges in the areas of robotics, power electronics, bio-

medical physics and engineering, microelectronics, among others, and for promoting a direct interaction between the students and the 19 participant entities. As an outcome, the Physics Technology Day enabled future collaborations and careers in applied physics and engineering, fostering also opportunities for recruiting talented students from IST, that visited the Workshop.

## SCHOOL VISITS

### **Visits from schools**

There are regular requests of high-schools to visit IST, which are normally handled by NAPE, the student support unit of IST. The groups requesting visits to the facilities located at the DF or its associated research units are handled directly by the DF.

Additionally, several schools visit IST after direct contact with the Research Units or as part of the programme of NFIST's Physics Week - “Semana da Física”, which receives more than 2000 students a year.

### **Outreach seminars at schools and other institutions**

The DF faculty are well engaged with the Society and try hard to answer all the requests from schools and other institutions across the country, to receive a scientist/teacher. These visits normally include a presentation by the members of the DF on a feature hot topic, properly adapted to the group's age (between 5-18 years old), after which the students have the possibility to ask questions about physics, the IST and the MEFT. In 2016 and 2017, more than 160 outreach talks were delivered by members of the DF at high-schools and other institutions. Of these, 48 talks were made in the scope of the project “Espaço vai à escola” from ESERO-Portugal.

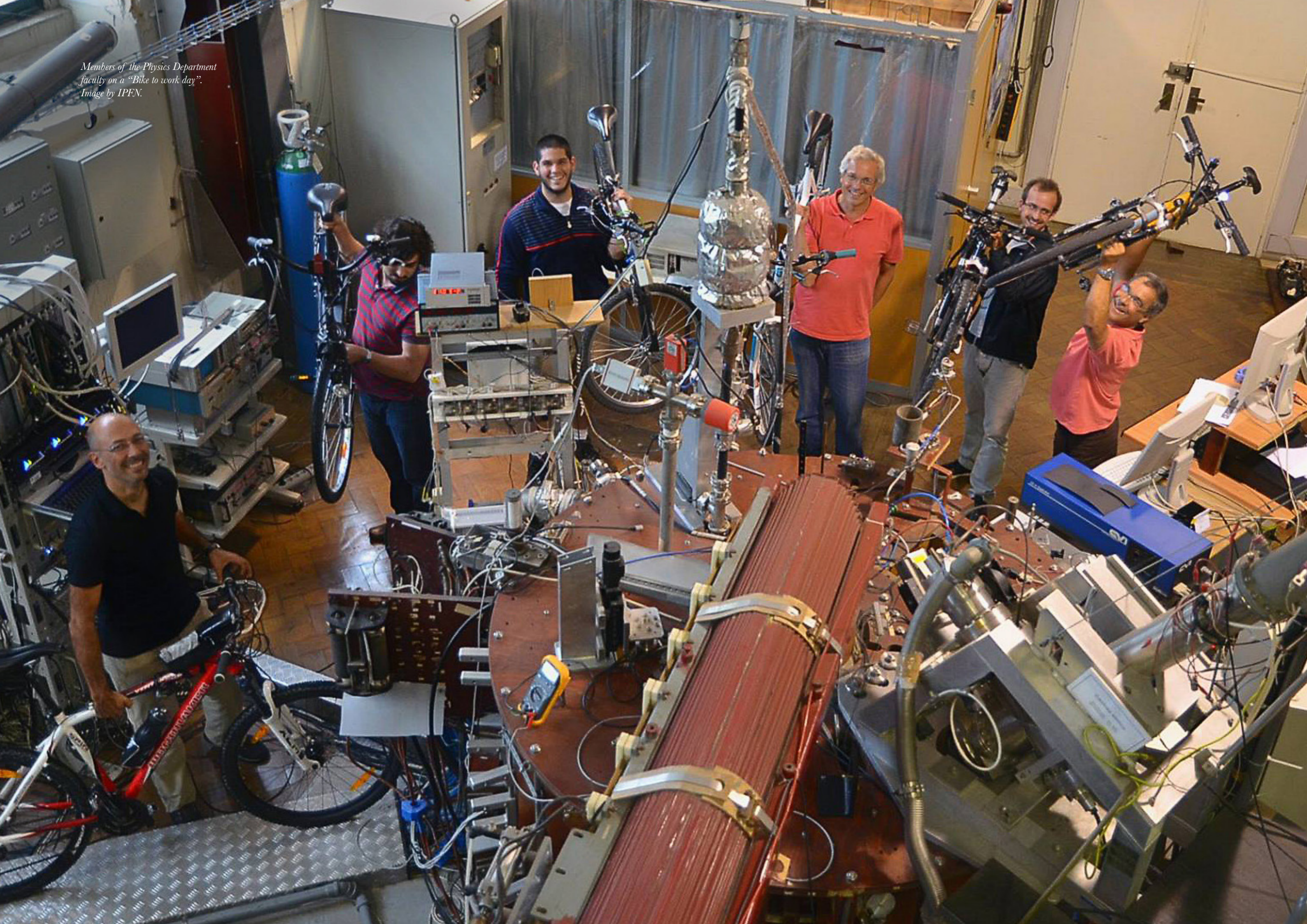
## NEWTONMAS

In 2016, the DF launched this very innovative event to celebrate the 30th anniversary of the MEFT and the birthday of Isaac Newton (25th December, 1642, in the Julian calendar). The Newtonmas was organized on a Saturday afternoon and evening, after the last lecture-day of

the first term, serving also to gather the students, the faculty and the staff of the DF, in a special end-of-the-year celebration.

In 2016, the history of the MEFT was reviewed by several speakers, and a seminar about gravitation

*Members of the Physics Department  
faculty on a "Bike to work day".  
Image by IPFN.*





# FACULTY

The heart of the DF is composed by its faculty (with both permanent and invited members), collaborators, and administrative and technical staff. These are people that give life to the department, contributing to its success.

## In 2016 and 2017, the following faculty were recruited/promoted:

Teresa Peña, Full Professor  
Vitor Cardoso, Full Professor  
Pedro Bicudo, Associate Professor  
Pedro Sebastião, Associate Professor  
Marta Fajardo, Assistant Professor  
Pedro Assis, Assistant Professor  
Bruno Gonçalves, Principal Investigator  
Carlos Silva, Principal Investigator  
Rui Coelho, Assistant Investigator

## The DF also thanks its collaborators in 2016 and 2017:

André Lopes  
Angela Mecca  
Antonio Tejero-Del-Caz  
António Samuel Ávila Balula  
Carlos Augusto Santos Silva  
Daniele Vernieri  
David Mathew Hilditch  
Diogo Bragança  
Diogo Da Silva Duarte Cruz  
Domenica Corona  
Eduardo Jorge Da Costa Alves  
Elena Stefanova Tatarova  
Elmar Biernat  
Fábio Cruz

## In 2016 and 2017, the following faculty left the DF:

Jorge Loureiro, Associated Professor (Retired)  
Eduardo Castro, Assistant Professor (Moved to UPorto)  
João Fonseca, Assistant Professor (Leave of absence)

We thank them for their dedication and commitment to the success of the DF, during the years of service.

Gareth Oisin Williams  
Gonçalo Quinta  
Henrique Leal  
Hugo Fernando Santos Terças  
João Carlos Nogueira de Brito Fortunato  
João Daniel Marques Rodrigues  
João Luis de Figueiredo Rosa  
João Vargas  
Jorge Lopes  
José Manuel das Neves Rodrigues  
José Maria Vargas Lopes  
Katharina Lorenz  
Kevin Michael Schoeffler  
Manuel Peres Alonso

Maria Teresa Ferreira Marques Pinheiro  
Miguel Alexandre Ribeiro Correia  
Miguel Reis Orcinha  
Miguel Rodrigues Zilhão Nogueira  
Myriam Arnal Rodrigues  
Nelson Manuel Carreira Lopes  
Nuno Rombert Pinhão  
Paulo Jorge Rodrigues  
Pedro Lourenço  
Pedro Manuel Peixoto Teles

Pedro Ricardo Charters Ribeiro da Cunha Sanguino  
Raul de Diego Martinez  
Ricardo Parreira de Azambuja Fonseca  
Rodrigo Clemente Velez Mateus  
Rodrigo Vicente  
Sofia Freitas  
Sofia Isabel Cardoso de Almeida Leitão  
Thomas Emmanuel Aurelien Grismayer  
Victoria Corregidor Berdasco  
Vânia Cristina Henriques Silvério

## Tenure-track/tenured professors & invited professors:

Alessandro de Angelis  
Alfred Stadler  
Amaro José Rica da Silva  
Amílcar José Ferros Praxedes  
Ana Maria Guerreiro Martins  
Ana Maria Heleno Branquinho de Amaral  
Ana Maria Vergueiro Monteiro Cidade Mourão  
André David Tinoco Mendes  
António Jorge Duarte de Castro Silvestre  
António Mário Pereira Ferraz  
Artur Jorge Louzeiro Malaquias  
Bernardo António Neto Gomes Baptista Tomé  
Bernardo Brotas de Carvalho  
Carlos Manuel dos Santos Rodrigues da Cruz  
David Emanuel da Costa  
David Pacheco Resendes  
Diana Cristina Pinto Leitão  
Eduardo Filipe Vieira de Castro  
Enrico Maglione  
Fernando José de Carvalho Barão  
Filipe Rafael Joaquim  
Gernot Eichmann  
Gonçalo Nuno Marmelo Foito Figueira  
Heinrich Hoerber  
Helena Cristina Ramos Jerónimo Dias Alves  
Horácio João Matos Fernandes  
Ilídio Pereira Lopes  
Ivo Varzielas  
João Alberto dos Santos Mendanha Dias  
João Carlos Azevedo Gaspar  
João Carlos Carvalho de Sá Seixas  
João Carlos Ferreira Fernandes  
João Filipe de Barros Duarte Fonseca  
João Luís Maia Figueirinhas  
João Paulo Ferreira da Silva  
João Pedro Saraiva Bizarro  
Joaquim Inácio da Silva Marcos  
Jorge Manuel Amaro Henriques Loureiro

Jorge Manuel Rodrigues Crispim Romão  
Jorge Miguel Ramos Domingues Ferreira Vieira  
José Emilio Fernandes Tavares Ribeiro  
José Guilherme Teixeira de Almeida Milhano  
José Luis Rodrigues Júlio Martins  
José Pizarro de Sande e Lemos  
Liliana Marisa Cunha Apolinário  
Luís Filipe Moreira Mendes  
Luís Humberto Viseu Melo  
Luís Manuel Balio Lavoura  
Luís Miguel Faria Pereira Lopes da Silva  
Luís Miguel de Oliveira e Silva  
Luís Paulo da Mota Capitão Lemos Alves  
Maria Joana Patrício Gonçalves de Sá  
Maria Manuela de Sousa Mendes  
Maria Margarida Nesbitt Rebelo da Silva  
Maria Raquel Nunes Pereira Crespo  
Maria Teresa Haderer de la Peña Stadler  
Marta Leitão Mota Fajardo  
Michele Gallinaro  
Mário António Prazeres Lino da Silva  
Mário José Gonçalves Pinheiro  
Mário João Martins Pimenta  
Nuno Filipe Gomes Loureiro  
Nuno Miguel Ribeiro Cardoso  
Patrícia Carla Serrano Gonçalves  
Pedro Domingos Santos do Sacramento  
Pedro Jorge dos Santos Assis  
Pedro José Gonçalves Ribeiro  
Pedro José Oliveira Sebastião  
Pedro José de Almeida Bicudo  
Pedro Miguel Félix Brogueira  
Pedro Morais Salgueiro Teixeira de Abreu  
Pietro Faccioli  
Reinhard Horst Schwarz  
Ricardo Jorge González Felipe  
Ruben Maurício da Silva Conceição  
Rui Manuel Agostinho Dilão



Image by Débora Rodrigues/Técnico.



**Alfred Stadler**

*Invited Assistant Professor*

**Area:** Particle Physics & Nuclear Physics  
**PhD:** Karl-Franzens Universität Graz, 1989.  
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**Research area & interests:**

Alfred Stadler's research activities are focused on the theory of strongly interacting particles. In particular, he has developed a relativistic model of the interaction between two nucleons (neutrons and protons), and has shown, by solving the corresponding relativistic three-nucleon equations exactly, that they lead to an accurate description of the three-nucleon bound states (the light nuclei tritium and helium-3). Currently he investigates the structure of mesons as relativistic quark-antiquark bound states. He teaches physics at the University of Évora and has supervised two Masters and two PhD theses.

**Selected References:**

Leitão, S., Stadler, A., Peña, M., & Biernat, E. P. (2017). Covariant spectator theory of quark-antiquark bound states: Mass spectra and vertex functions of heavy and heavy-light mesons. *Physical Review D*, 96(7). doi:10.1103/physrevd.96.074007.

Gross, F., & Stadler, A. (2008). Covariant spectator theory of np scattering: Phase shifts obtained from precision fits to data below 350 MeV. *Physical Review C*, 78(1). doi:10.1103/physrevc.78.014005.

Stadler, A., & Gross, F. (1997). Relativistic Calculation of the Triton Binding Energy and Its Implications. *Physical Review Letters*, 78(1), 26-29. doi:10.1103/physrevlett.78.26.

Samuel Rodrigues Martins Eleutério  
 Susana Isabel Pinheiro Cardoso de Freitas  
 Sérgio Eduardo de Campos Costa Ramos  
 Umesh Vinaica Mardolcar  
 Vasco António Dinis Leitão Guerra  
 Vincenzo Vitagliano  
 Vitor Manuel dos Santos Cardoso  
 Vitor João Rocha Vieira

**Tenure-track/tenure investigators**

Bruno Miguel Soares Gonçalves  
 Carlos Alberto Nogueira Garcia da Silva  
 Rui Miguel Dias Alves Coelho

**Administrative and technical staff**

Ana Bela Gomes dos Santos Pires Cardoso  
 Daniel de Jesus Mendes Lala  
 Dulce Maria Martins da Conceição  
 Hélder Alexandre Armário Santos Carvalho  
 João Paulo dos Santos Guerreiro  
 Maria de Fátima da Fonseca Sousa Correia  
 Maria de Fátima da Silva Casquilho  
 Martinha Viegas de Sousa  
 Pedro Nuno da Silva Claro  
 Sandra Cristina Gonçalves de Oliveira dos Santos  
 Sandra Rodrigues José Martins



### Alessandro de Angelis

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#### Research area & interests:

Alessandro de Angelis is a high-energy physicist and astrophysicist. Full Professor at the University of Udine and the IST of the University of Lisbon, he is currently Director of Research at INFN Padova and chairman of the collaboration board managing the MAGIC gamma-ray telescope at the Northern European Observatory, La Palma, Canary Islands. His main research interest is fundamental physics, especially astrophysics and elementary particle physics at accelerators. After graduating from Padova University, de Angelis was employed at CERN in the 1990s, and he later became a founding member of the collaboration board managing the NASA Fermi gamma-ray telescope. He has been a lecturer in electromagnetism and astroparticle physics in Italy and Portugal and Visiting Professor at the ICRR in Tokyo, the Max-Planck Institute in Munich, and the University of Paris VI.

#### Selected references:

De Angelis, A. and Pimenta, M. (a2015). *Introduction to particle and astroparticle physics*, Springer (700 pp.). ISBN 978-88-470-2688-9.

Fermi-LAT Collaboration/M. Ackermann et al. (2013). Detection of the characteristic pion-decay signature in supernova remnants. *Science* 339 807. Cited by 190 records. doi: 10.1126/science.1231160

MAGIC Collaboration/J. Aleksic et al.(2011). Searches for dark matter annihilation signatures in the Segue 1 satellite galaxy with the MAGIC-I telescope. *Journal of Cosmology and Astroparticle Physics - JCAP*. 6. Cited by 102 records. doi: 10.1088/1475-7516/2011/06/035.



### Amaro J. Rica da Silva

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#### Research area & interests:

Amaro Rica da Silva studies new computational methods applied to astrophysical problems, from planetary physics to solar flares to supernova characterization. The main focus is the exploration of the multi-scale description of these highly complex systems, either by using wavelet analysis, empirical mode decompositions or integral transforms for spectral analysis. Also interested into possible applications of deep neural networks and unsupervised learning modeling in physics with convolutional nets. These methods should allow the analysis of high-dimensional dynamical systems incorporating a priori knowledge with mesh-free methods, future prediction with incomplete information and training, hierarchical feature representation, extraction and classification.

#### Selected references:

R. da Silva, A. J., & Lemos, J. P. (2008). Binary collisions and the slingshot effect. *Celestial Mechanics and Dynamical Astronomy*, 100(3), 191-208. doi:10.1007/s10569-007-9114-5.

R. da Silva. Galois Groups in the work of Mira Fernandes (2010-2011). *Boletim da Sociedade Portuguesa de Matemática, Numero Especial - Aureliano Mira Fernandes*: 125-145. <http://adsabs.harvard.edu/abs/2011arXiv1101.1618J>.

P. Jorge, A. R. da Silva, and I. Lopes (2006). Pulsating Spectrum of Subdwarf Star PG 1605+072: Comparative Time-Frequency Analysis via Wavelet Packet and Local Sine Packet Transforms of an Interrupted Light Curve. *The Astrophysical Journal*, 647(1), 564-572. doi:10.1086/504461.



### **Amilcar Praxedes**

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#### **Research area & interests:**

Amilcar Praxedes was awarded the "Excellent Teacher" distinction at IST in 2016 and 2017.

#### **Selected references:**

Cowan, E. E. B., Fluendy, M., Moutinho, A., & Praxedes, A. (1984). Non-adiabatic processes in alkali metal-alkyl halide molecule collisions. *Molecular Physics*, 52(5), 1125-1143. doi:10.1080/00268978400101831.

Praxedes, A., & Naegele, J. (1991). O<sub>2</sub> adsorption on UNi<sub>5</sub> studied by ion scattering spectroscopy and UV photoelectron spectroscopy. *Surface Science*, 251-252, 916-920. doi:10.1016/0039-6028(91)91124-g.

Cabral, J. A., Varandas, C. A., Malaquias, A., Praxedes, A., et. al., (1996). Analysis of the IST-TOK plasma density profile evolution in sawtooth discharges by heavy-ion beam probing. *Plasma Physics and Controlled Fusion*, 38(1), 51-70. doi:10.1088/0741-3335/38/1/002.



### **Ana Branquinho de Amaral**

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#### **Research area & interests:**

The work of Ana Branquinho de Amaral is focused on the optimization of micro-electronics devices and photovoltaic cells. To accomplish this objective several types of semiconducting, insulating and conducting materials are deposited and characterized. Her research envisage both the fundamental understanding of the materials physical properties and the exploration of their potential for the development of applications with technological impact. Presently she is also interested on the deposition of amorphous silicon films on graphene substrates to study the damages caused by plasma during deposition in order to use graphene material as a TCO in amorphous silicon solar cells or in photo-sensors.

#### **Selected references:**

Ricardo, L., Amaral, A., Nunes de Carvalho, C., & Lavareda, G. (2016). Dopant transfer from poly-si thin films to c-Si: an alternative technique for device processing. *Materials Science in Semiconductor Processing*, 42, 210-214. doi:10.1016/j.mssp.2015.09.006.

Fernandes, M., Vygranenko, Y., Vieira, M., Lavareda, G., Carvalho, C. N., & Amaral, A. (2016). Automated rf-PERTE system for room temperature deposition of TCO coatings. *Energy Procedia*, 102, 96-101. doi:10.1016/j.egypro.2016.11.323.

Amaral, A., Lavareda, G., Nunes de Carvalho, C., André, V., Vygranenko, Y., Fernandes, M., & Brogueira, P. (2018). Etchability dependence of InO<sub>x</sub> and ITO thin films by plasma enhanced reactive thermal evaporation on structural properties and deposition conditions. *MRS Advances*, 3(04), 207-212. doi:10.1557/adv.2018.113.



**Ana M. Martins**

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**Selected references:**

Martins, A. M. (2015). Necessary and sufficient conditions for local unitary equivalence of multi-qubit states. *Physical Review A*, 91(4). doi: 10.1103/physreva.91.042308.

Martins, A. M. (2008). Minimization of a quantum automaton: The transducer. *Physical Review A*, 78(6). doi:10.1103/physreva.78.062326.

Mendonça, J. T., Guerreiro, A., & Martins, A. M. (2000). Quantum theory of time refraction. *Physical Review A*, 62(3). doi:10.1103/physreva.62.033805.



**Ana Maria Mourão**

*Associate Professor*

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**Research area & interests:**

A. Mourão has been participating in several international efforts related to the use of supernovae to understand the nature of dark energy and the accelerated expansion of the Universe. The current constraints on the nature of the dark energy from supernovae can only be greatly improved with a much better control of systematics, such as the extinction in host galaxies, evolutionary effects or host galaxy properties. She is now studying supernova host galaxies using wide field integral spectroscopy. She is also using the FORS2 instrument at the ESO - VLT-Very Large Telescope in Paranal, Chile, to measure the polarization of the light from the galaxies to infer the properties of the dust in supernova host galaxies. AM has been responsible for the DEMO-Demonstrations laboratory. The aim of this Laboratory is to provide experimental support for the lectures courses in physics. She was awarded with the diploma "Excellency in teaching" in 2016 and 2017.

A. Mourão was the responsible at Executive Commission of the Department of Physics for the contacts with media, press releases and outreach. She was the responsible for the publication of the

first Report of the DF (2016), the annual meeting "Newtonmas" (2016). As Vice-President at CEN-TRA-Center for Astrophysics & Gravitation at the IST, she was responsible for various press-releases and production of videos covering scientific discoveries, namely related to the discovery of gravitational waves (<https://www.youtube.com/watch?v=w8EIXKL6IGU>) and the Nobel prizes in Physics 2017.

**Selected references:**

Astier, P. et al. (2006). The supernova legacy survey: measurement of  $\Omega_M$ ,  $\Omega_\Lambda$  and  $w$  from the first year data set, *Astronomy and Astrophysics*, Volume 447, Issue 1, pp.31-48; doi: 10.1051/0004-6361/20054185

Galbany, L., Stanishev, V., Mourão, A. M. et al. (2016). Nearby supernova host galaxies from the CALIFA survey. *Astronomy & Astrophysics*, 591, A48. doi:10.1051/0004-6361/201528045

Stanishev, V., Rodrigues, M., Mourão, A. M., & Flores, H. (2012). Type Ia supernova host galaxies as seen with IFU spectroscopy. *Astronomy & Astrophysics*, 545, A58. doi:10.1051/0004-6361/201219188



### André David

*Invited Assistant Professor*

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#### Research area & interests:

André David is a CERN staff physicist presently working on designing and building the high-granularity calorimeter for the upgraded CMS experiment at the high-luminosity LHC. He was convener of the CMS Higgs physics group from 2015 to 2017 and teaches the particle physics module of advanced computational physics techniques. He has over 50 papers with direct contributions, including articles from the CMS, NA60, and CLOUD collaborations. André was awarded the CMS Young Researcher prize in 2013 for “sustained and critical contributions to the preparation and commissioning of the electromagnetic calorimeter, to the search of the Higgs boson in its decay to photons, and to the combination of results from its various decay modes”.

André David is active in engaging the public and in broadening the reach of high-energy particle physics. He organised the first CERN School Philippines in 2014 and regularly hosts schools, students, and teachers in the CERN-related academic and non-academic programmes.

#### Selected references:

Chatrchyan, S., Khachatryan, V., Sirunyan, A. M., et al. (2012). Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC. *Physics Letters B*. 716. 30-61. doi: 10.1016/j.physletb.2012.08.021.

Kirkby, J., Curtius, J., Almeida, J., et al. (2011). Role of sulphuric acid, ammonia and galactic cosmic rays in atmospheric aerosol nucleation. *Nature*. 476. 429-33. Times cited: 476. doi: 10.1038/nature10343

Arnaldi, R; Averbeck, R; Banicz, K; et al. (2006). First measurement of the  $\rho$  spectral function in high-energy nuclear collisions. *Physical Review Letters* 96. 162302. Times cited: 251. doi: 10.1103/PhysRevLett.96.162302



### António Ferraz

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#### Research area & interests:

António Ferraz studies the molecular dynamics of liquid crystalline materials, using Nuclear Magnetic Resonance techniques. He was awarded the “Excellent Teacher” distinction at IST in 2016 and 2017.

#### Selected references:

Mircea Serban Rogalski e António Ferraz. (2011). *Física para engenheiros*. Escolar Editora, ISBN 978-972-592-314-6.

Ferraz, A., Zhang, J., Sebastião, P. J., Ribeiro, A. C., & Dong, R. Y. (2014). Proton and deuterium nuclear spin relaxation study of the SmA and SmC\* phases of BP8Cl-d17: a self-consistent analysis. *Magnetic Resonance in Chemistry*, 52(10), 546-555. doi:10.1002/mrc.4107.

Fernandes, J. C. (2017). Study of large-angle anharmonic oscillations of a physical pendulum using an acceleration sensor. *European Journal of Physics*, 38(4), 045004. doi:10.1088/1361-6404/aa6c52.



### António Jorge Silvestre

*Invited Associate Professor*

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**PhD:** Universidade de Lisboa, 1997.

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#### Research area & interests:

António Jorge Silvestre is a member of the Center of Physics and Engineering of Advanced Materials (CeFEMA). His current scientific interests include the deposition of functional oxide thin films (e.g. CrO<sub>2</sub>, Fe<sub>3</sub>O<sub>4</sub>, transition metal doped TiO<sub>2</sub> and SnO<sub>2</sub>) by chemical and physical methods, and their structural, optical, electrical and magnetic characterization. He has been also interested on the synthesis of nanostructured materials by chemical routes with potential application on photocatalysis for the degradation of organic pollutants. He co-authored 1 book on mechanics and has published 35 papers in international journals and several other research papers in proceedings of international conferences and on educational physics subjects. He and was awarded the “Excellent Teacher” distinction at IST in 2017.

António Jorge Silvestre has been Secretary of the General Assembly of the Portuguese Society of Physics and enrolled in outreach events such as the “European Researchers’ Night”. He is currently reviewer for numerous leading journals, having received certificates of outstanding contribution in reviewing from several Elsevier journals. He has also been collaborating with the FCT and the Czech Science Foundation as evaluator of research projects.

#### Selected references:

Entradas, T., Cabrita, J., Dalui, S., Nunes, M., Monteiro, O., & Silvestre, A. (2014). Synthesis of sub-5 nm Co-doped SnO<sub>2</sub> nanoparticles and their structural, microstructural, optical and photocatalytic properties. *Materials Chemistry and Physics*, 147(3), 563-571. doi:10.1016/j.matchemphys.2014.05.032.

Pereira, L. C., Nunes, M. R., Monteiro, O. C., & Silvestre, A. J. (2008). Magnetic properties of co-doped TiO<sub>2</sub> anatase nanopowders. *Applied Physics Letters*, 93(22), 222502. doi:10.1063/1.3036534.

Conde, O., Silvestre, A., & Oliveira, J. (2000). Influence of carbon content on the crystallographic structure of boron carbide films. *Surface and Coatings Technology*, 125(1-3), 141-146. doi:10.1016/s0257-8972(99)00594-0.



### Artur Malaquias

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#### Research area & interests:

Assistant Professor Artur Malaquias is the responsible for the Heavy Ion Beam Diagnostic in the ISTTOK tokamak. He and his team develops new concepts and applications for this diagnostic in order to improve the accuracy and the number of parameters measured. He is responsible for the Portuguese team participating in the integration of diagnostics in the EURO-FUSION DEMO device. He supervises two PhD students. He has published over 60 papers in international journals addressing several areas of fusion research.

Artur Malaquias has given 5 seminars at High-Schools and Universities. He has been scientific secretary for 3 major IAEA conferences and over 20 technical meetings in fusion. He was responsible scientist for IAEA Technical Cooperation projects in Poland. He was awarded the Peace Nobel Prize in 2005 shared in half by the IAEA director and the IAEA staff members.

#### Selected references:

Malaquias, A., Silva, A., Moutinho, R., Luis, R., Lopes, A., Quental, P. B., ... Franke, T. (2018). Integration concept of the reflectometry diagnostic for the main plasma in dEMO. *IEEE Transactions on Plasma Science*, 46(2), 451-457. doi:10.1109/tps.2017.2784785.

Malaquias, A., Henriques, R., Silva, C., Figueiredo, H., Nedzelskiy, I., Fernandes, H., ... Plyusnin, V. (2017). Investigation of the transition of multicycle AC operation in ISTTOK under edge electrode biasing. *Nuclear Fusion*, 57(11), 116002. doi:10.1088/1741-4326/aa7c9c.

Malaquias, A., Philipps, V., Huber, A., Hakola, A., Likonen, J., Kolehmainen, J., ... Xiao, Q. (2013). Development of ITER relevant laser techniques for deposited layer characterisation and tritium inventory. *Journal of Nuclear Materials*, 438, S936-S939. doi:10.1016/j.jnucmat.2013.01.203.


**Bernardo Brotas de Carvalho**
*Assistant Professor*
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**Research area & interests:**

Bernardo Carvalho works on Fusion Plasma Technologies, mainly on Control and Data Acquisition Systems and High-Performance Digital Processing Hardware and Software. He is developing also the control system for the ESTHER shock Tube.

**Selected references:**

Baldzuhn, J., Biel, W., Biedermann, C., Bosch, H. S., Bozhenkov, S., Brotas de Carvalho, B., et al. (2015). The Set of Diagnostics for the First Operation Campaign of the Wendelstein 7-X Stellarator. *Journal of Instrumentation*. doi: 10.1088/1748-0221/10/10/P10002.


**Bernardo Tomé**
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**Research area & interests:**

Bernardo Tomé develops research work mainly in astroparticle physics and detectors simulation. He is a member of the Pierre Auger and of the GEANT4 collaborations. In the last two years he was largely involved in the simulation and performance studies of a new detector concept for gamma-ray observations in South America. He has been co-responsible for the courses of Radiation Physics, Particle Detector Simulation Methods and Design and Simulation of Radiation Detectors. He has published 27 papers in the period 2016-2017, of which 20 as a co-author of the Pierre Auger Collaboration and one as co-author of the GEANT4 Collaboration.

**Selected references:**

Abreu, P. et al. (2018). MARTA: A high-energy cosmic-ray detector concept with high-accuracy muon measurement, *Eur. Phys. J. C* 78 333. doi: 10.1140/epjc/s10052-018-5820-2

Assis, P., Barres de Almeida, U., Blanco, A., Conceição, R., D'Etorre Piazzoli, B., De Angelis, A., Doro, M., Fonte, P., Lopes, L., Matthiae, G., Pimenta, M., Shellard, R., Tomé, B. (2018). Design and expected performance of a novel hybrid detector for very-high-energy gamma-ray astrophysics. *Astroparticle Physics*, vol. 99, pp. 34-42. doi: 10.1016/j.astropartphys.2018.02.004.

Allison, J. et al., (2016). Recent developments in GEANT4. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. 835. doi: 10.1016/j.nima.2016.06.125.





### Bruno Soares Gonçalves

Principal Investigator with “Agregação”

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#### Research area & interests:

Bruno Soares Gonçalves is the President of Instituto de Plasmas e Fusão Nuclear (since May 2012) and Head of the Group of Engineering and Systems Integration (since 2013). Bruno Gonçalves was responsible for several international projects (and presently is the responsible for the ITER Plasma Position Reflectometer Project, for the Portuguese contribution to the ITER Collective Thomson Scattering Diagnostics (lead by DTU), responsible for the Portuguese Participation in the Fusion Programme (through the EURATOM co-funded action carried out by the consortium Eurofusion) and is the responsible for the management of the research unit FCT funding. He has particular scientific interest in plasma turbulence, in the development of diagnostics and control and data acquisition systems for fusion devices.

Bruno Soares Gonçalves (h-index: 22) is co-inventor of one submitted patent, co-author of one chapter in a book, of 100 articles published in international peer-reviewed journals, 58 (fifty-eight) articles published in conference proceedings. He co-supervised 5 Master students and he is co-supervisor of 3 PhD students.

Bruno Soares Gonçalves has given 15 outreach seminars at High-Schools and in Public Sessions, moderated 1 debates about science and participated in 6 outreach events.

#### Selected references:

Goncalves, B., Hidalgo, C., Pedrosa, M. A., et al. (2003). Edge localized modes and fluctuations in the JET SOL region. *Plasma Physics and Controlled Fusion*, 45(9), 1627-1635. doi:10.1088/0741-3335/45/9/305

Gonçalves, B., Hidalgo, C., Pedrosa, M. A., et al. (2006). Role of turbulence on edge momentum redistribution in the TJ-II stellarator. *Physical Review Letters*, 96(14). doi:10.1103/physrevlett.96.145001.

Goncalves, B., Sousa, J., Carvalho, B. B., et al. (2012). ITER fast plant system controller prototype based on ATCA platform. *Fusion Engineering and Design*, 87(12), 2024-2029. doi:10.1016/j.fusengdes.2012.04.005



### Carlos Cruz

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#### Research area & interests:

Carlos R. Cruz is the Coordinator of the Complex Fluids NMR and Surfaces Group of CeFEMA (Center of Physics and Engineering of Advanced Materials). His research work is mainly focused on Liquid Crystals Experimental Physics with particular emphasis on NMR and X-ray diffraction studies.

In recent years he has been team-leader in two European Projects on Liquid Crystal Dendrimers. He has published 36 papers in international journals and a book on NMR of Liquid Crystal Dendrimers. He was awarded the “Excellent Teacher” distinction at IST in 2014. He was vice-coordinator of the Technological Physical Engineering MSc course and member of the Pedagogical Council of IST from 2009 to 2011.

#### Selected references:

Cruz, C. R., Figueirinhas, J. L., Sebastião, P. J. (2016). *NMR of liquid crystal dendrimers*. Pan Stanford Publishing.

Polineni, S., Figueirinhas, J. L., Cruz, C., Wilson, D. A., & Mehl, G. H. (2013). Capacitance and optical studies of elastic and dielectric properties in an organosiloxane tetrapode exhibiting a NB phase. *The Journal of Chemical Physics*, 138(12), 124904. doi:10.1063/1.4795582.

Aluculesei, A., Vaca Chávez, F., Cruz, C., Sebastião, P. J., Nagaveni, N. G., Prasad, V., & Dong, R. Y. (2012). Proton NMR Relaxation Study on the Nematic-Nematic Phase Transition in A131 Liquid Crystal. *The Journal of Physical Chemistry B*, 116(31), 9556-9563. doi:10.1021/jp305064x.


**Carlos Garcia Silva**

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**Research area & interests:**

The research activities of Carlos Garcia Silva have been focused on edge physics, multi-scale turbulent transport and diagnostic development in fusion devices. The work is performed in devices such as ISTTOK (Portugal), AUG (Germany) and JET (UK), where he regularly participates in experimental campaigns. His research methodology combines data analysis with diagnostic operation and development. He is co-author of about 130 publications in international scientific journals with referee.

Carlos Garcia Silva gives regular talks on Nuclear Fusion and visits to the ISTTOK laboratory for high school and graduate students.

**Selected references:**

Silva, C., Hillesheim, J., Hidalgo, C., Belonohy, E., Delabie, E., Gil, L., Maggi, C.F., Meneses, L., Solano, E., Tsalas, M. and JET Contributors. (2016). Experimental investigation of geodesic acoustic modes on JET using Doppler backscattering. *Nuclear Fusion*, 56(10), 106026. doi:10.1088/0029-5515/56/10/106026.

Silva, C., Henriques, R., Hidalgo, C., & Fernandes, H. (2017). Experimental evidence of turbulence regulation by time-varying  $E \times B$  flows. *Nuclear Fusion*, 58(2), 026017. doi:10.1088/1741-4326/aa9dc0.


**David Emanuel da Costa**

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**Research area & interests:**

David Emanuel Costa investigates several topics of particle physics, namely flavour physics, neutrino physics, grand unified models, proton decay, baryon asymmetry of the Universe. He is member of the CFTP - IST. He has published 33 papers and proceedings in international journals. He has supervised 3 MSc and 2 PhD thesis.

**Selected references:**

Emmanuel-Costa, D., & Wiesenfeldt, S. (2003). Proton decay in a consistent supersymmetric GUT model. *Nuclear Physics B*, 661(1-2), 62-82. doi:10.1016/s0550-3213(03)00301-8.

Branco, G., Emmanuel-Costa, D., & González Felipe, R. (2000). Texture zeros and weak basis transformations. *Physics Letters B*, 477(1-3), 147-155. doi:10.1016/s0370-2693(00)00193-3.

de Medeiros Varzielas, I. and Emmanuel-Costa, D. (2011). Geometrical spontaneous CP violation. *Physical Review D*, 84(11). doi:10.1103/PhysRevD.84.117901.


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**Research area & interests:**

Diana Leitao work focus on the optimization of materials at the nanoscale to deliver customized magnetic properties, and on the development of micro and nanofabrication strategies and methodologies for sensing devices. She is member of the Spintronics and Magnetic Biosensors line of research at INESC-MN. Diana co-authors 62 peer reviewed papers and 3 book chapters. She was awarded a FCT Investigator Starting Grant and IST Excellent Teacher (2014-15, 2015-16).

Diana Leitão has been involved in the organization of visits to the laboratories - from schools, open days, inside views. She has also participated in national initiatives (Noite do Investigador, Semana CeT, FCT Encontro Ciencia, Futurália) and international (TechDays, EU-ICT Lisbon) dissemination activities and given several outreach presentations at undergraduated level (Jornadas, Escolas de Verão de Física).

**Selected references:**

Leitão, D. C., Silva, A. V., Paz, E., Ferreira, R., Cardoso, S., & Freitas, P. P. (2015). Magnetoresistive nanosensors: controlling magnetism at the nanoscale. *Nanotechnology*, 27(4), 045501. doi:10.1088/0957-4484/27/4/045501.

Sousa, C. T., Leitão, D. C., Proenca, M. P., Ventura, J., Pereira, A. M., & Araujo, J. P. (2014). Nanoporous alumina as templates for multifunctional applications. *Applied Physics Reviews*, 1(3), 031102. doi:10.1063/1.4893546.

Vivas, L. G., Vazquez, M., Escrig, J., Allende, S., Altbir, D., Leitão, D. C., & Araujo, J. P. (2012). Magnetic anisotropy in CoNi nanowire arrays: Analytical calculations and experiments. *Physical Review B*, 85(3). doi:10.1103/physrevb.85.035439.


**Eduardo V. Castro**
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**Research area & interests:**

Eduardo V. Castro has a background in Theoretical Condensed Matter Physics, with focus on phenomenological descriptions of two-dimensional systems. He has been contributing to the field of graphene physics since 2006, with a first, highly cited (>1100 citations, Thomson Reuters; >1500 citations, Google Scholar) publication in 2007. Recently he has also contributed to the field of non-trivial topological electronic systems, with emphasis in two-dimensional realizations. Since 2007 he has been involved in 6 research projects in the field of 2D materials, funded either by Portuguese or Spanish agencies, and by the European Commission in one case, being the PI in 2 of them. He is currently supervising 2 MSc students, 3 PhD students, and 1 Post-Doc. He is the author of 37 indexed scientific articles in excess of 2900 citations (Google Scholar; 2100 Thomson Reuters) and an h-index 20 (Google Scholar; 19 Thomson Reuters).

Eduardo V. Castro has given 13 outreach seminars to High-School students and published recently two popular science articles in two national magazines: *Gazeta de Física* and *PULSAR*.

**Selected references:**

Wang, Z., Castro, E. V., & Lin, H. (2018). Strain manipulation of Majorana fermions in graphene armchair nanoribbons. *Physical Review B*, 97(4). doi:10.1103/physrevb.97.041414.

Castro, E. V., Ochoa, H., Katsnelson, M. I., Gorbachev, R. V., Elias, D. C., Novoselov, K. S., Geim, A. K. and Guinea, F. (2010). Limits on Charge Carrier Mobility in Suspended Graphene due to Flexural Phonons. *Physical Review Letters*, 105(26). doi:10.1103/physrevlett.105.266601.

Castro, E. V., Novoselov, K. S., Morozov, S. V., Peres, N. M., Dos Santos, J. M., Nilsson, J., Guinea, F., Geim, A. K., Castro Neto, A. H. (2007). Biased Bilayer Graphene: Semiconductor with a Gap Tunable by the Electric Field Effect. *Physical Review Letters*, 99(21). doi:10.1103/physrevlett.99.216802.



### Enrico Maglione

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#### Research area & interests:

Enrico Maglione is a theoretician that studies the structure of exotic nuclei. He collaborates with many experimental groups, in preparing the theoretical part of the proposals for the experiments at many labs around the world, such as Legnaro (Italy), Riken (Japan), GSI (Germany), Jyvaskyla (Finland), Argonne (USA), CERN (Switzerland), and interpreting afterwards the obtained experimental data.

Enrico Maglione has organized 3 international conferences, has been member of the international advisory board of 6 conferences, is referee of 7 international journals, has published more than 100 papers with h-factor = 22.

#### Selected references:

Maglione, E., Ferreira, L. S., & Liotta, R. J. (1998). Nucleon Decay from Deformed Nuclei. *Physical Review Letters*, 81(3), 538-541. doi:10.1103/physrevlett.81.538.

Gottardo, A. et al. (2012). New isomers in the full seniority scheme of neutron-rich lead isotopes: the role of effective three-body forces. *Physical review letters*. 109. 162502. 10.1103/PhysRevLett.109.162502.

Suzuki, H., et al. (2017). Discovery of  $^{72}\text{Rb}$ : a nuclear sandbank beyond the proton drip line. *Physical Review Letters*. doi: 119. 10.1103/PhysRevLett.119.192503.



### Fernando Barão

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#### Research area & interests:

Fernando Barão is working on astro-particle experiments since more than 15 years. He is leader of the portuguese group that is part of the AMS experiment, that orbits around earth on the international space station, since 2011. The Portuguese group made major contributions for the design, study and operation of the ring imaging cerenkov detector that integrates the AMS detector. He is also the responsible of the cosmic ray laboratory at IST that allow students to develop detector and simulation projects for cosmic rays detection.

#### Selected references:

Aguilar, M. et al. (2015). Precision measurement of the proton flux in primary cosmic rays from rigidity 1GV to 1.8 TV with the alpha magnetic spectrometer on the International Space Station. *Physical Review Letters* 114, 171103. doi: 10.1103/PhysRevLett.114.171103.

Aguilar-Benitez, M. et al. (2013). First result from the alpha magnetic spectrometer on the international space station: precision measurement of the positron fraction in primary cosmic rays of 0.5-350 GeV. *Physical Review Letters* 110, 141102. doi: 10.1103/PhysRevLett.110.141102

Barão, F. (2004). AMS: Alpha magnetic spectrometer on the international space station. *Nuclear Instruments and Methods*, A535. doi: 10.1016/j.nima.2004.07.196



### Filipe R. Joaquim

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#### Research area & interests:

Filipe R. Joaquim is interested in studying new physics phenomena at the elementary particle level. His research has been focused on the theoretical construction of new theories to be tested at current particle physics and cosmological experiments, which aim at understanding the origins of our Universe. He has published several papers in international journals and awarded the “Excellent teacher” distinction for the courses of Complements of Quantum Mechanics and Introduction to Research. Closer look at the possible CMS signal of a new gauge boson.

#### Selected references:

Aguilar-Saavedra, J., & Joaquim, F. (2014). Closer look at the possible CMS signal of a new gauge boson. *Physical Review D*, 90(11). doi:10.1103/physrevd.90.115010.

Branco, G., González Felipe, R., & Joaquim, F. (2012). Leptonic CP violation. *Reviews of Modern Physics*. 84. doi: 10.1103/RevModPhys.84.515.

Joaquim, F. R., & Rossi, A. (2006). Gauge and Yukawa Mediated Supersymmetry Breaking in the Triplet Seesaw Scenario. *Physical Review Letters*, 97(18). doi:10.1103/physrevlett.97.181801.



### Gernot Eichmann

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#### Research area & interests:

Gernot Eichmann is an FCT Investigator who works in Quantum Chromodynamics and Hadron Physics, where he investigates bound states such as mesons, baryons, and multi-quark systems. In particular, he uses functional methods to develop a description of their spectra, structure properties and reaction mechanisms in terms of the elementary quarks and gluon degrees of freedom. He has published 28 papers in international journals and 21 conference proceedings, which have been cited over 1400 times on Inspire. He has co-supervised 3 master and 3 PhD theses.

#### Selected references:

Eichmann, G., Sanchis-Alepuz, H., Williams, R., Alkofer, R., Fischer, C. (2016). Baryons as relativistic three-quark bound states. *Prog. Part. Nucl. Phys.* 91 1-100. doi: 10.1016/j.pnpnp.2016.07.001

Eichmann, G. (2011). Nucleon electromagnetic form factors from the covariant Faddeev equation. *Phys. Rev. D* 84, 014014. doi: 10.1103/PhysRevD.84.014014

Eichmann, G., Alkofer, R., Krassnigg, A., Nic-morus, D. (2010). Nucleon mass from a covariant three-quark Faddeev equation. *Phys. Rev. Lett.* 104, 201601 doi: 10.1103/PhysRevLett.104.201601.



### Gonçalo Figueira

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#### Research area & interests:

Gonçalo Figueira is interested in exploring and developing the concepts and the technology for next-generation high power lasers and their applications. In particular, he investigates new nonlinear optical materials and amplification techniques at the Laboratory for Intense Lasers, a leading facility hosting the most powerful laser in the country. He is in charge of the courses “Introduction to Experimental Physics” and “Optics and Lasers”. He has supervised 15 MSc and 4 PhD thesis. Apart from research and teaching, Gonçalo is also strongly involved with science communication and outreach activities, targeted at different audiences.

Gonçalo Figueira acted as chief editor of *Gazeta de Física*, the magazine of the Portuguese Physical Society, from 2013 to 2017. In 2016 he co-edited a book on the history of physics in Portugal in the 20th century. He became strongly involved with the commemorations of the international year of light, giving presentations and training sessions in optics and lasers at schools, workshops and science centres across the country.

#### Selected references:

Figueira, G., Alves, J., Dias, J. M., Fajardo, M., Gomes, N., Hariton, V., Imran, T., João, C. P., Koliyadu, J., Künzel, S., Lopes, N. C., Pires, H., Ruão F., and Williams, G. (2017). Ultrashort pulse capability at the L2I high intensity laser facility. *High Power Laser Science and Engineering*, 5. doi:10.1017/hpl.2017.2.

Pires, H., Galimberti, M., & Figueira, G. (2014). Numerical evaluation of ultrabroadband parametric amplification in YCOB. *Journal of the Optical Society of America B*, 31(11), 2608. doi:10.1364/josab.31.002608.

João, C. P., Pires, H., Cardoso, L., Imran, T., & Figueira, G. (2014). Dispersion compensation by two-stage stretching in a sub-400 fs, 12 mJ Yb:CaF<sub>2</sub> amplifier. *Optics Express*, 22(9), 10097. doi:10.1364/oe.22.010097.



### Helena Alves

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#### Research area & interests:

Helena Alves develops materials with optoelectronic properties and nanotechnology process for advanced applications (flexible, transparent and wearable). In particular, she correlates solid-state materials structure and design with electronic, magnetic and mechanical properties, and device architecture for molecular and textile electronics applications. She has been responsible for creating and leading the molecular electronics line of research and collaborated with the course “Nanotechnology and Nanoelectronics”. She has 1 patent and 37 published papers in high quality international journals such as *Nature Materials*, *Nature Communications*, *Journal of the American Chemical Society*, *Advanced Functional Materials*, and is editor at *Scientific Reports*. She has given 95 presentations in international conferences (60 oral) and given 28 invited lectures in international conferences and universities abroad. She has supervised 7 MSc and 1 PhD thesis.

Helena Alves has participated in 2 outreach events, and 1 public session with debates about “Innovation sharing”. Helena Alves has given a radio interview.

#### Selected references:

Neves, A. I., Bointon, T. H., Melo, L. V., Russo, S., De Schrijver, I., Craciun, M. F., & Alves, H. (2015). Transparent conductive graphene textile fibers. *Scientific Reports*, 5(1). doi:10.1038/srep09866.

Alves, H., Pinto, R. M., & Maçôas, E. S. (2013). Photoconductive response in organic charge transfer interfaces with high quantum efficiency. *Nature Communications*, 4(1). doi:10.1038/ncomms2890.

Alves, H., Molinari, A., Xie, H., Morpurgo, A. F. (2008). Metallic conduction at charge-transfer interfaces. *Nature Materials*, 7, 574-580. doi:10.1038/nmat2205.



### Horácio Fernandes

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#### Research area & interests:

Horácio Fernandes is a researcher at IPFN, where he coordinates the activity on the tokamak ISTTOK and is the Experimental Physics group leader. In 1999 he created the e-lab, the first remote laboratory at IST and one of the few in the world for education purposes, with free access and hosting about 20 online experiments. His scientific interests cover fusion devices diagnostics, real-time operation and engineering. He also maintains regular participation in science outreach. He was appointed during six years member of the “Technical Advisor Panel” at F4E (the European Agency for ITER), had been a research coordinator in IAEA and served in several national and international boards of conferences and societies. He has authored more than 200 scientific works either in international journals or conference proceedings. He has supervised 28 MSc and 5 PhD students.

Horácio Fernandes is the national coordinator of MEDEA programme from the Portuguese Physical Society (a national competition for the understanding of low frequency electromagnetic fields). To promote the use of e-lab (remote laboratories) in secondary schools he gave several workshops and seminars, populate in some schools a few

remote experiments and presently is promoting IoT for doing physics experiments. At a graduate level, he maintains an Athens course (athensprogramme.org) for foreigners every semester at IST. Horácio Fernandes chairs the PlasmaSurf (IPFN summer school) scientific committee.

#### Selected references:

Hidalgo, C., Silva, C., Pedrosa, M. A., Sánchez, E., Fernandes, H., & Varandas, C. A. (1999). Radial Structure of Reynolds Stress in the Plasma Boundary of Tokamak Plasmas. *Physical Review Letters*, 83(11), 2203-2205. doi:10.1103/physrevlett.83.2203.

Cabral, J., Fernandes, H., Figueiredo, H., & Varandas, C. (1997). Operation of the tokamak ISTOKK in a multicycle alternating flat-top plasma current regime. *Nuclear Fusion*, 37(11), 1575-1581. doi:10.1088/0029-5515/37/11/i07.

Neto, R., Fernandes, H., Pereira, J., & Duarte, A. (2012). E-lab remote laboratory integrated overview. 2012 9th International Conference on Remote Engineering and Virtual Instrumentation (REV). doi:10.1109/rev.2012.6293102.



### Ilídio Lopes

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#### Research area & interests:

Ilídio Lopes works in astrophysics, cosmology and particle physics. In particular, his work focuses on stellar evolution, dark matter and neutrinos. Following his Ph.D. in the University of Paris (France), he was a postdoctoral fellow in the “Commissariat à l’énergie atomique et aux énergies alternatives” (France), a research associate in the Institute of Astronomy of the University of Cambridge (United Kingdom), and a fellow in the department of Physics of the University of Oxford (United Kingdom). He published more than 100 articles in high impact journals, with a small number of authors (one or two). He supervised four Ph.D. students, two of which won Ph.D. research awards from the Fundação Calouste Gulbenkian.

Ilídio Lopes has given several outreach seminars at High-Schools and in Public Sessions and has participated in several outreach events.

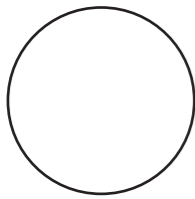
Ilídio Lopes has also published several articles in newspapers and magazines. Moreover, several articles about his scientific work have appeared in scientific news magazines and websites like New Scientist and Institute Of Physics (IOP) news.

#### Selected references:

Lopes, I. & Silk, J. (2010). Neutrino spectroscopy can probe the dark matter content in the sun. *Science* 330. 462. (Article chosen for Science Express Highlights, Science, Volume 329, pp.1251). doi:10.1126/science.1196564.

Lopes, I., & Turck-Chièze, S. (2013). Solar neutrino physics oscillations: sensitivity to the electronic density in the sun’s core. *The Astrophysical Journal*, 765(1), 14. doi:10.1088/0004-637x/765/1/14.

Lopes, I., Kadota, K., & Silk, J. (2013). Constraint on light dipole dark matter from helioseismology. *The Astrophysical Journal*, 780(2), L15. doi:10.1088/2041-8205/780/2/L15.



### Joaquim I. Silva-Marcos

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#### Research area & interests:

J. I. Silva-Marcos has worked on Neutrino Physics, Quark Masses, Mixing, Higgs Physics, CP Violation, and Extra Dimensions. He publishes in international journals (with around 40 papers). He supervises MSc and PhD students and continues to be very active in the daily management of his research unit (for almost 16 years, now).

In the past, J. I. Silva-Marcos has been involved and co-responsible for the setup a systematic programme of activities involving secondary school students and teachers, stimulating the study, use and understanding of Mathematics and Physics in a project, entitled 'O Livro da Natureza' (The Book of Nature), supported by FCT. He regularly gives talks in high schools and organizes visits to CERN for high school and first year university students.

#### Selected references:

Branco, G. C., Rebelo, M. N., & Silva-Marcos, J. I. (1999). Degenerate and Quasidegenerate Majorana Neutrinos. *Physical Review Letters*, 82(4), 683-686. doi:10.1103/physrevlett.82.683.

Botella, F. J., Branco, G. C., Coutinho, A. M., Rebelo, M. N., & Silva-Marcos, J. I. (2015). Natural quasi-alignment with two Higgs doublets and RGE stability. *The European Physical Journal C*, 75(6). doi:10.1140/epjc/s10052-015-3487-5.

Branco, G. C. (2017). Leptonic invariants, neutrino mass-ordering and the octant of  $\theta_{23}$ . *Journal of High Energy Physics*, 2017(11). doi:10.1007/jhep11(2017)001.



### Joana Gonçalves-Sá

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#### Research area & interests:

Joana Gonçalves-Sá works on data mining for decision-making. Has taught Introduction to Research and participated in the Energy Transfer classes. Is currently co-supervising one MSc student and has been on the jury of 7 MSc thesis defenses. Joana Gonçalves-Sá is the Director of the PGCD, Graduate Programme Science for Development, a PhD programme directed at Portuguese-speaking African students, based in Cabo Verde. Currently it has 55 enrolled students, working on their thesis in 10 different countries. JGS is the Coordinator of the "Lab in a Box" project, a scientific kit with participation of Filipe Mendes (DF-IST), Pedro Brogueira (DF-IST), Catarina Júlio (IGC) and Mónica-Bettencourt-Dias (IGC). The kit has been sponsored by the UNESCO, Instituto Camões and the Instituto Gulbenkian de Ciência. A pilot trial is ongoing in Cabo Verde from September 2016 to June 2018.

Science Communication:

- 1) "La Nuit des Idées", co-organized by the French Embassy/Institut Français and the Fundação Calouste Gulbenkian,
- 2) "Ciência, literacias e inclusão", Invited Speaker, Centro de Formação de Escolas António Sérgio, Portugal,
- 3) "Decisões e Amostragem", Invited Speaker,

Ciclo Ponto de Gravidade, Teatro Cão Solteiro, 4) Arriaga M, and Gonçalves-Sá J, (17th January 2017) Acordar para a democracia, *Jornal Público*, National newspaper opinion column;

5) "Replacing the Ivory and Exiting the Tower", *Encontros Ciência Aberta*, Ministério da Ciência, Tecnologia e Ensino Superior, Portugal

6) "Digital Parliament - 40 years of Portuguese Parliamentary Debates", Grupo de Trabalho para o Parlamento Digital, Portugal.

#### Selected references:

Muller, N., Piel, M., Calvez, V., Voituriez, R., Gonçalves-Sá, J., et al. (2016). A predictive model for yeast cell polarization in pheromone gradients. *PLOS Computational Biology*, 12(4), e1004795. doi:10.1371/journal.pcbi.1004795.

Won, M., Marques-Pita, M., Louro, C., & Gonçalves-Sá, J. (2017). Early and real-time detection of seasonal influenza onset. *PLOS Computational Biology*, 13(2), e1005330. doi:10.1371/journal.pcbi.1005330.

Wood, I. B., Varela, P. L., Bollen, J., Rocha, L. M., & Gonçalves-Sá, J. (2017). Human Sexual Cycles are Driven by Culture and Match Collective Moods. *Scientific Reports*, 7(1). doi:10.1038/s41598-017-18262-5.





**João L. M. Figueirinhas**  
Assistant Professor with “Agregação”

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**PhD:** Kent State University, Kent/  
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**Research area & interests:**

João Figueirinhas uses Nuclear Magnetic Resonance and Electro-Optical methods in the physical characterization of mesomorphic systems with potential technological application including liquid crystals, cellulose based composites and PDLs. He has published 78 papers in international journals, 1 book and 5 book chapters and was awarded the “Excellent Teacher” distinction at IST in 2016. He has co-supervised 6 PhD and 2 Msc thesis.

João Figueirinhas published 2 articles in general magazines.

**Selected references:**

Cruz, C. R., Figueirinhas, J. L., Sebastião, P. J., & Pan Stanford Publishing. (2017). *NMR of liquid crystal dendrimers*. Singapore: Pan Stanford Publishing.

Echeverria, C., Almeida, P. L., Feio, G., Figueirinhas, J. L., Rey, A. D., & Godinho, M. H. (2015). Rheo-NMR study of water-based cellulose liquid crystal system at high shear rates. *Polymer*, 65, 18-25. doi:10.1016/j.polymer.2015.03.050.

Lehmann, M., Köhn, C., Figueirinhas, J., Feio, G., Cruz, C., & Dong, R. (2010). Biaxial Nematic Mesophases from Shape-Persistent Mesogens with a Fluorenone Bending Unit. *Chemistry - A European Journal*, 16(28), 8275-8279. doi:10.1002/chem.201001214.



**João Fonseca**  
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**Research area & interests:**

Geophysicist, specialized in seismic hazard assessment and volcanic hazard assessment.

Member, Executive Committee, C4G (RNIE Research Infrastructure).

National Representative, EPOS-IP (ESFRI Research Infrastructure).

Researcher, CERENA.

PI, Research Line of Excellence SEICHE (Intraplate Seismology).

Co-PI, H2020 Project SERA (starting 2016).

**Selected references:**

Domingues, A., Silveira, G., Ferreira, A. M., Chang, S., Custódio, S., & Fonseca, J. F. (2016). Ambient noise tomography of the East African Rift in Mozambique. *Geophysical Journal International*, 204(3), 1565-1578. doi:10.1093/gji/ggv538.

Canora, C., Vilanova, S. P., Besana-Ostman, G. M., Carvalho, J., Heleno, S., & Fonseca, J. (2015). The Eastern Lower Tagus Valley Fault Zone in central Portugal: Active faulting in a low-deformation region within a major river environment. *Tectonophysics*, 660, 117-131. doi:10.1016/j.tecto.2015.08.026.

Faria, B., & Fonseca, J. F. (2014). Investigating volcanic hazard in Cape Verde Islands through geophysical monitoring: network description and first results. *Natural Hazards and Earth System Sciences*, 14(2), 485-499. doi:10.5194/nhess-14-485-2014.



### João Gaspar

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**Area:** Condensed Matter & Nanotechnology

**PhD:** Instituto Superior Técnico, 2005.

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#### Research area & interests:

João Gaspar has a PhD in Materials Engineering from INESC-MN and IST, focused on the fabrication and characterization of thin film silicon microelectromechanical systems (MEMS). He worked at IMTEK Freiburg from 2005 to 2011 first as a post-doc and then as a group leader/lecturer in MEMS materials and devices. He joined INL Braga in 2011, where is currently the head of the nano fabrication department. He has published 78 scientific articles and presented his work in 130 conferences in the areas of cleanroom fabrication, MEMS and NEMS, advanced micro- and nano machining technologies, and sensors.

#### Selected references:

Costa, M., Gaspar, J., Ferreira, R., Paz, E., Fonseca, H., Martins, M., Cardoso, S. and Freitas, P. P. (2015). Integration of magnetoresistive sensors with atomic force microscopy cantilevers for scanning magnetoresistance microscopy applications. 2015 IEEE Magnetics Conference (INTERMAG). doi:10.1109/intmag.2015.7157123.

Silvério, V., Cardoso, S., Gaspar, J., Freitas, P. P., & Moreira, A. (2015). Design, fabrication and test of an integrated multi-microchannel heat sink for electronics cooling. *Sensors and Actuators A: Physical*, 235, 14-27. doi:10.1016/j.sna.2015.09.023.

Silva, C. S., Noh, J., Fonseca, H., Pontes, A., Gaspar, J. and Rocha, L. A. (2015). Fabrication and characterization of polymeric three-axis thermal accelerometers. *Journal of Micro-mechanics and Microengineering*. 25. doi:10.1088/0960-1317/25/8/085005.



### João Mendanha Dias

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#### Research area & interests:

João Mendanha Dias research is focused on secondary radiation sources and optical diagnostics in laser-plasma interaction field. I have also devoted significant work to optical applications in medicine (eye optical modeling) and in industry (spectroscopy and laser metrology). My research methodology is based on experimental work and occasionally simulations and modeling. He has supervised 8 MSc and 2 PhD thesis.

At the Physics Dept. he has been responsible for several teaching experimental physics laboratories in the Engineering Physics and other IST's Engineering courses. Today he is the vice-presidente of the department for general affairs, spaces and budget.

João Mendanha Dias has been lecturer in several training courses in lasers for high school teachers and post-graduation courses in medicine. Scientific consultation for expositions and co-responsible for one module of the F. C. Gulbenkian exposition "À luz de Einstein 1905-2005". He is also member of the scientific council of the Interdisciplinary Portuguese Society of the medical laser since 1999.

#### Selected references:

Boné, A., Lemos, N., Figueira, G., & Dias, J. M. (2016). Quantitative shadowgraphy for laser-plasma interactions. *Journal of Physics D: Applied Physics*, 49(15), 155204. doi:10.1088/0022-3727/49/15/155204.

Ribeiro, F. J., Castanheira-Dinis, A., & Dias, J. M. (2012). Personalized Pseudophakic Model for Refractive Assessment. *PLoS ONE*, 7(10), e46780. doi:10.1371/journal.pone.0046780.

Cipiccia, S., Islam, M. R., Ersfeld, B., Shanks, R. P., Brunetti, E., Vieux, G., Yang, X., Issac, R. C., Wiggins, S. M., Welsh, G.H., Anania, M.-P., Maneuski, D., Montgomery, R., Smith, G., Hoek, M., Hamilton, D. J., Lemos, N. R. C., Symes, D., Rajeev, P. P., Shea, V. O., Dias, J. M., Jaroszynski, D. A., (2011). Gamma-rays from harmonically resonant betatron oscillations in a plasma wake. *Nature Physics*, 7(11), 867-871. doi:10.1038/nphys2090.



### João P. S. Bizarro

Associate Professor with “Agregação”

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#### Research area & interests:

João P. S. Bizarro was born in Dili, Timor (formerly a Portuguese territory), in 1963. He received the Technological Physics Engineering degree from Instituto Superior Técnico, Lisboa, Portugal, in 1987, the Ph.D. degree in Radiation and Plasmas from Université de Provence (Aix-Marseille I), Marseille, France, in 1993, and the Habilitation in Physics from IST in 2010. He was an JNICT fellow between 1988 and 1990, was an Euratom fellow between 1990 and 1993 and has been a professor in the Physics Department, IST, since 1993, having been the Head of the Theory and Modeling Group of the Associação Euratom-IST during 2008 - 2012. He has visited and worked in fusion laboratories such as the Joint European Torus, Abingdon, UK, TORE SUPRA, Cadarache, France, and the Instituto de Física, Universidade de São Paulo, Brazil, having been a research fellow of the Junta Nacional de Investigação Científica e Tecnológica, Lisboa, Portugal, in 1988 -1990, and of the Commission of the European Communities (Euratom) in 1990 -1993. He has been appointed to bodies of the European Fusion Programme, having seated in the Fusion Physics Committee during 2000 -2002, and in the Scientific and Technological Advisory Committee during 2002 -2007. He has authored, or co-authored, more than 90 papers in leading scientific journals and his research interests have ranged from quantum me-

chanics and thermodynamics to RF engineering and signal processing, and have included as well several fields of high-temperature plasma physics such as plasma waves, kinetic equations, RF heating and current drive, and plasma equilibrium and transport. He has supervised, or co-supervised, 1 MSc and 5 PhD thesis, as well as 4 Post-docs, won an Honourable Mention in Physics of the 2012 UTL/Santander-Totta scientific prize, was awarded Outstanding Reviewer Status by Elsevier (Annals of Physics) in 2014, and several Peer Review Awards by Publons in 2017.

#### Selected references:

Bizarro, J. P. (2017). Comment on “Not all counterclockwise thermodynamic cycles are refrigerators” [Am. J. Phys. 84, 413-418 (2016)]. American Journal of Physics, 85(11), 861-863. doi:10.1119/1.5005928.

Mendonça, J. T., & Bizarro, J. P. (2017). Twisted waves in a magnetized plasma. Plasma Physics and Controlled Fusion, 59(5), 054003. doi:10.1088/1361-6587/aa6231.

Vilela Mendes, R., & Bizarro, J. P. (2017). Analytical study of growth estimates, control of fluctuations, and conservative structures in a two-field model of the scrape-off layer. Physics of Plasmas, 24(1), 012303. doi:10.1063/1.4973222.



### João P. Silva

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**Area:** Particle Physics & Nuclear Physics

**PhD:** Carnegie Mellon University, 1994.

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#### Research area & interests:

João P. Silva is interested in models and signals of new physics, including neutrinos, CP violation, and especially signs of more than one Higgs at LHC. He received the IST Outstanding Teaching Award, chosen from amongst all 1st cycle lecturers in 2014/2015, which recognizes and promotes excellence in education.

#### Selected references:

Branco, G., Ferreira, P., Lavoura, L., Rebelo, M., Sher, M., & Silva, J. P. (2012). Theory and phenomenology of two-Higgs-doublet models. Physics Reports, 516(1-2), 1-102. doi:10.1016/j.physrep.2012.02.002.

Botella, F. J., & Silva, J. P. (1995). Jarlskog-like invariants for theories with scalars and fermions. Physical Review D, 51(7), 3870-3875. doi:10.1103/physrevd.51.3870.

Ferreira, P. M., Santos, R., Sher, M., & Silva, J. P. (2012). Implications of the LHC two-photon signal for two-Higgs-doublet models. Physical Review D, 85(7). doi:10.1103/physrevd.85.077703.



### João Seixas

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#### Research area & interests:

Member of the CMS Collaboration.

Seminars in High schools and public sessions.

#### Selected references:

R. Arnaldi et al./NA60 Collaboration. (2006). First measurement of the  $\rho$  spectral function in high-energy nuclear collisions. *Physical Review Letters* 96, 162302. doi: 10.1103/PhysRevLett.96.162302.

Faccioli, P., Lourenço, C., Seixas, J., & Wöhri, H. K. (2010). Towards the experimental clarification of quarkonium polarization. *The European Physical Journal C*, 69(3-4), 657-673. doi:10.1140/epjc/s10052-010-1420-5.

Chatrchyan, S. et al./The CMS Collaboration. (2013). Measurement of the prompt  $J/\psi$  and  $\psi(2S)$  polarizations in pp collisions at  $\sqrt{s} = 7$  TeV. *Physics Letters B*, 727 381-402. doi: 10.1016/j.physletb.2013.10.055.



### Jorge Loureiro

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#### Research area & interests:

Modelling of molecular low-temperature plasmas, such as the self-consistent kinetic modelling of  $N_2$ ,  $O_2$ ,  $N_2-O_2$ , and  $N_2-Ar$  plasmas under discharge and post-discharge conditions including the strong coupling between electron and vibrational kinetics, together with chemical and ion kinetics. Study of plasmas created under non-equilibrium conditions such as those occurred during the early stages of the descent of a spacecraft in a planetary atmosphere (Earth, Mars and Titan). Developing of kinetics and fluid models to take into account the energy transferred by a strong shockwave into the internal modes of molecules ultimately leading to strongly non-equilibrium dissociation and ionization reactions. Comparison with plasmas produced in a discharge. He has published 77 papers in international scientific journals and 3 books. He has supervised 3 PhD and 4 MSc thesis.

#### Selected references:

Loureiro, J. (1993). Time-dependent electron kinetics in  $N_2$  and  $H_2$  for a wide range of the field frequency including electron-vibration superelastic collisions. *Physical Review E*, 47(2), 1262-1275. doi:10.1103/physreve.47.1262.

Loureiro, J., and Amorim, J. (2012). Non-Maxwellian velocity distributions and non-Gaussian profiles of H atoms in low-pressure hydrogen discharges. *Plasma Sources Science and Technology*, 22(1), 015016. doi:10.1088/0963-0252/22/1/015016.

J. Loureiro and J. Amorim. (2016). *Kinetics and spectroscopy of low temperature plasmas*. Springer: Graduate Texts in Physics. ISBN 978-3-319-09252-2.



**Jorge C. Romão**  
Full Professor

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**Research area & interests:**

Jorge C. Romão studies weak interactions. This includes looking at precision tests of the Standard Model as well as studying its extensions. He is a specialist in supersymmetric theories both with and without R-parity, where he has done extensive work in connection with neutrino physics. More recently his interests have moved the focus into models with several Higgs doublets, both CP conserving or CP violating. He has published 94 papers in top international journals and two books. He has been the Portuguese coordinator for 4 European Union Marie Curie Training Networks. He has supervised or co-supervised 8 PhD thesis.

Jorge C. Romão has given 2 outreach seminars and participated in the CERN Master Classes.

**Selected references:**

Hirsch, M., Díaz, M. A., Porod, W., Romão, J. C., & Valle, J. W. (2000). Neutrino masses and mixings from supersymmetry with bilinear R-parity violation: A theory for solar and atmospheric neutrino oscillations. *Physical Review D*, 62(11). doi:10.1103/physrevd.65.119901.

Fontes, D., Romão, J. C., Santos, R., & Silva, J. P. (2015). Large pseudoscalar Yukawa couplings in the complex 2HDM. *Journal of High Energy Physics*, 2015(6). doi:10.1007/jhep06(2015)060.

Valle, J. W. F., & Romão, J. C. (2015). *Neutrinos in high energy and astroparticle physics*. Wiley-VCH. ISBN: 978-3-527-41197-9”



**Jorge Vieira**  
Invited Assistant Professor

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**Research area & interests:**

The research of Jorge Vieira focuses on plasma based accelerators, their corresponding radiation sources, and on the non-linear optics of plasmas at relativistic intensities driven by structured light, combining theory and high performance computing to address interdisciplinary questions ranging from plasma physics to photonics. Jorge Vieira has authored and co-authored 65 research papers (including 1 in *Nature Physics*, 2 in *Nature Communications* and 11 in *Physical Review Letters*) and 1 patent. Jorge Vieira is involved in the AWAKE plasma acceleration experiment at CERN, and in the preparation of the European strategy for a future plasma based collider. Jorge Vieira has received the UTL prize for Young Researchers in 2011 and an excellent teaching award at IST in 2016/2017. Jorge Vieira is also developing innovative pedagogical techniques with the overarching goal of introducing computer simulations as a virtual experimental tool for the classroom.

**Selected references:**

Vieira, J., Trines, R., Alves, E., Fonseca, R., Mendonça, J., Bingham, R., Norreys, P., Silva, L. O. (2016). High Orbital Angular Momentum Harmonic Generation. *Physical Review Letters*, 117(26). doi:10.1103/physrevlett.117.265001.

Vieira, J., Trines, R. M., Alves, E. P., Fonseca, R. A., Mendonça, J. T., Bingham, R., Norreys, P., Silva, L. O. (2016). Amplification and generation of ultra-intense twisted laser pulses via stimulated Raman scattering. *Nature Communications*, 7, 10371. doi:10.1038/ncomms10371.

Vieira, J., & Mendonça, J. (2014). Nonlinear laser driven donut wakefields for positron and electron acceleration. *Physical Review Letters*, 112(21). doi:10.1103/physrevlett.112.215001.



### José Guilherme Milhano

*Invited Assistant Professor*

**Area:** Particle Physics & Nuclear Physics

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#### Research area & interests:

José Guilherme Milhano studies properties of strongly interacting matter in the extreme conditions created in heavy-ion collisions. He has made significant contributions to the advancement of jet studies in heavy ion collisions and the understanding of the initial conditions for such collisions. He is Invited Assistant Professor at IST and Researcher at LIP where he leads the Phenomenology Group. He was responsible for the 'Analytical Mechanics' course for the last 3 years. His publications have been cited over 2000 times. He has supervised 2 MSc and 1 PhD theses.

José Guilherme Milhano gave two radio interviews (Antena 2) and several talks to high-school students on LHC physics. He participates annually as CERN Moderator in the IPPOG International Masterclasses.

#### Selected references:

Milhano, J. G., & Zapp, K. C. (2016). Origins of the di-jet asymmetry in heavy-ion collisions. *The European Physical Journal C*, 76(5). doi:10.1140/epjc/s10052-016-4130-9.

Casalderrey-Solana, J., Gulhan, D. C., Milhano, J. G., Pablos, D., & Rajagopal, K. (2014). A hybrid strong/weak coupling approach to jet quenching, *Journal of High Energy Physics*, 2014(10). Erratum *Journal of High Energy Physics* 1509 (2015) 175; doi: 10.1007/JHEP09(2015)175

Casalderrey-Solana, J., Milhano, J. G., & Wiedemann, U. (2011). Jet quenching via jet collimation. *Journal of Physics G: Nuclear and Particle Physics*, 38(12), 124086. doi:10.1088/0954-3899/38/12/124086.



### José Luís Martins

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#### Research area & interests:

Research on electronic structure of solids. development of methods. Applications to semiconductors and nanostructures.

#### Selected references:

Troullier, N., and Martins, J. L. (1993). Efficient pseudopotentials for plane-wave calculations. *Physical Review B*, 43(3), 1993-2006. doi: 10.1103/physrevb.43.1993.



### José Pizarro de Sande e Lemos

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#### Research area & interests:

José P. S. Lemos works on black holes and fundamental physics. He devises methods to calculate the black hole entropy and so to arrive at an understanding of what and where are the black hole degrees of freedom. Those are connected at a semiclassical level to a still elusive quantum gravity. He also works on astrophysical and cosmological problems. He has published more than 150 papers, has more than 5000 citations in Inspires, has supervised 9 PhD theses, 15 MSc theses, and 10 postdoctoral researchers. He is Professor Catedrático at the Physics Department of Instituto Superior Técnico, President of CEN-TRA (Centro Multidisciplinar de Astrofísica) and in the period 2013-2015 has been President of the Physics Department. He is the recipient of national and international prizes, and has been invited professor at the University of Paris, University of Columbia New York, Freie University of Berlin, Universities and Institutions in Rio de Janeiro and in São Paulo. He has lectured and has been invited to give main talks in several international schools and conferences.

José P. S. Lemos has organized the past IST Schools in Astrophysics and Gravitation, in

particular the 8th School held in 2016, and the 9th to be held in 2018. He has been interviewed in Radio Antenna 2 Programa Ciência on black holes, gravitational waves, and cosmology, several times. He has delivered many seminars in Public Sessions.

#### Selected references:

Rosa, J. L., Carloni, S., Lemos, J. P., & Lobo, F. S. (2017). Cosmological solutions in generalized hybrid metric-Palatini gravity. *Physical Review D*, 95(12). doi:10.1103/physrevd.95.124035. arXiv: 1703.03335 [gr-qc].

Lemos, J. P., & Zanchin, V. T. (2017). Plethora of relativistic charged spheres: The full spectrum of Guifoye's static, electrically charged spherical solutions. *Physical Review D*, 95(10). doi:10.1103/physrevd.95.104040.

Lemos, J. P., Minamitsuji, M., & Zaslavskii, O. B. (2017). Unified approach to the entropy of an extremal rotating BTZ black hole: Thin shells and horizon limits. *Physical Review D*, 96(8). doi:10.1103/physrevd.96.084068. arXiv: 1709.08637 [hep-th].



### Líliliana Apolinário

*Invited Assistant Professor*

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#### Research area & interests:

Líliliana Apolinário contributes to the development of the theory of the strong interactions (QCD) at high temperature and density. Her work is particularly focused on the characterisation of the Quark Gluon Plasma that is created in ultra-relativistic heavy-ion collisions at both RHIC and the LHC. She has made significant contributions to the field so far: 17 publications and more than 30 talks (10 of which as an invited speaker). At the department, she has been lecturing for the last 3 years (Analytical Mechanics; Hadron Physics and Quantum Chromodynamics; Oscillations and Waves). She has already supervised 2MSc students (1 is on-going) and 2 Summer Internship students.

Líliliana Apolinário has participated in several outreach events: NFIST activities (2004-2005); Master Classes (since 2015); Physics Olympiads (2015).

#### Selected references:

Apolinário, L., Milhano, J. G., Salam, G. P., and Salgado C. A. Probing the time structure of the quark-gluon plasma with top quarks, Under revision at PRL.

Zhang, X., Apolinário, L., Milhano, J., & Płoskoń, M. (2016). Sub-jet structure as a discriminating quenching probe. *Nuclear Physics A*, 956, 597-600. doi:10.1016/j.nuclphysa.2016.02.028.

A. Dainese et al. (2017). Heavy ions at the Future Circular Collider. CERN Yellow Report no.3, 635-692. doi: 10.23731/CYRM-2017-003.635



### Luís Filipe Mendes

Assistant Professor

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#### Research area & interests:

Filipe Mendes works on solar refrigeration and air-conditioning systems and developed several small power prototypes obtaining a patent on a new approach for this type of machine. More recently he has started working on new scientific topics which include concentrating solar thermal energy and photovoltaics. During the years of 2016-2017 he was awarded the “Excellent Teacher” distinction at IST and has supervised 9 MSc thesis and 2 PhD thesis (one in progress).

Within the project “Lab in a Box” he developed a set of physics experiments and carried out activities of specialized training and promotion of science for teachers in secondary schools of Cape Verde.

#### Selected references:

Castro, A., Cardoso, J. P., Mendes, L. F., Azevedo, P., Farinha Mendes, J. (2017), pre-heating boiler feedwater for expanded cork agglomerate production using a parabolic trough system. SolarPACES 2017 International Conference, Santiago de Chile, Chile, September (Proceedings to be published by the American Institute of Physics).

Eiró, A. M., Mendes, F., Brites, G., Brogueira, P. (2014). *A física no dia-a-dia na escola*. Ministério da Educação e Ciência, Programa “O Mundo na Escola”, 160 pgs. ISBN 978-972-95047-5-4.

Mendes, L. F., Collares-Pereira, M., (2005). Máquina de absorção com sistema inovador de refinação de vapor e sistema de controlo do modo de funcionamento para funcionar com fontes de energia de baixa temperatura. PT103112.



### Luís L. Alves

Full Professor

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#### Research area & interests:

Luís L. Alves is an expert in the modelling and simulation of low-temperature plasmas, adopting verification and validation methodologies. He works on the characterisation of DC/RF/HF plasma sources and the multi-dimensional dynamic description of reactive gas/plasma systems, of interest for material science, biological and environmental applications. Presently, he is developing the open source code LisbOn KInetics (LoKI) for the coupled solution of the electron Boltzmann equation and the rate balance equations of chemically active plasma species. He has been responsible for the two specialized courses in low-temperature plasmas for the students of Engineering Physics. He is currently the President of the Department of Physics and the Head of the research group N-Reactive Plasmas: Modelling and Engineering (N-PRiME) with the Instituto de Plasmas e Fusão Nuclear (IPFN). He has published more than 80 papers in international scientific journals and books and he has supervised more than 15 PhD and MSc theses. Luís L. Alves was the chairman of the Local Organizing Committee of the International Conference on Phenomena in Ionized Gases (ICPIG), held in July 2017 at Estoril, Portugal. He is a regular teacher of the initiative “Plasmasurf” (July of every year) and the ATHENS school in

Plasma Science and Technology (March and November of every year), organized by IPFN/IST. He has been a regular collaborator of the MEFT/DF joint initiative “MEFT: desafiar os limites”, targeting the recruitment of high-school students for MEFT. He delivered a talk in Semana da Física 2016 (“Física na Piscina”).

#### Selected References:

Coche, P., Guerra, V., & Alves, L. L. (2016). Microwave air plasmas in capillaries at low pressure I. Self-consistent modeling. *Journal of Physics D: Applied Physics*, 49(23), 235207. doi:10.1088/0022-3727/49/23/235207.

Guerra, V., Silva, T., Ogloblina, P., Grofulović, M., Terraz, L., Silva, M. L., Pintassilgo, C. D., Alves, L. L. and Guaitella, O. (2017). The case for in situ resource utilisation for oxygen production on Mars by non-equilibrium plasmas. *Plasma Sources Science and Technology*, 26(11), 11LT01. doi:10.1088/1361-6595/aa8dcc.

Alves, L. L., Bogaerts, A., Guerra, V., and Turner, M. (2018). Topical Review: “Foundations of modelling of nonequilibrium low-temperature plasmas”, *Plasma Sources Sci. Technol.* 27 023002. doi:10.1088/1361-6595/aaa570.




**Luís Lopes da Silva**
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**Area:** Particle Physics & Nuclear Physics

**PhD:** Universidade Técnica de Lisboa, 2011.

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**Research area & interests:**

Nucleon spin structure and parton spin contribution.

Strangeness in heavy ion collisions.

RPC detector studies and optimisation.

Detector efficiency studies and simulations.

**Selected references:**

COMPASS Collaboration/Silva, L. et al. (2013) Leading order determination of the gluon polarisation. *Phys.Lett. B* 718 922-930. arXiv:1202.4064 [hep-ex]. doi: 10.1016/j.physletb. 2012.11.056.

Silva, L. et al. (2008). The characterisation of the multianode photomultiplier tubes for the RICH-1 upgrade project at COMPASS. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. 595. 177-179. doi: 10.1016/j.nima.2008.07.074.

HADES Collaboration/G. Kornakov et al. (2014). Time of flight measurement in heavy-ion collisions with the HADES RPC TOF wall. *Journal of Instrumentation*. 9. C11015-C11015. doi: 10.1088/1748-0221/9/11/C11015.


**Luis O. Silva**
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**Research area & interests:**

The contributions of Luis O. Silva are on the interaction of intense beams of particles/lasers with plasmas, resorting to theory and super-computers. He has authored over 200 papers and three patents, serves on the editorial board of the *Journal of Plasma Physics*, and on the International Scientific Advisory Board of ELI Beamlines. He has supervised 11 PhDs and 7 post-docs, was awarded two Advanced Grants of the European Research Council, the 2011 Scientific Prize of the UTL, IBM Scientific Prize 2003, the 2001 ICTP Medal for Excellence in Nonlinear Plasma Physics, and the Gulbenkian Prize for Young Researchers (1994). He is Fellow of the American Physical Society and of the European Physics Society. In 2016, Luis O. Silva was awarded the title of Grande Oficial of the Ordem da Instrução Pública by the President of the Portuguese Republic.

**Selected references:**

Silva, L. O., Marti, M., Davies, J. R., Fonseca, R. A., Ren, C., Tsung, F. S., & Mori, W. B. (2004). Proton Shock Acceleration in Laser-Plasma Interactions. *Physical Review Letters*, 92(1). doi:10.1103/physrevlett.92.015002.



### Luís V. Melo

Assistant Professor with “Agregação”

**Area:** Condensed Matter & Nanotechnology

**PhD:** IST, 1996.

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#### Research area & interests:

Luis V. Melo works in different fields related to scanning probe microscopy (SPM), as AFM applied to Biology and to nanofabrication, as well as imaging in different fields of materials science. Work developed includes the study of cellular phenomena, as cilia growth in Tetrahymena and the host cell invasion by parasite Besnoitia, and also study of the behaviour of microtubules in large electromagnetic fields. He also co-developed a nanometre-sized pattern fabrication method using an AFM metal-coated tip. This technique was further expanded to the fabrication of metal/semiconductor junctions. Lately has also developed work on synchronization of oscillators.

From 2006 to 2010 he was Advisor of the FCT for NanoTechnologies. He is also the national delegate to international bodies, including the EU High Level Group on Nanotechnologies and Advanced Materials, the EU JTI ECSEL, and the H2020 Nanoscience and Nanotechnology, Materials, Biotechnology and Production Technologies (NMBP) Programme Committee. He

was also vice-chair of the OECD Working Party on Nanotechnology until the end of its mandate (12/2014). From 2010 to 2011 he was Benjamin Meaker Visiting Professor of the IAS of the University of Bristol (UK). He is currently Vice-President of IST-ID.

#### Selected references:

Reis, Y., Cortes, H., Viseu Melo, L., Fazendeiro, I., Leitão, A., & Soares, H. (2006). Microtubule cytoskeleton behavior in the initial steps of host cell invasion by *Besnoitia besnoiti*. *FEBS Letters*, 580(19), 4673-4682. doi:10.1016/j.febslet.2006.07.050.

Neves, A. I., Bointon, T. H., Melo, L. V., Russo, S., De Schrijver, I., Craciun, M. F., & Alves, H. (2015). Transparent conductive graphene textile fibers. *Scientific Reports*, 5(1). doi:10.1038/srep09866.

Oliveira, H. M., & Melo, L. V. (2015). Huygens synchronization of two clocks. *Scientific Reports*, 5(1). doi:10.1038/srep11548.



### Manuela Mendes

Assistant Professor

**Area:** Interdisciplinary Physics

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#### Research area & interests:

My main research interests is seismic imaging applied to oil industry, environment and culture heritage. Elastic Ray-Born L2- Migration/Inversion.

#### Selected references:

Beydoun, W. B., & Mendes, M. (1989). Elastic Ray-Born L2-Migration/Inversion. *Geophysical Journal International*, 97(1), 151-160. doi:10.1111/j.1365-246x.1989.tb00490.x.

Mendes, M. (2009). A hybrid fast algorithm for first arrivals tomography. *Geophysical Prospecting*, 57(5), 803-809. doi:10.1111/j.1365-2478.2008.00755.x.

Martinho, E. & Dionísio, A., and Mendes, M. (2017). Simulation of a portuguese limestone masonry structure submitted to fire: 3D ultrasonic tomography approach. *International Journal of Conservation Science*. 8. 565-580.



**Maria Margarida Nesbitt  
Rebelo da Silva**

*Invited Associate Professor*

**Area:** Particle Physics & Nuclear Physics  
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**Research areas & interests:**

Most of my work has been done in various phenomenological aspects of unified electroweak interactions, with particular emphasis on CP violation, Flavour Physics and Higgs Physics. I am specially interested in models with an extended scalar sector and the implications for Flavour Physics. I am also very interested in the question of the origin of fermion masses and mixing, both in the quark and leptonic sectors, in the framework of the Standard Model and beyond the SM as well as in the origin of CP violation. My work is closely related to LHC physics. More than 40 papers in journals with referee. More than 3300 citations in Inspire, h index = 29.

**Selected references:**

Branco, G., Ferreira, P., Lavoura, L., Rebelo, M., Sher, M., & Silva, J. P. (2012). Theory and phenomenology of two-Higgs-doublet models. *Physics Reports*, 516(1-2), 1-102. (790 citations counted in INSPIRE as of 15 Sep 2016). doi:10.1016/j.physrep.2012.02.002 .

Rebelo, M. N. (2003). Leptogenesis without CP violation at low energies. *Physical Review D*, 67(1). (68 citations counted in INSPIRE as of 15 Sep 2016). doi:10.1103/physrevd.67.013008.

G. C. Branco, M. N. Rebelo and J. I. Silva-Marcos. (1999). Degenerate and Quasidegenerate Majorana Neutrinos. *Physical Review Letters*, 82(4), 683-686. (103 citations counted in INSPIRE as of 15 Sep 2016). doi:10.1103/physrevlett.82.683.



**Mário J. Pinheiro**

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**Area:** Plasma Physics, Lasers & Nuclear Fusion  
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**Selected references:**

Pinheiro, M. J. (2017). A reformulation of mechanics and electrodynamics. *Heliyon*, 3(7), e00365. doi:10.1016/j.heliyon.2017.e00365.

Pinheiro, M. J. (2013). A Variational Method in Out-of-Equilibrium Physical Systems. *Scientific Reports*, 3(1). doi:10.1038/srep03454.

Pinheiro, M. J. (2016). Some effects of topological torsion currents on spacecraft dynamics and the flyby anomaly. *Monthly Notices of the Royal Astronomical Society*, 461(4), 3948-3953. doi:10.1093/mnras/stw1581

Mário maintains the scientific blog Science2be: <https://science2be.wordpress.com/>



### Mário Lino da Silva

*Invited Assistant Professor*

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#### Research areas & interests:

Mário Lino da Silva He has an Aerospace Eng. degree from IST (2001) and a Ph.D in Plasma Physics from the Université d'Orléans, France (2004). Since 2001 he has worked on the topic of nonequilibrium kinetic and radiative processes in low-pressure, high-speed hydrodynamic plasmas, with the application to spacecraft reentry flows. He has been participating in several technology research programmes funded by the European Space Agency, and is the Manager of the IPFN Hypersonic Plasmas Laboratory, which hosts the largest Space research facility in Portugal, the European Shock-Tube for High Enthalpy Research (ESTHER).

Mário Lino da Silva has given over 50 outreach talks in public schools in the scope of the Ciência Viva "O Espaço vai à Escola" programme and has in the past lead a formation on Space at Ciência Viva. He has made two educational movies about Space that were presented in the Festrião festival in 2009, in the scope of the celebration of the International year for Astronomy.

#### Selected references:

Da Silva, M. L., Guerra, V., & Loureiro, J. (2007). State-Resolved Dissociation Rates for Extremely Nonequilibrium Atmospheric Entries. *Journal of Thermophysics and Heat Transfer*, 21(1), 40-49. doi:10.2514/1.24114.

Da Silva, M. L., Guerra, V., & Loureiro, J. (2007). Two-temperature models for nitrogen dissociation. *Chemical Physics*, 342(1-3), 275-287. doi:10.1016/j.chemphys.2007.10.010.

Da Silva, M. L., & Beck, J. (2011). Contribution of CO<sub>2</sub> IR Radiation to Martian Entries Radiative Wall Fluxes. 49th AIAA Aerospace Sciences Meeting including the New Horizons Forum and Aerospace Exposition. doi:10.2514/6.2011-135.



### Mário Pimenta

*Full Professor*

**Area:** Particle Physics & Nuclear Physics

**PhD:** Instituto Superior Técnico, 1986.

**ORCID:** 0000-0002-2590-0908

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#### Research areas & interests:

Particle and Astroparticle Physics, in particular with Ultra High Energy Cosmic Rays and very High Energy Gamma Rays. Experimental High Energy Physics. Searches for New Physics. Hadronic Interactions. Radiation environment in the Heliosphere. Radiation effects on electronic components. Radiation monitors for space missions. Photosensors. Since 1989 Principal Investigator of more than 30 projects of relevant national interest financed by the Portuguese Science funding agencies in the framework of Portuguese participation at CERN and at ESA and in cosmic rays experiments. Supervisor of twelve PhD theses and several master theses. He co-authored the books "Introdução à Física", and "Introduction to Particle and Astroparticle Physics", authored and co-authored more than 400 scientific articles.

President of LIP since 2015 (and Director since 1995), organized and gave a LIP overview seminar in the 30th anniversary of LIP and in several occasions, presented 5 outreach seminars at IST or in public sessions in Montijo and in the Lisbon Planetarium, and organized advanced training schools. He is also the coordinator of the IDPASC

Doctorate Network (International Doctorate in Particle and astroparticle physics, Astrophysics and Cosmology) and of the national FCT IDPASC Portugal doctorate programme.

#### Selected references:

De Angelis, A., and Pimenta, M. J. (2015). *Introduction to particle and astroparticle physics: Questions to the universe*. Milan: Springer. ISBN: 978-88-470-2687-2 (Print) 978-88-470-2688-9 (Online);

Dias de Deus, J., Pimenta, M., Noronha, A., Penha, T., Brogueira, P. (2014). *Introdução à Física*. Physics textbook for undergraduates (1st Edition, McGrawHill, 1992; 2nd Edition, McGrawHill, 2000; 3rd Edition, Escolar Editora, 2014. Spanish edition, McGrawHill, 2001). ISBN 9789725924402.

Alexander Aab et al. (includes M. Pimenta), Pierre Auger Collaboration. (2016). Testing hadronic interactions at ultrahigh energies with air showers measured by the Pierre Auger Observatory. *Physical Review Letters* 117, 19, 192001. doi:10.1103/PhysRevLett. 117.192001.



**Marta Fajardo**  
*Assistant Professor*

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Técnica de Lisboa, 2001.  
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#### Research areas & interests:

Marta Fajardo develops novel x-ray sources through high power laser - plasma interaction with applications on high resolution imaging and plasma physics. She is responsible for the VOXEL laboratory at IPFN, an X-ray metrology station. She has published 102 articles in international journals including leading magazines as Nature, Nature Photonics, Nature Physics and Physical Review Letters.

Marta Fajardo regularly disseminates her work to the general public. Recently her work and the VOXEL lab were showcased in the Euronews Futuris documentary <http://www.euronews.com/2017/10/16/how-wine-corks-can-aid-our-health>

She is also the Chair of the Beam Plasmas and Inertial Fusion section of the Plasma Physics Division at the European Physical Society.

#### Selected references:

Lambert, G., Vodungbo, B., Gautier, J., Mahieu, B., Malka, V., Sebban, S., ... Fajardo, M. (2015). Towards enabling femtosecond helicity-dependent spectroscopy with high-harmonic sources. *Nature Communications*, 6(1). doi:10.1038/ncomms7167.

Williams, G. O., Künzel, S., Daboussi, S., Iwan, B., Gonzalez, A. I., Boutu, W., ... Fajardo, M. (2018). Tracking the ultrafast XUV optical properties of x-ray free-electron-laser heated matter with high-order harmonics. *Physical Review A*, 97(2). doi:10.1103/physreva.97.023414.

Fajardo, M., Audebert, P., Renaudin, P., Yashiro, H., Shepherd, R., Gauthier, J. C., & Chenais-Popovics, C. (2001). Study of the Ion-Distribution Dynamics of an Aluminum Laser-Produced Plasma with Picosecond Resolution. *Physical Review Letters*, 86(7), 1231-1234. doi:10.1103/physrevlett.86.1231.



**Michele Gallinaro**  
*Invited Assistant Professor*

**Area:** Particle Physics & Nuclear Physics  
**PhD:** Univ. Rome, Italy, 1996.  
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#### Research areas & interests:

I currently hold a research position at LIP, where I have been conducting research in the context of the Portuguese participation in the CMS experiment at the Large Hadron Collider (LHC) at CERN. I have been involved in the study of Standard Model (SM) and Beyond SM processes to fully exploit the opportunities of the unparalleled energy of the LHC collisions. Besides my research activity at LIP, I have been providing support to the academic activities at IST in three main areas: 1) Submitted research proposals to be conducted by students, both for Master and Doctorate level. In this domain, during the past few years I have been supervising several students, providing guidance and training. 2) Provided support for the basic Physics courses at the University; 3) I am responsible coordinator for the advanced course on "Physics at the LHC" (yearly, since 2012), a specialized course in the field of High Energy Particle Physics. This course is aimed at teaching the basic concepts on the fundamental research that is being pursued at the LHC.

I am occasionally invited to give seminars in Public Sessions related to my research activity at CERN/LHC. Also, I regularly participate to Outreach activities and dedicated Schools aimed at undergraduate students.

#### Selected references:

Khachatryan, V. et al./CMS Collaboration. (2015). Search for a charged Higgs boson in proton-proton collisions at 8 TeV. *Journal of High Energy Physics* 1511, 018. doi: 10.1007/JHEP11(2015)018.

Chatrchyan, S. et al./CMS Collaboration. (2012). Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC. *Physics Letters B* 716 30. doi:10.1016/j.physletb.2012.08.021.

Abe, F. et al./CDF Collaboration. (1995). Observation of top quark production in proton-antiproton collisions. *Physics Review Letters* 74 2626.



### Nuno Loureiro

*Invited Associate Professor*

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**PhD:** Imperial College London, 2005.

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#### Research areas & interests:

Nuno Loureiro is a theoretical and computational plasma physicist working on magnetic confinement fusion and astrophysics. His main areas of investigation are magnetic reconnection - the explosive topological reconfiguration of the magnetic field in a plasma that lies at the heart of solar flares, amongst many other phenomena - and plasma turbulence. He is the 2015 recipient of the American Physical Society Thomas H. Stix Award for Outstanding Early Career Contributions to Plasma Physics Research.

#### Selected references:

Loureiro, N. F., Schekochihin, A. A., & Cowley, S. C. (2007). Instability of current sheets and formation of plasmoid chains. *Physics of Plasmas*, 14(10), 100703. doi:10.1063/1.2783986.

Schoeffler, K., Loureiro, N., Fonseca, R., & Silva, L. (2014). Magnetic-Field Generation and Amplification in an Expanding Plasma. *Physical Review Letters*, 112(17). doi:10.1103/physrevlett.112.175001.

Uzdensky, D., & Loureiro, N. (2016). Magnetic Reconnection Onset via Disruption of a Forming Current Sheet by the Tearing Instability. *Physical Review Letters*, 116(10). doi:10.1103/physrevlett.116.105003.



### Patrícia Gonçalves

*Invited Assistant Professor*

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#### Research areas & interests:

Patrícia Gonçalves is a Researcher at LIP, Laboratório de Instrumentação e Física Experimental de Partículas, where she coordinates the activities related to Space applications, in the field of Space Radiation Environment and Effects, She is also with the Portuguese group participating in the Pierre Auger Observatory and a member of the Geant4 collaboration. She is an Invited Assistant Professor with the Physics Department, at IST. Her Research interests include the Radiation Environment in Space and Effects, the development of energetic particle radiation detectors for future space missions, Ultra High Energy Cosmic Rays and simulation of the interaction of particles with matter.

Patrícia Gonçalves has given 12 outreach seminars in Basic and Secondary Schools, in the framework of the Ciencia Viva ESERO programme “O Espaço vai à Escola”, and she has also presented a public conference to a general audience on “Quantum Physics and Pseudoscience” (<http://concept.org/events/event/iv-conferencia-do-solsticio-fisica-quantica/>).

#### Selected references:

Arruda, L., Gonçalves P., et al. (2017). SEP Protons in GEO measured with the ESA MultiFunctional Spectrometer. *IEEE Transactions on Nuclear Science* 64 (8), pp2333. doi:10.1109/tns.2017.2714461.

Aab, A. et al. (2015). (2014). Searches for Anisotropies in the Arrival Directions of the Highest Energy Cosmic Rays Detected by the Pierre Auger Observatory. *The Astrophysical Journal*. 804. 10.1088/0004-637X/804/1/15.

McKenna-Lawlor, S., Gonçalves, P., et al. (2012). Characterization of the particle radiation environment at three potential landing sites on Mars using ESA's MEREM models. *Icarus*, 218(1), 723-734. doi:10.1016/j.icarus.2011.04.004.



### Pedro Abreu

Assistant Professor with "Agregação"

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#### Research areas & interests:

Pedro Abreu works at LIP on communication and outreach in particle and astroparticle physics and on data analysis and algorithms at the Pierre Auger Observatory. As a member of the Pierre Auger Collaboration has co-authored 25 papers published in international journals with peer review in years 2016 and 2017.

In the years 2016 and 2017, Pedro Abreu has given 56 outreach seminars at high-schools and public sessions, and organized and participated in about 16 outreach events. He is also the Portuguese representative in the CERN - European Particle Physics Communication Network, in the CERN High Schools and Teachers forum, and is also the LIP delegate to the IPPOG - International Particle Physics Outreach Group. He is also the national coordinator for the IPPOG International Masterclasses (since its start in 2005), and coordinator of these Masterclasses at IST and 7 other places in Portugal. Since 2010 is also President of the South and Isles Delegation of the Portuguese Physics Society; in this scope he is the coordinator of the Portuguese Physics Olympiads

regional phase and national phase in 2017; he is also the Chair of the Local Organizing Committee of the IPhO2018 - the International Physics Olympiad in Portugal in 2018 - having done preparation work in 2016 and 2017.

#### Selected references:

Abreu, P., Andringa, S., Diogo, F., & Espírito Santo, M. (2016). Questions and Answers in Extreme Energy Cosmic Rays - a guide to explore the data set of the Pierre Auger Observatory. *Nuclear and Particle Physics Proceedings*, 273-275, 1271-1275. doi:10.1016/j.nuclphysbps.2015.09.203.

Electroweak measurements in electron-positron collisions at W-boson-pair energies at LEP. (2013). *Physics Reports*, 532(4), 119-244. doi:10.1016/j.physrep.2013.07.004.

Abreu, P. As escolas de professores no CERN em língua portuguesa. (2015). In Dias Garcia, N. M. (Ed.), *Nós, professores brasileiros de física do ensino médio, estivemos no CERN* (pp. 37-58), São Paulo, Sociedade Brasileira de Física, Editora Livraria da Física. ISBN: 978-85-7861-316-7.



### Pedro Assis

Assistant Professor

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#### Research areas & interests:

P. Assis specializes in experimental particle and astroparticle physics. His work has been developed in the context of several international collaborations developing data acquisition systems for which he has taken great responsibilities. P. Assis is member of the Auger Collaboration and has authored papers with great impact on CR astrophysics. P. Assis also participates in LIP activities with the European Space Agency to study the radiation environment in space and its effects in components. P. Assis has published more than 90 papers in international peer review journals and more than 25 papers in proceedings of international conferences. Researcher ID gives a sum of the times cited of 4280 with an h-index of 29. Has authored more than 250 proceedings as an Auger Collaborator.

#### Selected references:

The Pierre Auger Collaboration. (2015). The Pierre Auger Cosmic Ray Observatory. *Nuclear Instruments and Methods in Physics Research A*, 798 172-213. doi: 10.1016/j.nima.2015.06.058.

Lopes, L., Assis, P., Blanco, A., Cerda, M., Carolino, N., Cunha, O., Ferreira, M., Fonte, P., Mendes, L., Palka, M., Pereira, A., Pimenta, M., Tomé, B. (2014). Resistive Plate Chambers for the Pierre Auger array upgrade. *Journal of Instrumentation*, 9(10), C10023-C10023. doi:10.1088/1748-0221/9/10/c10023.

The Pierre Auger Collaboration. (2017). Observation of a large-scale anisotropy in the arrival directions of cosmic rays above  $8 \times 10^{18}$  eV. *Science* 357 issue 1266. doi: 10.1126/science.aan4338.



### Pedro Bicudo

Associate Professor with “Agregação”

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#### Research areas & interests:

Pedro Bicudo studies Quantum Chromodynamics, the quantum field theory for quarks and gluons. He develops quark models with coupled channels and with spontaneous chiral symmetry breaking, and also researches the confinement, the screening mass of the gluon and exotic hadrons. Recently the evidence for tetraquarks in the experimental collaboration BESIII made exotic hadrons one of the most interesting subjects in physics. He published 77 articles in international journals of high impact, including 3 Physical Review Letters.

In the last 10 years, he was the principal investigator of scientific projects dedicated to research in the topic of ‘Lattice QCD’. This approach combines mathematical beauty with the use of computers, and it is hoped that it will eventually solve Quantum Chromodynamics and other non-perturbative field theories. As a second research topic, to outreach his scientific knowledge to society, he applies particle physics techniques to oceanic surface waves, surf technology and coastal environment.

Pedro Bicudo has given circa 30 outreach seminars at High-Schools and in Public Sessions, circa 10 interviews in television, circa 20 interviews in printed media, and wrote circa 100 articles or columns in wide public newspapers and magazines.

#### Selected references:

Bicudo, P., Cardoso, M., Van Cauteren, T., & Llanes-Estrada, F. J. (2009). Probing the infrared quark mass from highly excited baryons. *Physical Review Letters*, 103(9). doi:10.1103/physrevlett.103.092003.

Llanes-Estrada, F. J., Bicudo, P., & Cotanch, S. R. (2006). Oddballs and a low odderon intercept. *Physical Review Letters*, 96(8). doi:10.1103/physrevlett.96.081601.

Bicudo, P. J. (1994). Nuclear matter may enhance chiral symmetry breaking. *Physical Review Letters*, 72(11), 1600-1603. doi:10.1103/physrevlett.72.1600.



### Pedro Brogueira

Full Professor

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#### Research areas & interests:

Pedro Brogueira main scientific topics of research are scanning probe microscopy, semiconductor materials and devices, energy and particle physics detectors. His expertise covers vacuum technology; thin film deposition, PVD and CVD; optical, transport and structural thin film characterization; data acquisition systems design and implementation. He has been responsible for the Mechanics course for Engineering Physics first year students. He co-authored more than 150 scientific papers in international journals, 2 teaching books, 20 science videos broadcasted nationwide (one minute each), 3 science exhibitions and a science itinerancy project for the Ministry of Education and Science. He was coordinator of the Engineering Physics and of the Biomedical Engineering degrees of IST, member of the Pierre Auger Collaboration, President of the Physics Department and of the Center of Physics and Engineering of Advanced Materials (CeFEMA) and he is presently the coordinator of the scientific area of Condensed Matter and Nanotechnology.

Pedro Brogueira co-authored more than 150 scientific papers in international journals, 2 teaching

books, 20 science videos broadcasted nationwide (one minute each), 3 science exhibitions and a science itinerancy project for the Ministry of Education and Science.

#### Selected references:

Assis, P., Brogueira, P., Ferreira, M., Luz, R., & Mendes, L. (2016). Design and characterization of the PREC (Prototype Readout Electronics for Counting particles). *Journal of Instrumentation*, 11(08), T08004-T08004. doi:10.1088/1748-0221/11/08/t08004.

Fernandes, S. N., Aguirre, L. E., Pontes, R. V., Canejo, J. P., Brogueira, P., Terentjev, E. M., & Godinho, M. H. (2015). Cellulose-based nanostructures for photoresponsive surfaces. *Cellulose*, 23(1), 465-476. doi:10.1007/s10570-015-0815-8.

Dias de Deus, J., Pimenta, M., Noronha, A., Penha, T., Brogueira, P. (2014). *Introdução à Física*. Escolar Editora, 3rd Edition. ISBN 9789725924402.





### Pedro Ribeiro

*Invited Assistant Professor*

**Area:** Condensed Matter & Nanotechnology

**PhD:** 2008

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#### Research areas & interests:

I am a researcher at the Center of Physics and Engineering of Advanced Materials (CeFEMA), Lisbon and an invited Professor at the Physics Department of Instituto Superior Técnico (IST). Previously, I was a research fellow at Russian Quantum Center (RQC), Moscow (2014-2015), a postdoctoral fellow at Centro de Física das Interações Fundamentais (CFIF), IST, Lisbon (2013-2014 and 2008-2011), at the MPI-PKS, Dresden (2011-2013), and at the Condensed Matter Theory Group of MIT, Cambridge USA (2009 - 2010). I obtained my PhD in 2008 from UPMC, Paris-VI. My research has been developed within the fields of Condensed Matter and Quantum Information. My current interests focus on aspects of open quantum systems driven away from equilibrium. This research line provides a route to novel phases of matter with exotic properties that are impossible at equilibrium and have potential applications in thermoelectrics, electronic and sensing devices and quantum information processing.

#### Outreach:

Article explaining The Physics Nobel Prize 2016. E. Castro, P. Ribeiro. "O que há de topológico na matéria que nos rodeia? Trocando por miúdos o Nobel da Física de 2016." (in Portuguese), *Gazeta da Física*./Coordination and participation on

the Open Lab Day at the Theoretical Group of CeFEMA. Students visits to the center to get to know the researcher and research topics. IST, Lisbon, 2017./ Seminar explaining the Physics Nobel Prize 2016 to colleagues of other areas, CeFEMA workshop 2016, IST, Lisbon 2016./Outreach article explaining some of the current research lines in non-equilibrium physics./P. Ribeiro, Perder o equilíbrio... (in Portuguese), *Pulsar*, 2015-2016;

#### Selected references:

Ribeiro, P., Zamani, F., & Kirchner, S. (2015). Steady-state dynamics and effective temperature for a model of quantum criticality in an open system. *Physical Review Letters*, 115(22). doi:10.1103/physrevlett.115.220602.

Ribeiro, P., & García-García, A. M. (2012). Theoretical description of the superconducting state of nanostructures at intermediate temperatures: a combined treatment of collective modes and fluctuations. *Physical Review Letters*, 108(9). doi:10.1103/physrevlett.108.097004.

Ribeiro, P., & Mosseri, R. (2011). Entanglement in the symmetric sector of  $n$  qubits. *Physical Review Letters*, 106(18). doi:10.1103/physrevlett.106.180502.



### Pedro D. Sacramento

*Associate Professor with "Agregação"*

**Area:** Condensed Matter & Nanotechnology

**PhD:** Temple University, 1991.

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#### Research areas & interests:

Pedro D. Sacramento works in Theoretical Condensed Matter Physics and his main research interests are Topological phases of matter, Quantum information and condensed matter physics, Non-equilibrium dynamics, Strongly correlated systems, Fractionalization and confinement, Unconventional behavior in electronic systems, Disorder and magnetic field effects in superconductors and Magnetism and superconductivity. He has published 117 papers.

Pedro D. Sacramento has organized or co-organized several Conferences, Workshops and Schools both national and international. Also, has given Colloquia and short courses both locally and abroad.

#### Selected references:

Schlottmann, P., & Sacramento, P. (1993). Multichannel Kondo problem and some applications. *Advances in Physics*, 42(6), 641-682. doi:10.1080/00018739300101534.

Sacramento, P. D. (2014). Fate of Majorana fermions and Chern numbers after a quantum quench. *Physical Review E*, 90(3). doi:10.1103/physreve.90.032138.

Tešanović, Z., & Sacramento, P. D. (1998). Landau Levels and Quasiparticle Spectrum of Extreme Type-II Superconductors. *Physical Review Letters*, 80(7), 1521-1524. doi:10.1103/physrevlett.80.1521.



### Pedro Sebastião

Associate Professor with “Agregação”

**Area:** Condensed Matter & Nanotechnology

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#### Research areas & interests:

More than 70 international publications in peer-review. 3 chapters in scientific books. A book published. A Portuguese patent. 6 PhD students (5 completed), 7 master students in Physics/Engineering Physics/Materials Engineering. Supervisor of more than 11 students graduate and post-doc in research internships of more than three months. Regular national collaborations (Universidade Nova de Lisboa, Universidade de Coimbra) and international (Uni. Federal of Rio de Janeiro, University of Ljubljana, University of Pisa). Leader of the Fast Field Cycling NMR development team (3 developed prototypes, one in continuous operation since 2009). Software developer for data analysis and functions fitting made available through the web service at <http://fitteia.org> to the community of users around the world. Management activities by the Center of Physics and Engineering of Advanced Materials, as President, by the Executive of the Department of Physics, as vice-president, by the Coordination Commission of the MSc in Engineering Physics IST, as vice-coordinator, and by Portuguese Society of Physics, as vogal. Software development dedicated to supporting the management of students in Experimental Physics and management

of surveillance tests in the Department of Physics of IST. Teacher-rated “Excellent” in the years 2012-2016.

#### Selected references:

Daniel, C. I., Vaca Chávez, F., Feio, G., Portugal, C. A., Crespo, J. G., & Sebastião, P.J. (2013). 1H NMR relaxometry, viscometry, and PFG NMR studies of magnetic and nonmagnetic ionic liquids. *The Journal of Physical Chemistry B*, 117(39), 11877-11884. doi:10.1021/jp4078536.

Domenici, V., Gradišek, A., Apih, T., Hamplová, V., Novotná, V., & Sebastião, P.J. (2016). 1H NMR relaxometry in the TGBA\* and TGBC\* phases. *Ferroelectrics*, 495(1), 17-27. doi:10.1080/00150193.2016.1136725.

Sebastião, P.J., Monteiro, M. S., Brito, L. M., Rodrigues, E., Chávez, F. V., & Tavares, M. I. (2016). Conventional and fast field cycling relaxometry study of the molecular dynamics in polymer nanocomposites for use as drug delivery systems. *Journal of Nanoscience and Nanotechnology*, 16(7), 7539-7545. doi:10.1166/jnn.2016.12476.



### Pietro Faccioli

Invited Assistant Professor

**Area:** Particle Physics & Nuclear Physics

**PhD:** Università di Bologna

**ORCID:** 0000-0003-1849-6692

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#### Research areas & interests:

Within the CMS experiment P.F. leads the quarkonium polarization analyses. He was senior sub-convenor of the CMS Beauty-physics analysis group. He is involved in the writing of all CMS publications on quarkonium physics. He is member of the CMS publication board for heavy-ion papers. He is PI of a FCT project hosted by LIP on quarkonium production phenomenology. He demonstrated a theorem providing a new interpretation and generalization of the Lam-Tung identity (a key relation in the theory of Drell-Yan production), triggering a change of paradigm in the way experiments measure dilepton polarizations. He presented his research in many invited talks and seminars (CERN, Fermilab, Brookhaven, DESY, Vienna, Israel, Zürich, Beijing). In the last 10 years he was principal author of 15 high-impact publications with few co-authors, 6 peer-reviewed conference proceedings, 2 HERA-B and 10 CMS papers, 2 CERN Courier articles and 11 CMS analysis notes.

#### Selected references:

Faccioli, P., Lourenço, C., Seixas, J., & Wöhri, H. K. (2010). Towards the experimental clarification of quarkonium polarization. *The European Physical Journal C*, 69(3-4), 657-673. doi:10.1140/epjc/s10052-010-1420-5.

Faccioli, P., Lourenço, C., & Seixas, J. (2010). Rotation-invariant relations in vector meson decays into fermion pairs. *Physical Review Letters*, 105(6). doi:10.1103/physrevlett.105.061601.

Faccioli, P., Knünz, V., Lourenço, C., Seixas, J., & Wöhri, H. K. (2014). Quarkonium production in the LHC era: A polarized perspective. *Physics Letters B*, 736, 98-109. doi:10.1016/j.physletb.2014.07.006.



### Raquel Crespo

Assistant Professor with “Agregação”

**Area:** Particle Physics & Nuclear Physics

**PhD:** University Surrey, 1991.

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#### Research areas & interests:

R. Crespo works in reaction theory. In particular the development of reaction frameworks to study exotic nuclei. She works in collaboration with leading experimental facilities of Radioactive Ion Beams (RIB) such GSI/FAIR/Germany and RIKEN/Japan.

#### Selected references:

Crespo, R., Deltuva, A., & Cravo, E. (2014). Rescattering effects for the  $^{12}\text{C}(p,2p)^{11}\text{B}$  reaction at 400 MeV/u”, *Phys. Rev. C* 90.4 (2014). doi: 10.1103/PhysRevC.90.044606.

Fonseca, A. C., Crespo, R., & Deltuva, A. (2014). Momentum-space approach to nuclear reaction studies: opportunities and perspectives. *Journal of Physics G: Nuclear and Particle Physics*, 41(9), 094004. doi:10.1088/0954-3899/41/9/094004.

Crespo, R., Deltuva, A., & Moro, A. M. (2011). Core excitation contributions to the breakup of the one-neutron halo nucleus  $^{11}\text{Be}$  on a proton. *Physical Review C*, 83(4). doi:10.1103/physrevc.83.044622.



### Reinhard Schwarz

Associate Professor with “Agregação”

**Area:** Condensed Matter & Nanotechnology

**PhD:** Université de Neuchâtel, 1982.

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#### Research areas & interests:

Reinhard Schwarz studied Physics and Mathematics at the University of Stuttgart, Germany, and did a Ph.D. in Experimental High Energy Physics at the University of Neuchâtel, Switzerland. After a postdoc period at Princeton University, he started his own research group at the Technical University of München, Germany. He focused on thin film solar cells and on transport studies in amorphous silicon superlattices. He is co-author of some 250 publications in refereed journals and conference proceedings and co-inventor of a cyclic chemical vapor deposition method. Since 1996, he is an associate professor at the Physics Department of Instituto Superior Técnico, Lisbon, Portugal, with research on wide-band gap semiconductors and lead-free ferroelectrics prepared by pulsed laser deposition.

#### Selected references:

Schwarz, R., Slobodin, D., & Wagner, S. (1985). Differential surface photovoltage measurement of minority-carrier diffusion length in thin films. *Applied Physics Letters*, 47(7), 740-742. doi: 10.1063/1.96023.

Gu, Q., Schiff, E. A., Grebner, S., Wang, F., & Schwarz, R. (1996). Non-Gaussian Transport

Measurements and the Einstein relation in amorphous silicon. *Physical Review Letters*, 76(17), 3196-3199. doi:10.1103/physrevlett.76.3196.

Niehus, M., Sanguino, P., Schwarz, R., Monteiro, T., Soares, M., Pereira, E., Kunst, M. and Koynov, S. (2003). Low temperature photoluminescence, transient photoconductivity and microwave reflection for optical properties and transport in PLD-GaN. *physica status solidi (c)*, 0(1), 386-391. doi:10.1002/pssc.200390069.

Schwarz, R., Santos, L., Ayouchi, R., Bhattacharyya, S. R., Mardolcar, U., Leal, M., & Kholkin, A. (2013). Optical properties of lead-free NKN films from transmission and spectral ellipsometry. *Ferroelectrics*, 446(1), 118-127. doi:10.1080/00150193.2013.821018.

Tolstogousov, A., Aguas, H., Ayouchi, R., Belykh, S. F., Fernandes, F., Gololobov, G. P., ... Teodoro, O. M. (2016). Vacuum solid-state ion-conducting silver source for application in field emission electric propulsion systems. *Vacuum*, 131, 252-258. doi:10.1016/j.vacuum.2016.07.003.



### Ricardo Jorge González Felipe

*Invited Associate Professor*

**Area:** Particle Physics & Nuclear Physics

**PhD:** University of Helsinki, 1994.

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#### Research areas & interests:

Matter-antimatter asymmetry of the Universe, neutrino physics, early Universe cosmology, among others.

#### Selected references:

Branco, G., González Felipe, R., & Joaquim, F. (2012). Leptonic CP Violation. *Reviews of Modern Physics* 84.2: 515-565. doi: 10.1103/RevModPhys.84.515.

Felipe, R. G., Joaquim, F. R., & Nobre, B. M. (2004). Radiatively induced leptogenesis in a minimal seesaw model. *Physical Review D*, 70(8). doi:10.1103/physrevd.70.085009.

Branco, G., González Felipe, R., Joaquim, F., & Rebelo, M. (2002). Leptogenesis, CP violation and neutrino data: what can we learn? *Nuclear Physics B*, 640(1-2), 202-232. doi:10.1016/s05503213(02)00478-9.



### Ruben Conceição

*Invited Assistant Professor*

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**PhD:** Universidade de Lisboa, 2011.

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#### Research areas & interests:

Ruben Conceição (RC) is a member of the Pierre Auger Observatory, an experiment dedicated to the study of Ultra High Energy Cosmic Rays. Besides participating in the data analysis he has published several works on the Extensive Air Shower phenomenology with particular focus on the study of hadronic interactions at energies above those reached by Man-made accelerators. Ruben is also Co-PI of a new project to build a wide field-of-view gamma-ray experiment in the Southern Hemisphere (LATTES, [www.lip.pt/experiments/lattes/](http://www.lip.pt/experiments/lattes/)). He has supervised 2 Master students (1 on-going), has published 82 paper (13 short author) and has an h-index of 37.

Ruben Conceição has participated in several outreach and inreach events, for instance: Invited talk about High-energy multi-messengers at LIP/CFTP winter school, Invited talk about Pierre Auger Observatory at Hands on Particles and Light Workshop, Master Class: Hands-On Particles (IST). RC has also organized a Symposium Data Science dedicated to the connection between Academia and Industry: <http://www.lip.pt/events/2018/data-science/?p=index>.

#### Selected references:

The Pierre Auger Collaboration/Aab, A., et al. (2017). Observation of a Large-scale Anisotropy in the Arrival Directions of Cosmic Rays above  $8 \times 10^{18}$  eV. *Science* 357 no.6537, 1266-1270. doi: 10.1126/science.aan4338.

Assis, P., Conceição, R., et al. (2018). Design and expected performance of a novel hybrid detector for very-high-energy gamma-ray astrophysics. *Astroparticle Physics*, 99, 34-42. doi:10.1016/j.astropartphys.2018.02.004.

Espadanal, J., Cazon, L., & Conceição, R. (2017). Sensitivity of EAS measurements to the energy spectrum of muons. *Astroparticle Physics*, 86, 32-40. doi:10.1016/j.astropartphys.2016.11.003.



### Rui Dilão

*Assistant Professor with “Agregação”*

**Area:** Interdisciplinary physics

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#### Research areas & interests:

In 1986, he obtained the PhD in Physics (Mathematical Physics) from the Technical University of Lisbon and, in 1997, the Habilitation from the same university. In the period 1986-1988 he has been fellow at CERN. He has been collaborator of the scientific programme associated with the Portuguese satellite PoSAT-1 (1992-93). In 1999, together with two colleagues, he received the Lab-Med prize for original research work on laboratory research medicine. He is author of more than 60 research publications, distributed among dynamical systems theory, chaos theory, celestial mechanics, ecological and economic modelling, mathematical biology, biophysics, morphogenesis and nonlinear reaction-diffusion equations. He has presented more than 100 research lectures or communications in the academia and research meetings.

He has presented more than 100 research lectures or communications in the academia and research meetings. He has supervised 4 PhD thesis, 35 students at the master level, and has served as advisor of 4 postdoc researchers. He coordinated and participated in 18 research projects. He has co-authored a research book on dynamical system techniques for the design of particle accelerators. He has written 4 monographs for undergraduate and graduate studies, one book for undergraduate

teaching, and a two-booklet set with a kit for the awareness of the concepts of latitude and longitude, at the middle school level. On a regular basis, he serves as referee for several academic journals and served as member of the steering committees of 2 research programmes of the European Science Foundation. He participated as principal investigator in one of the work packages of the project GENNETEC (2006-2009) supported by the European Commission. He organized several research meetings in Portugal and abroad, and has edited several proceedings monographs. He is member of several professional societies.

#### Selected references:

Dilão, R., & Fonseca, J. (2016). Dynamic guidance of gliders in planetary atmospheres. *Journal of Aerospace Engineering*, 29(1), 04015012. doi:10.1061/(asce)as.1943-5525.0000499.

Almeida, S., & Dilão, R. (2016). Directional sensing and streaming in *Dictyostelium* aggregation. *Physical Review E*, 93(5). doi:10.1103/physreve.93.052402.

Cano, G., & Dilão, R. (2017). Intermittency in the Hodgkin-Huxley model. *Journal of Computational Neuroscience*, 43(2), 115-125. doi:10.1007/s10827-017-0653-9.



### Samuel Eleutério

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**PhD:** Universidade Técnica de Lisboa, 1986.

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#### Research areas & interests:

Simulation in Polymers: calculation of Flory index with models of fractional Brownian motion. Sentiments influence applies to the dynamics of the market. “Excellent Teacher” distinction at IST in 2016 and 2017. Scaling Properties of Weakly Self-Avoiding Fractional Brownian Motion in One Dimension *Journal of Statistical Physics*.



### Sérgio Ramos

Assistant Professor with “Agregação”

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**PhD:** Ecole Polytechnique/Université de Paris XI, 1986.

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#### Research areas & interests:

Structure of matter, in the COMPASS experiment at CERN (and previously in the NA51 Expt. at CERN): transverse momentum dependent parton distribution functions, through the polarised Drell-Yan process; gluon polarisation; quark helicity and transverse distributions.

Heavy ion collisions, in the HADES experiment at GSI (and previously in the NA38 and NA50 expts. at CERN): properties of matter at high density; dielectron and strange particle detection.

2002 - 2017 Co-responsible for the LIP portuguese group of the experiment COMPASS at CERN, annual Projects financed by FCT.

1990 - 2004 Co-responsible for the LIP Portuguese group of the NA50 experiment at CERN, annual Projects financed by FCT.

1992 - 1993 Co-responsible for the LIP portuguese group of the experiment NA51 at CERN.

1986 - 1992 Co-responsible for the LIP portuguese group of the NA38 experiment at CERN, annual Projects financed by FCT.

160 Publications in International Journals with Peer Review, of which 30 Publications have more

than 100 citations, in accordance to inSPIRE. Supervision of several PhD Theses, and several Pre-Bologna and Bologna Master Theses.

Membro da Comissão Organizadora da Conferência bienal: XIII International Conference on Beauty, Charm, and Hyperons in Hadronic Interactions, a realizar-se em Junho 2018, Peniche.

#### Selected references:

COMPASS Experiment. (2007). The deuteron spin-dependent structure function  $g_1(d)$  and its first moment. *Physics Letters B* 647 8. (333 citations).

NA50 Experiment, Abreu, M.C. et al. (2000). Evidence for deconfinement of quarks and gluons from the  $J/\psi$  suppression pattern measured in Pb-Pb collisions at the CERN-SPS, *Physics Letters B* 477 28. (442 citations). doi: 10.1016/S0370-2693(00)00237-9.

NA51 Experiment, Baldit, A. et al. (1994). Study of the isospin symmetry breaking in the light quark sea of the nucleon from the Drell-Yan process. *Physics Letters B*. 332. 244-250. (383 citations) doi:10.1016/0370-2693(94)90884-2.



### Susana Cardoso de Freitas

Associate Professor

**Area:** Condensed Matter & Nanotechnology

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#### Research areas & interests:

Susana Cardoso de Freitas is the leader of the Magnetics & Spintronic sensors group and the co-director of INESC-MN. She is co-author of over 260 publications, 2 patents and advised 4 PhD and 46 master students. She has coordinated 5 national projects, managed the INESC-MN participation in 3 training networks (Marie-Curie and ITN), and has been involved in several EU projects related with sensors. She is the responsible for the services and technology transfer provided by INESMN. Her research interests include advanced thin films, spintronic sensors, microfabrication processes in large area wafers, and sensors for robotics, biomedical and industrial applications. She has been responsible for the Spintronics, Nanoelectronics and Microfabrication techniques courses at IST. She received the Honorable Mention in Scientific Awards Universidade de Lisboa/Santander in 2016 and 2017 and the Magnetic Society of Japan Distinguished Publication Award in 2014.

Susana Freitas participates actively in the IEEE society activities and was appointed the Educational Activities Coordinator of the IEEE Portugal (2015). She is involved in a number of international clusters and networks: KET Tools (EU Infrastructure Cluster) and SpintronicFactory (European Network on Magnetism), and participated

in the RRI-Tools project: “To foster Responsible Research and Innovation for society, with society”. FP7-SCIENCE-IN-SOCIETY-2013-1-612393. She organized several International Workshops (eg.: Micro and Nano Devices (2012), Magnetic Recording (2016)) and has been involved in International Conference Organization (eg. as Programme Committee, Publication Committee, scientific committee, symposium organizer or Session Chair Advisory Board Member).

#### Selected references:

Caruso, L., Wunderle, T., Lewis, C. M., ..., Cardoso, S., et al. (2017). In vivo magnetic recording of neuronal activity. *Neuron*, 95(6), 1283-1291.e4. doi: 10.1016/j.neuron.2017.08.012.

Cardoso, S., Leitão, D. C., Dias, T. M., Valadeiro, J., Silva, M. D., Chicharo, A., Silverio, et al. (2017). Challenges and trends in magnetic sensor integration with microfluidics for biomedical applications. *Journal of Physics D: Applied Physics*. 50. doi: 10.1088/1361-6463/aa66ec.

Costa, J. D., Huisman, T., Mikhaylovskiy, R., Ventura, J., Teixeira, J. M., Schmool, D., Kakazei, G., Cardoso, S., Freitas, P. (2015). Terahertz dynamics of spins and charges in CoFe/Al<sub>2</sub>O<sub>3</sub> multilayers. *Physical Review B* 91(10) 104407. doi: 10.1103/PhysRevB.91.104407.



### Teresa Peña

Full Professor

**Area:** Particle Physics & Nuclear Physics

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#### Research areas & interests:

Teresa Peña works in Nuclear and Hadronic Physics. Her recent work is on spectroscopy and structure of mesons and baryons, with challenging questions on properties of matter under extreme conditions, in accelerators, or in the merger of stars. In addition, it contributes to technological applications, as medical imaging and radiation therapy, with large benefits to the society.

The research covers questions such as: What binds nucleons in nuclei? How do quarks acquire mass? What does the emissivity of matter tell us about the early universe? What are the radiation protection procedures for safe space travel and clinical procedures?

On Women's Day, 2016, she was given a tribute by *Ciência Viva*, and in 2011 the "René Glidden" Professorship distinction from the University of Ohio, for "...artistic, engineering, historical, literacy and scientific achievements". She authored an international publication "Nucleus - A trip to the heart of matter", translated into 5 european languages. At the CTN campus Teresa Peña participates in socially relevant projects on Biomedical Applications of Nuclear Technologies. In 2017,

she delivered two invited talks: at ECT\*, the European Center for Theoretical Studies in Nuclear Physics, and at the Nuclear Physics European Collaboration Committee.

She organized the Colloquia of the Physics Department, and an International Conference, LightCone 2016. She is a member of the European Research Committee on Few-Body Problems, and of the International Light Cone Advisory Committee, ILCAC. She is a member of the Executive Committee of the European Physical Society. During 2016-2017 she supervised 2 Master and 1 Ph.D students.

#### Selected references:

Leitão, S., Stadler, A., Peña, M., & Biernat, E. P. (2017). Covariant Spectator Theory of heavy-light and heavy mesons and the predictive power of covariant interaction kernels. *Physics Letters B*, 764, 38-41. doi:10.1016/j.physletb.2016.11.013.

Ramalho, G. D., Peña, M., Weil, J., Van Hees, H., & Mosel, U. (2016). Role of the pion electromagnetic form factor in the  $\Delta(1232) \rightarrow \gamma^* N$  timelike transition *Physical Review D*. 93. doi: 10.1103/PhysRevD.93.033004.



### Umesh Vinaica Mardolcar

Assistant Professor

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#### Research areas & interests:

Study of thermophysical properties of nanomaterials at high temperatures. Properties measured are thermal diffusivity by laser flash technique and Cp by Differential scanning calorimetry. Collaboration in the area of photocapacitance. He has published 32 papers in international journals and is responsible by discipline "Laboratory of Workshop" since 1988. Co-oriented two PhD and three MSc thesis.

#### Selected references:

Tejado, E., Carvalho, P., Munoz, A., Dias, M., Correia, J., Mardolcar, U., & Pastor, J. (2015). The effects of tantalum addition on the microtexture and mechanical behaviour of tungsten for ITER applications. *Journal of Nuclear Materials*, 467, 949-955. doi:10.1016/j.jnucmat.2015.10.034.

Nunes, D., Livramento, V., Mardolcar, U., Correia, J., & Carvalho, P. (2012). Tungsten-nanodiamond composite powders produced by ball milling. *Journal of Nuclear Materials*, 426(1-3), 115-119. doi:10.1016/j.jnucmat.2012.03.028.

Livramento, V., Nunes, D., Correia, J., Carvalho, P., Mardolcar, U., Mateus, R., Hanada, K., Shohoji, N., Fernandes, H., Silva, C., Alves, E. (2011). Tungsten-microdiamond composites for plasma facing components. *Journal of Nuclear Materials*, 416(1-2), 45-48. doi:10.1016/j.jnucmat.2011.02.031.



### Vasco Guerra

Associate Professor with “Agregação”

**Area:** Plasma Physics, Lasers & Nuclear Fusion

**PhD:** Universidade Técnica de Lisboa, 1998.

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#### Research areas & interests:

Vasco Guerra develops kinetic models to study non-equilibrium processes in low-temperature plasmas. He is currently very interested in understanding how to take advantage of the internal degrees of freedom of the CO<sub>2</sub> molecule to promote its recycling and to produce oxygen on Mars. He has been responsible of the courses of Thermodynamics and the Structure of Matter and Plasma Physics and Technology. He was awarded the William Crookes Prize in 2016, sponsored by the European Physical Society and the Institute of Physics, for the outstanding contribution to the modeling of molecular low-temperature plasmas. He is currently the Coordinator of the Master in Engineering Physics.

Vasco Guerra has given outreach seminars at high schools and in public sessions (Ciência Viva) on “Oxygen production on Mars” and “The Physics of Music”.

#### Selected references:

Guerra, V., Silva, T., Ogloblina, P., Grofulović, M., Terraz, L., Silva, M. L., Pintassilgo, C. D., Alves, L. L. e Guaitella, O. (2017). The case for in situ resource utilisation for oxygen production on Mars by non-equilibrium plasmas. *Plasma Sources Science and Technology*, 26(11), 11LT01. doi:10.1088/1361-6595/aa8dcc.

Pintassilgo, C. D., & Guerra, V. (2017). Modelling of the temporal evolution of the gas temperature in N<sub>2</sub> discharges. *Plasma Sources Science and Technology*, 26(5), 055001. doi:10.1088/1361-6595/aa5db2.

Marinov, D., Teixeira, C., & Guerra, V. (2016). Deterministic and Monte Carlo methods for simulation of plasma-surface interactions. *Plasma Processes and Polymers*, 14(1-2), 1600175. doi:10.1002/ppap.201600175.



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#### Research areas & interests:

Vitor Cardoso is Professor of Physics at IST, where he is Head of the IST Gravity group at CENTRA. He is a Visiting Fellow at Perimeter Institute. Vitor currently Chairs the COST Action GWverse, on black holes, gravitational waves and fundamental physics, which represents over 30 countries worldwide. He is mainly focused on strong-gravity problems, with implications for gravitational-wave physics, high-energy and particle physics. He is co-author of the book “Superradiance” (Springer-Verlag, 2015) and of over 180 scientific papers. In 2015, he was awarded the “Ordem de Sant’Iago da Espada” title, for scientific achievements, by the President of the Portuguese Republic. He is the recipient of the “Excellent Teacher” award by Técnico.

Vitor Cardoso has given numerous radio and TV interviews, about science and society. He was the guest of TV show “Filhos da Nação” in 2017. He is a founding member of the portuguese society for General Relativity and Gravitation (SPRG) and the Chair of the largest meeting in the field, GR22 in Valencia 2019.

#### Selected references:

Brito, R., Cardoso, V., & Pani, P. (2015). *Superradiance, Lecture notes in physics*. Springer-Verlag. eBook ISBN: 978-3-319-19000-6.

Berti, Emanuele, Cardoso, Vitor, & Starinets, A. (2009). Quasinormal modes of black holes and black branes. *Classical and Quantum Gravity* 26 163001 (2009) doi:10.1088/0264-9381/26/16/163001

V. Cardoso and Pani, P. (2017). Tests for the existence of black holes through gravitational wave echoes. *Nature Astronomy* 1, no. 9, 586. doi: 10.1038/s41550-017-0225-y.




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**Research area & interests:**

Strongly correlated electron and spin systems. Low-dimensional systems. Phase space representations of quantum mechanics. Nonperturbative methods. Systems far from equilibrium. Real time formalisms. Quantum thermodynamics. Quantum stochastic processes. Quantum information and computation.

**Teaching:**

Many Particle Systems and Critical Phenomena, Advanced Condensed Matter Physics, Statistical Mechanics and Phase Transitions, Condensed Matter Physics, Topics of Condensed Matter Physics, Physics Seminar.

Scientific Orientation of several Master and PhD students.

Coordinator of the PhD Doctoral Programmes of the Physics Department (1999-2014, 2012-2016).

**Selected references:**

Mera, B., Vlachou, C., Paunković, N., & Vieira, V. R. (2017). Uhlmann Connection in Fermionic Systems Undergoing Phase Transitions. *Physical Review Letters*, 119(1). doi:10.1103/physrevlett.119.015702.

Vieira, V., & Sacramento, P. (1995). Path integrals of spin-J systems in the holomorphic representation. *Nuclear Physics B*, 448(1-2), 331-354. <https://www.sciencedirect.com/science/article/pii/055032139500196Y>. doi:10.1016/0550-3213(95)00196-y.

Vieira, V. R. (1989). Finite-temperature real-time field theories for spin 1/2. *Physical Review B*, 39(10), 7174-7195. doi:10.1103/physrevb.39.7174.

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# ADMINISTRATIVE STAFF



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**Administrative duties:**

Ana Bela Cardoso's main activity is the support of the MEFT Coordination. She is responsible for the organization and structure of the Secretariat regarding the course "MEFT Project", including the disclosure of videos in a public website.

She is responsible for the procedures required for the submission and public presentation of the final masters dissertation by MEFT students. She also supports the "Welcome Week" for 1st year MEFT students and other events held in the Department of Physics. She is also in charge of the different aspects related to the MEFT students in ERASMUS.



**Daniel de Jesus Mendes Lála**  
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**Administrative duties:**

Daniel Lála works as a technician in the various laboratories, namely the Electronics, the Technological, and the DEMO - Demonstrations Laboratories.

He also supports the filming and the production of short videos for the UC "Project MEFT" and provides technical support in various laboratories of the Department of Physics in the field of electronics. In 2015, he provided major support to the installation of the new laboratory for the "Project MEFT".



**Dulce Maria Martins da Conceição**  
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**Administrative duties:**

Dulce Conceição is a Senior Technician in the Department of Physics. She provides secretariat duties for CENTRA and CEFEMA.



**Fátima Correia**  
*Operational Assistant*

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**Administrative duties:**

Fátima Correia's main activity is to support the DF's secretariat. She is involved in the support of students in daily activities, mail service (internal and external), management of various displays with information about department's activities. She is also involved with the archive of Assessment tests and written exams.



**Fátima Casquilho**  
*Operational Assistant*

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**Administrative duties:**

Fátima Casquilho provides support to the Dept. of Physics secretariat mainly in activities related to the Department of Physics archive and in analysis of curricular plans of students.



**Hélder Carvalho**  
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**Administrative duties:**

Hélder Carvalho provides technical support to the Experimental Physics Laboratories (Thermodynamics and Structure of Matter, Electromagnetism and Optics, Mechanics and Waves) and the LFEB (Basic Experimental Physics Laboratory) and LOO (Oscillations and waves Laboratory) Laboratories of MEFT.


**João Paulo dos Santos Guerreiro**
*Coordinator of Administrative Services*

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**Administrative duties:**

João Paulo Guerreiro's main activity is to support the management and coordination of tasks of the Executive Commission of the DF in the following areas: teaching, including organization of teaching activities; teaching permit applications for foreign employees; processing of the application of the Teaching Service Provision Regulation (RSD); order Sabbatical leaves; teacher hiring guests under Clause 32a of ECDU; management of monitor's applications for assessment tests (tests and exams) of course units under the department's responsibility.

He is also in charge of the procedures related with scholarships to support educational activities. He participates in the organization of events organized by the DF and the MEFT coordination, such as the workshop "MEFT-Challenging the Limits of Science and Technology" and the "Welcome Week at IST".

He gives crucial support in the management and full implementation of funds allocated to the DF, in accordance with the decisions of the department's executive commission.


**Martinha Viegas de Sousa**
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**Administrative duties:**

Martinha Viegas de Sousa's main activity is the secretariat of MEFT Coordination. Such work includes the schedule for MEFT procedures, compilation and completion of documents necessary for the process of annual assessment of MEFT, preparation of the beginning of each semester meetings.

She also provides the secretariat of the "Welcome Week", a DF initiative dedicated to new MEFT students and "MEFT-Challenging the Limits of Science and Technology", a department's initiative for high school students.

She has been working on an effective implementation at the MEFT Secretariat of the administrative procedures in accordance with the changes and innovation of the various IST services to improve the quality efficiency of the secretariat support to the MEFT coordination.

Martinha Viegas de Sousa has been in charge of maintaining updated information related to the UCs MEFT, DEAF, DEAEFT in the Portal Bologna. In 2015, she was involved in publication of the report for the process of MEFT Accreditation.


**Pedro Claro**
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**Administrative duties:**

Pedro Claro provides support for the Technological Laboratory. He is an expert in the fields of welding and works on metal parts. He also gives technical support to the DF in various areas.


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**Administrative duties:**

Sandra Martins works at the Department of Physics' secretariat. Since 2015, she has had responsibilities in the maintenance of the department's website and the television with updated information about the scientific, pedagogical and outreach activities. She participates in the organization of various department's initiatives such as the "Welcome week" for new students and the workshop "MEFT - Challenging the limits in science and technology" for high school students. She also provides support in the organization various of teaching activities and students examinations, and collaborated in the preparation of the present report.


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**Administrative duties:**

Sandra Oliveira's activity is to support the activities of the following research units: CFTP - Centre for Theoretical Particle Physics and CEFEMA - Center of Physics and Engineering of Advanced Materials.



*Image by Débora Rodrigues/Técnico Lisboa.*

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