Appendix 1

TECHNOLOGIES FOR FUNDAMENTAL RESEARCH IN PHYSICS AND ASTROPHYSICS information sheet

Department	Dipartimento di Fisica e Astronomia "Galileo Galilei" - DFA
Coordinator	Prof. Mosè Mariotti
Number of positions	32
SCHOLARSHIP funded by MD 629/2024 ***See Appendix***	**SCHOLARSHIP N.1** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Padova CURRICULUM: Detectors, Lasers and Optics TOPIC: Development of pixel detectors in CMOS technology for applications at future colliders **SCHOLARSHIP N.2** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Padova CURRICULUM: Mechanics TOPIC: Development and Characterization of Innovative Additively Manufactured Metal Alloys for High and Ultra-High Temperature Applications **SCHOLARSHIP N.3** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Padova CURRICULUM: Mechanics TOPIC: Advanced Design for Additive Manufacturing (DfAM) approaches for cutting-edge applications in Physics and Engineering **SCHOLARSHIP N.4** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Padova CURRICULUM: Detectors, Lasers and Optics TOPIC: Optical Design of MezzoCiel **SCHOLARSHIP N.5** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Cagliari CURRICULUM: Detectors, Lasers and Optics TOPIC: Optics and thermo-optics of dielectric coatings for gravitational-wave interferometers
SCHOLARSHIP funded by DM 630/2024 ***See Appendix***	**SCHOLARSHIP N.6** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Padova CURRICULUM: Computing and information technology TOPIC: Advanced algorithms for pattern recognition and feature extraction in embedded systems for particle physics detectors data processing **SCHOLARSHIP N.7** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Padova CURRICULUM: Detectors, Lasers and Optics TOPIC: Study and Characterization of Silicon-Photomultipers with applications to Large Surface Radiation Detectors **SCHOLARSHIP N.8** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Padova CURRICULUM: Mechanics TOPIC: Sustainable Surface Finishing of Additively Manufactured Metal Components for High-Precision Applications **SCHOLARSHIP N.9** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Napoli Federico II CURRICULUM: Detectors, Lasers and Optics TOPIC: Sensor characterization with impedance spectroscopy techniques and noise analysis

	SCHOLARSHIP N.10 HOSTING UNIVERSITY/RESEARCH CENTRE: Politecnico di Torino CURRICULUM: Detectors, Lasers and Optics TOPIC: Development and characterisation of CMOS sensors for X-ray imaging in space, medical and industrial applications **SCHOLARSHIP N.11** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Cagliari CURRICULUM: Computing and information technology TOPIC: Machine learning for high energy physics **SCHOLARSHIP N.12** HOSTING UNIVERSITY/RESEARCH CENTRE: GSSI - Gran Sasso Science Institute CURRICULUM: Detectors, Lasers and Optics TOPIC: Development and characterization of low-temperature detectors for rare event research and quantum sensing **SCHOLARSHIP N.13** HOSTING UNIVERSITY/RESEARCH CENTRE: GSSI - Gran Sasso Science Institute CURRICULUM: Mechanics TOPIC: Development, production and optimization of cryogenic components for applications at Kelvin and milliKelvin temperatures
SCHOLARSHIP FUNDED BY UNIVERSITY/OTHER BODIES ***See Appendix***	**SCHOLARSHIP N.14** HOSTING UNIVERSITY/RESEARCH CENTRE: Università degli Studi di Bari Aldo Moro CURRICULUM: Detectors, Lasers and Optics TOPIC: Development of Fast Timing MPGD Detector for Experiments at Future Accelerators **SCHOLARSHIP N.15** HOSTING UNIVERSITY/RESEARCH CENTRE: INAF - Osservatorio Astronomico di Padova CURRICULUM: Detectors, Lasers and Optics TOPIC: Simulations, analysis and procedures definition for alignment, test and calibration of complex Adaptive Optics systems in the framework of the new generation of telescope and instrumentation **SCHOLARSHIP N.16** HOSTING UNIVERSITY/RESEARCH CENTRE: INAF - Osservatorio Astronomico di Padova CURRICULUM: Computing and information technology TOPIC: Application of Artificial Intelligence for PSF Reconstruction in Adaptive Optics **SCHOLARSHIP N.17** HOSTING UNIVERSITY/RESEARCH CENTRE: INAF - Osservatorio Astronomico di Palermo CURRICULUM: Mechanics TOPIC: Study and mechanical characterisation of ultra-thin membranes for applications in astrophysics instruments **SCHOLARSHIP N.18** HOSTING UNIVERSITY/RESEARCH CENTRE: INAF - Osservatorio Astronomico di Brera CURRICULUM: Detectors, Lasers and Optics TOPIC: Development of self-consistent methods for simulating the optical performance of UV and X-band mirrors and gratings **SCHOLARSHIP N.19** HOSTING UNIVERSITY/RESEARCH CENTRE: INAF - Osservatorio Astrofisico di Arcetri CURRICULUM: Mechanics

	TOPIC: Adaptive optics for next-generation space telescopes **SCHOLARSHIP N.20** HOSTING UNIVERSITY/RESEARCH CENTRE: INAF - Osservatorio Astrofisico di Torino CURRICULUM: Computing and information technology TOPIC: Development of technologies for observing meteors from the ground and space **SCHOLARSHIP N.21** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Padova CURRICULUM: Electronics TOPIC: Study of Methods for Low Phase Noise Timing Distribution in Astrophysics Experiments **SCHOLARSHIP N.22** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Torino CURRICULUM: Detectors, Lasers and Optics TOPIC: Development and Characterisation of the Small-Sized Telescope camera for the Cherenkov Telescope Array (CTA) **SCHOLARSHIP N.23** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Ferrara CURRICULUM: Electronics TOPIC: Upgrade of the DAQ system of the LHCb Ring Imaging Cherenkov (RICH) detectors for operation at High-Luminosity LHC (HL-LHC) conditions **SCHOLARSHIP N.24** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Cagliari CURRICULUM: Detectors, Lasers and Optics TOPIC: Development of an innovative phase-camera for the Einstein Telescope Interferometer **SCHOLARSHIP N.25** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN- Sezione di Cagliari CURRICULUM: Detectors, Lasers and Optics TOPIC: Development of innovative techniques for background reduction in cryogenic liquid noble-gases detectors **SCHOLARSHIP N.26** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Napoli CURRICULUM: Mechanics TOPIC: Development of mechanical technologies for vibration insulation in gravitational wave detectors and other fundamental physics experiments **SCHOLARSHIP N.27** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Perugia CURRICULUM: Detectors, Lasers and Optics TOPIC: Development of solid-state detectors for clinical beam dosimetry, both conventional and FLASH **SCHOLARSHIP N.28** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Lecce CURRICULUM: Computing and information technology TOPIC: Optimizing Machine Learning Architectures for Enhanced Event Reconstruction and Calibration in Fundamental Physics Experiments **SCHOLARSHIP N.29** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Laboratori Nazionali di Legnaro CURRICULUM: Mechanics TOPIC: Development, design and testing of metallic components for high-

	temperature nuclear physics applications produced using additive manufacturing technologies **SCHOLARSHIP N.30** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Bari CURRICULUM: Electronics TOPIC: Development and test of a readout system for a pixel detector with multi-Gbps interface **SCHOLARSHIP N.31** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Roma Tor Vergata CURRICULUM: Computing and information technology TOPIC: Development of databases and archiving systems for real-time monitoring of scientific data for astroparticle physics missions **SCHOLARSHIP N.32** HOSTING UNIVERSITY/RESEARCH CENTRE: INFN - Sezione di Roma Tre CURRICULUM: Electronics TOPIC: Advanced acquisition system for hadrontherapy		
Selection criteria	PRESELECTION ON THE BASIS OF EVALUATION OF QUALIFICATIONS AND ORAL EXAMINATION		
Oral examination via remote interview:	Applicants, who have requested this on their application form, will take the oral exam via remote interview using the ZOOM videoconferencing tool.		
Evaluation criteria	Qualifications: max 45 points Oral examination: max 55 points Candidates may apply for admission to more than one topic, with a maximum of 3 topics. The project proposal will be unique for all applications submitted.		
Documents to be submitted	**Curriculum:**	Points: max 35	- Candidate Profile: 1) Relevance of your profile with respect to the Curriculum indicated and with respect to a specific research topic (“Tema Vincolato”) selected; 2) Extended summary of the master's / specialist / old system degree thesis. For candidates who have not yet obtained the master's degree (or equivalent), the summary must be countersigned by the supervisor; - Candidate career: Grade Point Average, weighted by the number of credits, for exams taken in the Laurea Triennale+ Magistrale/Specialistica or arithmetic average for exams taken in the Laurea Vecchio Ordinamento. For students with a foreign degree, provide the Grade Point Average (GPA) for each degree obtained. - Other titles: 1) Time spent abroad during your studies including virtual exchange activities (e.g. Erasmus grants, Time, Erasmus Placement, thesis abroad, etc.); 2) Relevant work experience after graduation (research grants, scholarships, internship periods, period of employment); 3) Scientific awards relevant to the curriculum; 4) Other qualifications (e.g., teaching assistantships).
	Scientific publications:	Points max 3	Scientific publications: publications in journals/conferences proceedings/books and patents; report full bibliographical information (name of authors, journal or conference name, volume, publication year, pages, DOI). Manuscripts accepted for publication will be considered only if DOI is provided. WARNING: insert publication data in the “LIST OF QUALIFICATIONS” template available at: https://www.unipd.it/en/national-phd-programme-technologies-fundamental-research-physics-

			astrophysics
	Reference Letter:	Point max 7	Candidate Reference Letters (maximum two) by University or Company referees, to be completed strictly through the PICA procedure; Reference letters (maximum two) written through the PICA web form by a faculty member or a person working in industry a motivational letter (no more than two pages) explaining the candidate's research interests, in particular how these fit in with the chosen lines of research. The motivational letter must be prepared according to the "PhD motivational letter" template available at: https://www.unipd.it/en/national-phd-programme-technologies-fundamental-research-physics-astrophysics
Preselection: First meeting of the Evaluating Commission	**August, 05th 2024**		
Publication of the results of the evaluation of the preselection	Within **September, 15th 2024** the evaluating Commission will publish the results of the evaluation of the qualifications in the following website: https://www.unipd.it/en/national-phd-programme-technologies-fundamental-research-physics-astrophysics Candidates who have passed the pre-selection on the basis of their qualifications, with a pass-mark of at least 70/100, will be admitted to the oral examination.		
Publication of the timetable of remote interviews and instructions on how to use the ZOOM video conferencing	By **September, 15th 2024** the commission will publish on the website https://www.unipd.it/en/national-phd-programme-technologies-fundamental-research-physics-astrophysics the timetable of the remote interviews and the instructions for using the ZOOM videoconferencing for those applicants who have chosen in their application form to take the oral examination via remote interview and who have passed the preselection on the basis of the qualifications with a pass-mark of at least 7/10.		
Oral examination	26/08/2024, 10:00 a.m.CEST - The exam may continue: 27/08/2024, 10:00 a.m. CEST, 28/08/2024, 10:00 a.m. CEST – 29/08/2024, 10.00 a.m. CEST		

APPENDIX

SCHOLARSHIP N.	**1**
FUNDED BY	DM 629/2024 - Action Line: Public Administration
TOPIC	Development of pixel detectors in CMOS technology for applications at future colliders
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Serena Mattiazzo serena.mattiazzo@unipd.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Università degli Studi di Padova
DEPARTMENT	Dipartimento di Fisica e Astronomia Via Marzolo 8, 35131 Padova https://www.dfa.unipd.it/
DESCRIPTION	In most future collider concepts (HL-LHC, EIC, FCC, muon collider) similar physics requirements are foreseen for vertex and tracker detectors: high vertex resolution, high transverse momentum resolution, background rejection, etc. This translates in common requirements for the sensor: high granularity, small material budget, low power consumption, improved timing capabilities, novel readout architectures, etc. Different technologies are presently under development, exploiting progress in semiconductor industry and synergies between experiments. The student will join the Silicon Detector Lab, presently involved in different R&D activities on monolithic pixel sensors in tight connection with the interested High Energy Physics experiments. The student will be able to actively participate in the different phases of the detector realization (design, testing) in collaboration with the other Italian and foreign groups involved in the R&D activity.

SCHOLARSHIP N.	**2**
FUNDED BY	DM 629/2024 - Action Line: Public Administration
TOPIC	Development and Characterization of Innovative Additively Manufactured Metal Alloys for High and Ultra-High Temperature Applications
CURRICULUM	Mechanics
CONTACTS	Massimo Pellizzari massimo.pellizzari@unitn.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Università degli Studi di Padova
DEPARTMENT	Dipartimento di Fisica e Astronomia Via Marzolo 8, 35131 Padova https://www.dfa.unipd.it/
DESCRIPTION	The project focuses on the development and characterization of innovative metal alloys tailored for additive manufacturing (AM), particularly using laser powder bed fusion technology. The research will delve into the properties and performance of these novel alloys under high and extreme temperature conditions. Application areas include thermal storage, oil and gas, nuclear physics, and nuclear fusion. The project encompasses alloy composition optimization, detailed microstructural analysis, and comprehensive mechanical testing to ensure the materials meet the stringent requirements of these challenging environments. By advancing the understanding and capabilities of high temperature and ultra-high temperature alloys in AM, this research aims to enhance the efficiency, durability, and overall performance of components used in the aforementioned industrial and R&D environments. The outcomes of this project are expected to lead to significant advancements in material science and engineering, driving innovation in high and ultra-high temperature applications.

SCHOLARSHIP N.	**3**
FUNDED BY	DM 629/2024 - Action Line: Public Administration
TOPIC	Advanced Design for Additive Manufacturing (DfAM) approaches for cutting-edge applications in Physics and Engineering
CURRICULUM	Mechanics
CONTACTS	Serena Graziosi serena.graziosi@polimi.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Università degli Studi di Padova
DEPARTMENT	Dipartimento di Fisica e Astronomia Via Marzolo 8, 35131 Padova https://www.dfa.unipd.it/
DESCRIPTION	The PhD project investigates advanced Design for Additive Manufacturing (DfAM) approaches with applications in physics and multidisciplinary fields. Additive Manufacturing (AM) enables the creation of complex geometries, the tuning of material distribution within a given design space, and the manufacturing of components not feasible with standard production technologies. This research aims to deepen and exploit this increased design and manufacturing freedom allowed by AM to enhance component performance, material efficiency, and production processes for applications in physics, such as experimental apparatus operating in extreme conditions. Additionally, the research focuses on multidisciplinary applications, integrating thermal management, structural integrity, and lightweight design. By exploring novel design approaches and computational tools, this PhD project is targeted to enhance the thermo-mechanical properties and pursue functional integration and scalability of 3D-printed components for the applications of interest. Integrating innovative design procedures with physics' multidisciplinary application fields will drive the development of high-performance, cost-effective, and customizable applications for designing advanced and complex experimental setups and devices. The findings will provide a comprehensive framework for designing innovative AM components tailored to diverse scientific and engineering challenges.

SCHOLARSHIP N.	**4**
FUNDED BY	DM 629/2024 - Action Line: Public Administration
TOPIC	Optical Design of MezzoCielo
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Demetrio Magrin demetrio.magrin@inaf.it demetrio.magrin@unipd.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Università degli Studi di Padova
DEPARTMENT	Dipartimento di Fisica e Astronomia Via Marzolo 8, 35131 Padova https://www.dfa.unipd.it/

DESCRIPTION

MezzoCielo is an innovative project based on a one-meter class telescope able to cover at the same time the whole sky hemisphere as patrol for transient. The concept is based on a monocentric spherical envelope made up by 800mm class meniscus forming a hollow sphere filled with low refractive Index, high transparency liquid and on an array of individual, mass produced, cameras compensating intrinsic aberrations and providing onto CMOS-like detectors seeing limited images of a small portion of the sky with a slight overlap. The PHD is oriented to the study of the optical concept, to the design and the optimization of the optical configurations accounting also for a serial production approach.

SCHOLARSHIP N.	**5**
FUNDED BY	DM 629/2024 - Action Line: PNRR
TOPIC	Optics and thermo-optics of dielectric coatings for gravitational-wave interferometers
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Francesco Quochi quochi@unica.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Universitá degli Studi di Cagliari
DEPARTMENT	Dipartimento di Fisica Complesso Universitario di Monserrato S.P. Monserrato-Sestu Km 0,700 09042 Monserrato (CA) - ITALY https://web.unica.it/
DESCRIPTION	The research project focuses on the development and characterisation of materials and multilayers for optical interferometry in the detection of gravitational waves, with a particular focus on the Einstein Telescope project. The field of research and development involved is characterised by: (i) A strong scientific-technological vocation; (ii) An innate interdisciplinary nature, ranging from materials science to physical optics; (iii) The ease of promoting scientific collaboration through participation in national and international collaboration networks; (iv) An intrinsic cross-sectoral character, which effectively favours collaboration with high-tech companies in the fields of optical technologies.

SCHOLARSHIP N.	**6**
FUNDED BY	DM 630/2024
TOPIC	Advanced algorithms for pattern recognition and feature extraction in embedded systems for particle physics detectors data processing
CURRICULUM	Computing and information technology
CONTACTS	Marco Zanetti marco.zanetti@unipd.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Università degli Studi di Padova
DEPARTMENT	Dipartimento di Fisica e Astronomia Via Marzolo 8, 35131 Padova https://www.dfa.unipd.it/
DESCRIPTION	The proposed PhD project focuses on developing advanced algorithms for pattern recognition and feature extraction tailored for embedded systems used in particle physics detectors. Particle physics experiments generate vast amounts of data from complex interactions, necessitating real-time processing capabilities. The student will design, implement, and optimize algorithms that efficiently identify and extract relevant features from raw detector data, enabling faster and more accurate data analysis. The project will begin with a comprehensive literature review of existing algorithms and techniques used in pattern recognition and feature extraction within the context of particle physics. The student will then investigate the specific challenges posed by the embedded systems, such as limited computational resources and stringent real-time processing requirements. Next, the student will develop novel algorithms that leverage machine learning and deep learning approaches, focusing on their adaptation to the constraints of embedded systems. This will involve creating lightweight models that maintain high accuracy while being computationally efficient. The student will implement these algorithms on various embedded platforms, conducting rigorous testing and benchmarking against existing solutions. Collaboration with leading particle physics research groups will be integral to the project, providing access to real-world data and ensuring the developed algorithms meet the practical demands of the field. Additionally, the student will have opportunities to present their findings at international conferences and publish in highimpact journals. Ultimately, the project aims to advance the state-of-the-art in data processing for particle physics detectors, contributing to more precise and timely discoveries in the field. This research will not only enhance the performance of current detector systems but also lay the groundwork for future innovations in embedded systems for scientific data processing.

SCHOLARSHIP N.	**7**
FUNDED BY	DM 630/2024
TOPIC	Study and Characterization of Silicon-Photomultipers with applications to Large Surface Radiation Detectors
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Gianmaria Collazuol gianmaria.collazuol@pd.infn.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	Università degli Studi di Padova
DEPARTMENT	Dipartimento di Fisica e Astronomia Via Marzolo 8, 35131 Padova https://www.dfa.unipd.it/
DESCRIPTION	The project comprises 3 parts. The 1st consists in the study and characterization of Backside Illuminated Silicon Photomultipliers (BISiPM) being developed at FBK. The separation between charge collection and multiplication regions enable several advantages including (a) sensitivity over wide range of wavelength, (b) small pitch cell with 100% Fill Factor, fast response, wide dynamic range and low cross-talk, (c) ultimate intercon density with ultrafast, low-power local electronics The 2nd part consists in developing Wavelength Shifter (WLS) based light-traps that utilize BISiPMs for reading out the light. Large Surface light-trapping Tiles (LSLT) comprise a thin WLS layer sandwiched between low refr. index planes conveying the light at the tile edges, where WLS fibers further convert and the light, which in turn is measured by BISiPMs at the fibers end In the 3rd part, LSLT will be tested at the University of Tokyo as photon detectors for the Intermediate Water Cherenkov Detector IWCD and the Near Detector ND280 of the Hyper-Kamiokande experiment.

SCHOLARSHIP N.	**8**
FUNDED BY	DM 630/2024
TOPIC	Sustainable Surface Finishing of Additively Manufactured Metal Components for High-Precision Applications
CURRICULUM	Mechanics
CONTACTS	Cristian Pira cristian.pira@lnl.infn.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Università degli Studi di Padova
DEPARTMENT	Dipartimento di Fisica e Astronomia Via Marzolo 8, 35131 Padova https://www.dfa.unipd.it/
DESCRIPTION	This PhD research project aims to enhance the surface quality of metal components produced by additive manufacturing (AM) through chemical and electrochemical finishing methods, including electropolishing, chemical polishing, and plasma electrolytic polishing (PEP). While AM enables the fabrication of complex structures, surface roughness and defects limit its application in high-precision fields such as physics, astrophysics, and various industrial sectors. The project will develop and optimize these surface finishing techniques to achieve smoother surfaces and improved mechanical properties. A key component is evaluating the environmental sustainability of each method. Performance testing on treated components will be compared to untreated surfaces to ensure significant improvements. The expected outcome is to provide environmentally sustainable surface finishing solutions that enhance the performance and applicability of AM metal components in high-precision fields, meeting the rigorous demands of scientific and industrial applications.

SCHOLARSHIP N.	**9**
FUNDED BY	DM 630/2024
TOPIC	Sensor characterization with impedance spectroscopy techniques and noise analysis
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Alberto Aloisio alberto.aloisio@unina.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	Università degli Studi di Napoli Federico II
DEPARTMENT	Dipartimento di Fisica Ettore Pancini Via Cinthia, 21 - 80126, Napoli https://www.fisica.unina.it/
DESCRIPTION	The research activity will focus on the electrical and optical characterization of sensors and photodetectors based on traditional and innovative materials. Impedance Spectroscopy and low-frequency noise analysis will be deployed to derive equivalent models of the devices and to study conduction dynamics. Bias stress, aging, as well as radiation damage will be studied through this approach. Noise mitigation techniques and low-noise read out electronics will be also addressed.

SCHOLARSHIP N.	**10**
FUNDED BY	DM 630/2024
TOPIC	Development and characterisation of CMOS sensors for X-ray imaging in space, medical and industrial applications
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Alberto Tibaldi alberto.tibaldi@polito.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Politecnico di Torino
DEPARTMENT	Dipartimento di Elettronica e Telecomunicazioni - DET Corso Castelfidardo, 39, 10129 Torino TO www.det.polito.it
DESCRIPTION	A new generation of monolithic CMOS sensors, capable of fully depletion over several hundreds of microns using high-resistivity silicon substrates, will pave the way to explore the use of this technology for X-ray detection in industry and space applications. The candidate will participate to the design activities and characterisation of system-ready CMOS sensors using state-of-the art X-ray irradiation setups allowing for micrometrical spatial resolution.

SCHOLARSHIP N.	**11**
FUNDED BY	DM 630/2024
TOPIC	Machine learning for high energy physics
CURRICULUM	Computing and information technology
CONTACTS	Pierluigi Bortignon pierluigi.bortignon@unica.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Università degli Studi di Cagliari
DEPARTMENT	Dipartimento di Fisica Complesso Universitario di Monserrato S.P. Monserrato-Sestu Km 0,700 09042 Monserrato (CA) - ITALY https://web.unica.it/
DESCRIPTION	Machine learning tools have proven to accelerate scientific production of high energy physics, both by making the distinction between signals and background noise clearer and by improving the resolution of the objects used. During the PhD the student will study and develop machine learning tools suitable for researching new physics phenomena in the field of high energy physics. He will also apply the knowledge and tools developed to branches of industry present in the area in a context of knowledge transfer.

SCHOLARSHIP N.	**12**
FUNDED BY	DM 630/2024
TOPIC	Development and characterization of low-temperature detectors for rare event research and quantum sensing
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Lorenzo Pagnanini lorenzo.pagnanini@gssi.it
HOSTING UNIVERSITY/RESEARCH CENTRE	GSSI - Gran Sasso Science Institute viale Francesco Crispi, 7 - 67100 LAquila (AQ)
DEPARTMENT	https://www.gssi.it/research-area/physics-research
DESCRIPTION	The Ph.D. project focuses on the development of technologies for the production and characterization of innovative cryogenic detectors. These detectors represent one of the most advanced approaches in rare event search (e.g. dark matter, neutrino physics), with increasingly consolidated applications in the field of quantum computing. The research activities will be conducted at the Gran Sasso Science Institute (GSSI), in close collaboration with the Gran Sasso National Laboratories (LNGS), as part of international experimental collaborations. The research project involves the development of systems for the assembly and characterization of detectors, as well as the optimization of superconducting sensors and readout electronics.

SCHOLARSHIP N.	**13**
FUNDED BY	DM 630/2024
TOPIC	Development, production and optimization of cryogenic components for applications at Kelvin and milliKelvin temperatures
CURRICULUM	Mechanics
CONTACTS	Paolo Gorla / Lorenzo Pagnanini paolo.gorla@lngs.infn.it lorenzo.pagnanini@gssi.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	GSSI - Gran Sasso Science Institute viale Francesco Crispi, 7 - 67100 LAquila (AQ)
DEPARTMENT	https://www.gssi.it/research-area/physics-research
DESCRIPTION	Applications at cryogenic temperatures have assumed a leading role in many sectors, such as fundamental and applied physics, mechanical, energy, chemical and electronic engineering and quantum computing. Sensors and detectors, operated at temperatures of mK or K inside dilution refrigerators, are elements sensitive to thermal dissipation induced by vibrations. Their characterization is particularly complex also due to the presence of pre-cooling stages based on Pulse Tube cryocoolers, which constitute an intrinsic source of vibrations. The project aims to develop and test components with innovative technical solutions to reduce vibrations at cryogenic temperatures. These components, in addition to reducing vibrations, must also guarantee the thermalization of the elements that make up the dilution refrigerators to preserve their thermal balance.

SCHOLARSHIP N.	**14**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development of Fast Timing MPGD Detector for Experiments at Future Accelerators
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Salvatore My salvatore.my@uniba.it
HOSTING UNIVERSITY/RESEARCH CENTRE	Università degli Studi di Bari Aldo Moro
DEPARTMENT	Dipartimento Interateneo di Fisica Campus Universitario, Via Amendola 173, 70125 Bari https://www.uniba.it/it/ricerca/dipartimenti/fisica
DESCRIPTION	High-Luminosity LHC and future accelerators foreseen an harsh environment, requiring radiation hard detectors featuring high rate capability and good spatial and time resolution. In particular, stringent requirements on time resolution are necessary to match the needs of a trigger system or to reject asynchronous background from the hard scattering process. Among all the detector technologies, Micro Pattern Gaseous Detectors (MPGD) represent a suitable solution, thanks to their radiation hardness, their higher rate capability (up to 10 MHz/cm2), their stability and their good spatial and time resolution. Different mpgd technologies will be investigated for their application in calorimetry or muon system.

SCHOLARSHIP N.	**15**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Simulations, analysis and procedures definition for alignment, test and calibration of complex Adaptive Optics systems in the framework of the new generation of telescope and instrumentation
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Maria Bergomi maria.bergomi@inaf.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INAF - Osservatorio Astronomico di Padova
DEPARTMENT	INAF - Osservatorio Astronomico di Padova Vicolo Osservatorio 5 - 35122 - PADOVA https://www.oapd.inaf.it/
DESCRIPTION	The Phd Thesis will focus on the study, definition and implementation of procedures related to adapive optics systems integration , simulating performances as well as defining the procedures needed to the integration steps and to the verification of requirements. During the project, the student will gather experience in optics, mechanics, large scale astronomical instruments development, critical thinking for practical problems solving, group work and laboratory expertise and lab data analysis, processing and reduction skills.

SCHOLARSHIP N.	**16**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Application of Artificial Intelligence for PSF Reconstruction in Adaptive Optics
CURRICULUM	Computing and Information Technology
CONTACTS	Carmelo Arcidiacono carmelo.arcidiacono@inaf.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INAF - Osservatorio Astronomico di Padova
DEPARTMENT	INAF - Osservatorio Astronomico di Padova Vicolo Osservatorio 5 - 35122 - PADOVA https://www.oapd.inaf.it/
DESCRIPTION	This thesis concerns the development of a Machine Learning (ML)-based Artificial Intelligence (AI) application for PSF reconstruction in ground-based adaptive optics systems. The calculation of the PSF from wavefront sensor telemetry data is intensive and faces challenges such as sensor non-linearity, readout and photon noise, and poor knowledge of optical turbulence. The use of ML algorithms trained on large databases, including those provided by INAF telescopes, such as the use of numerical simulation codes, will enable accurate PSF reconstruction. The application will be relevant for 8 m telescopes such as LBT and VLT, with a focus on MICADO and MORFEO systems for ELT. The goal is to achieve a more accurate and efficient reconstruction of the PSF, improving observing capabilities. The thesis combines expertise in computer engineering, artificial intelligence and adaptive optics, making a significant contribution to the field of astronomy.

SCHOLARSHIP N.	**17**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Study and mechanical characterisation of ultra-thin membranes for applications in astrophysics instruments
CURRICULUM	Mechanics
CONTACTS	Fabio D'Anca fabio.danca@inaf.it
HOSTING UNIVERSITY/RESEARCH CENTRE	INAF - Osservatorio Astronomico di Palermo
DEPARTMENT	INAF - Osservatorio Astronomico di Palermo Piazza del Parlamento 1, 90134 Palermo https://www.astropa.inaf.it/
DESCRIPTION	The activity is part of the design of optical X-ray filters with sufficient opacity to out-of-band UV/Vis/IR radiation. In order to maximise transparency to X-rays, the filters will have to be extremely thin, a few tens of nanometres, while guaranteeing high mechanical strength, which is necessary to overcome the high stresses they will undergo during the satellite launch. The thesis work will be concerned with defining the design of the filters through modelling (Computer-Aided Drafting, CAD) and calculation with Finite Element Method (FEM) and characterising the mechanical properties through testing and qualification tests that fall within the standards set by ESA. The aim of this PhD is to acquire high skills in the mechanical design of large-area thin optical filters for protection against out-of-band electromagnetic radiation, high-energy charged particles and for mechanical protection of the sensitive area of X-ray detectors used in future high-energy astrophysics space missions.

SCHOLARSHIP N.	**18**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development of self-consistent methods for simulating the optical performance of UV and X-band mirrors and gratings
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Daniele Spiga daniele.spiga@inaf.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INAF - Osservatorio Astronomico di Brera
DEPARTMENT	INAF - Osservatorio Astronomico di Brera via Brera 28 20121 Milano - ITALY http://www.brera.inaf.it/
DESCRIPTION	The simulation of the performance of optical components such as mirrors and gratings on the basis of metrology, i.e. measurements of shape errors and surface finish, is an essential component of the development of optics for high-energy, high angular resolution imaging systems. While there are simulation codes based solely on geometric optics that are limited to shape errors, modelling the effects of roughness in conjunction with shape errors on all spatial scales, while taking into account the two-dimensional nature of the focal plane, has yet to be developed as it requires wavefront propagation methods that are both accurate but not too computationally demanding. This thesis is aimed at students with a marked interest in physical optics and its inherent mathematical implications.

SCHOLARSHIP N.	**19**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Adaptive optics for next-generation space telescopes
CURRICULUM	Mechanics
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DEPARTMENT	INAF - Osservatorio Astrofisico di Arcetri LARGO ENRICO FERMI 5, I-50125 FIRENZE https://www.arcetri.inaf.it/
DESCRIPTION	The technological environment for next-generation space telescopes is full of challenges: scientific targets (including exoplanets and cosmic structures) require very high angular resolution and contrast, which impose high quality and optical stability. Active control is a key element to achieve the specifications and limit the cost. The topic is the study of adaptive optics technologies for large-diameter space telescopes. One example is the conversion of the adaptive secondary (e.g. LBT, VLT) into a space active primary segment. The concept, which implements non-contact optical surface control, allows for improved performance through decoupling from mechanical disturbance sources, and the use of ultra-light materials. Another example is the use of the pyramid sensor: exploiting its high sensitivity in the quasi diffraction-limited regime to operate the active loop at higher frequencies and reduce stability specifications. The proposed activity includes simulations of closed-loop systems and optical metrology laboratory, and is carried out in synergy with the adaptive optics group and industrial partners.

SCHOLARSHIP N.	**20**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development of technologies for observing meteors from the ground and space
CURRICULUM	Computing and Information technology
CONTACTS	Daniele Gardiol daniele.gardiol@inaf.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INAF - Osservatorio Astrofisico di Torino
DEPARTMENT	INAF - Osservatorio Astrofisico di Torino Via Osservatorio 20, 10025 – Pino Torinese (TO) https://www.oato.inaf.it/
DESCRIPTION	The goal of this project is to study, define and implement a methodology to combine in a coherent and systematic way observations of fireballs coming from very different observing techniques, i.e. optical imaging, radio scatter, infra-sound and seismic detections as well as space observations of the same event. In fact, these observations have been up to now combined, sometimes not always all together, to study few selected and remarkable events only. Moreover, Space and Earth based observations are currently serendipitous. But in the landscape of systematic observation surveys, combined analysis can provide an improved picture of these phenomena. An homogeneous and systematic combination of such different observational data require a remarkable effort in term of technology deployment and monitoring strategies, that will be the focus of the activity of the candidate.

SCHOLARSHIP N.	**21**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Study of Methods for Low Phase Noise Timing Distribution in Astrophysics Experiments
CURRICULUM	Electronics
CONTACTS	Marco Bellato bellato@pd.infn.it
HOSTING UNIVERSITY/RESEARCH CENTRE	INFN - Sezione di Padova
DEPARTMENT	INFN - Sezione di Padova Via Marzolo 8, 35131 Padova - Italy https://www.pd.infn.it/it/
DESCRIPTION	The research project will focus on the analysis of phase noise in timing signals, on issues related to their long distance distribution and active methods to reduce phase noise in the context of Astrophysics experiments such as VIRGO and the Einstein Telescope.

SCHOLARSHIP N.	**22**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development and Characterisation of the Small-Sized Telescope camera for the Cherenkov Telescope Array (CTA)
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Andrea Chiavassa andrea.chiavassa@to.infn.it
HOSTING UNIVERSITY/RESEARCH CENTRE	INFN – Sezione di Torino
DEPARTMENT	INFN - Sezione di Torino Via Pietro Giuria, 1 - 10125 Torino – TO https://www.to.infn.it/
DESCRIPTION	The goal of this research project is develop and characterize the SiPM camera that will operate on the Small-Sized Telescopes of the Cherenkov Telescope Array (CTA). The camera must collect the Cherenkov light emitted in atmosphere the EAS charged particles. The camera signals will allow the selection of the photon generated events and the measurement of the photon arrival direction and energy.

SCHOLARSHIP N.	**23**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Upgrade of the DAQ system of the LHCb Ring Imaging Cherenkov (RICH) detectors for operation at High-Luminosity LHC (HL-LHC) conditions
CURRICULUM	Electronics
CONTACTS	Angelo Cotta Ramusino cotta@fe.infn.it
HOSTING UNIVERSITY/RESEARCH CENTRE	INFN - Sezione di Ferrara
DEPARTMENT	INFN - Sezione di Ferrara via Saragat 1 - I 44122 Ferrara https://www.fe.infn.it
DESCRIPTION	At the HL-LHC targeted luminosity, the RICH detectors contributing to Particle Identification (PID) in the LHCb experiment will have to exploit photodetectors characterized by a timing resolution of a few tens of picoseconds in order to distinguish the arrival times of the individual photons produced in the multiple interactions which will potentially originate from the same "bunch crossing" event. The LHCb RICH detectors shall withstand a rate of single photon events almost an order of magnitude greater than that observed under the current luminosity conditions. The photodetectors used in the RICH systems will be characterized by an increased segmentation in order to limit the per-channel occupancy to less than about 30%, as required to maintain a good PID performance. The corresponding increase in the number of acquisition channels imposes a consequent upgrade of the RICH detectors Data Acquisition (DAQ) chain, which shall transmit, compared to the current RICH detector DAQ, a larger amount of timing and position (channel ID) information for a greater number of channels and will be subjected to more intense levels of background radiation. The candidate's activity will be framed within the current research and development programs through which the LHCb collaboration, with the support of CERN, aims to address and resolve the challenges imposed by the goal of updating the RICH systems as described above. At first, the candidate's research activity may, in particular, concern the characterization, first in the laboratory and then on test beams and at irradiation facilities for the evaluation of resistance to radiation damage, of dedicated integrated circuits such as the "FASTRICH" developed at CERN. The candidate's research activity may then include the study of the performance of ASICs such as the FASTRICH combined with the innovative photodetectors that will gradually be developed. The candidate's research activity may finally include the development of firmware modules dedicated to the processing of data from the LHCb RICH detectors and instantiated in the FPGAs (Field Programmable Gate Array) of the boards that create the "back-end" infrastructure of the experiment and which perform the tasks of receiving, synchronizing and select the data coming from the individual sections of the RICH detectors making it possible, starting from the individual data fragments, to arrive at the complete reconstruction of the events observed by the experiment.

SCHOLARSHIP N.	**24**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development of an innovative phase-camera for the Einstein Telescope Interferometer
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Andrea Contu / Alessandro Cardini andrea.contu@ca.infn.it alessandro.cardini@ca.infn.it
HOSTING UNIVERSITY/RESEARCH CENTRE	INFN- Sezione di Cagliari
DEPARTMENT	INFN - Sezione di Cagliari Complesso Universitario di Monserrato S.P. per Sestu – Km 0,700 09042 – Monserrato (Cagliari) www.ca.infn.it
DESCRIPTION	The PhD candidate is expected to take a leading role in the R&D activity for a phase-camera system for the future Einstein Telescope interferometer, which would be crucial for laser beam quality control. The candidate activity will focus on the optical system setup, joining the effort of local Einsten Telescope group which, within the ETICO2 PNRR initiative, is now setting up a new and dedicated laboratory.

SCHOLARSHIP N.	**25**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development of innovative techniques for background reduction in cryogenic liquid noble-gases detectors
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Matteo Cadeddu / Francesca Dordei matteo.cadeddu@ca.infn.it francesca.dordei@ca.infn.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INFN- Sezione di Cagliari
DEPARTMENT	INFN Sezione di Cagliari S.P. per Sestu – Km 0,700, 09042 – Monserrato (Cagliari) www.ca.infn.it

DESCRIPTION

The physics goals of future liquid noble-gases cryogenic detectors, including the direct detection of low-mass dark matter, require the understanding and the consequent reduction of the currently measured low-energy background. This represents the main limiting factor in order to reduce the energy thresholds for signal detection. In this doctoral project, innovative techniques for the reduction of this background will be studied and developed through the characterization of an argon-filled dual-phase time projection cryogenic chamber.

SCHOLARSHIP N.	**26**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development of mechanical technologies for vibration insulation in gravitational wave detectors and other fundamental physics experiments
CURRICULUM	Mechanics
CONTACTS	Luca Esposito luca.esposito2@unina.it
HOSTING UNIVERSITY/RESEARCH CENTRE	INFN- Sezione di Napoli
DEPARTMENT	INFN - Sezione di Napoli Complesso Universitario di Monte S. Angelo ed. 6 via Cintia, 80126, Napoli, Italia https://www.na.infn.it/
DESCRIPTION	The project consists of the design, study and development of technologies for the realization of optical suspensions that will allow the mechanical insulation from vibrations of elements that will constitute future generations gravitational wave detectors, such as the Einstein Telescope project. The same technologies can also be applied to other experiments that will study aspects of fundamental physics.

SCHOLARSHIP N.	**27**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development of solid-state detectors for clinical beam dosimetry, both conventional and FLASH
CURRICULUM	Detectors, Lasers and Optics
CONTACTS	Leonello Servoli leonello.servoli@pg.infn.it
HOSTING UNIVERSITY/RESEARCH CENTRE	INFN - Sezione di Perugia
DEPARTMENT	INFN - Sezione di Perugia Via A. Pascoli – 06123 Perugia – Italia www.pg.infn.it
DESCRIPTION	The development of ionising radiation sensors using innovative materials is guided by practical needs that are gradually emerging in medical physics and beyond. In particular, it is becoming increasingly important the availability of dosimeters that can be placed over patients during the administration of radiotherapy, according to the guidelines requiring precise measurement of the dose received by each individual during their lifetime. Furthermore, the emergence of the FLASH paradigm in radiotherapy makes it necessary to develop sensors that do not saturate due to the very high production of charges within the sensitive material. These needs have motivated the in recent years development of sensors with a sensitive layer based on hydrogenated amorphous silicon, carried out by the HASPIDE collaboration of INFN CSN5. The results obtained so far demonstrate the capability of this technology to respond at least in part to the aforementioned requests. The research project will therefore focus on further development of this type of sensor and on the customization for the various experimental needs, especially, but not exclusively, in the field of medical dosimetry.

SCHOLARSHIP N.	**28**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Optimizing Machine Learning Architectures for Enhanced Event Reconstruction and Calibration in Fundamental Physics Experiments
CURRICULUM	Computing and information technology
CONTACTS	Daniele Martello daniele.martello@le.infn.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INFN – Sezione di Lecce
DEPARTMENT	INFN Sezione di Lecce Via Provinciale per Arnesano, 73100 - Lecce https://web.le.infn.it/
DESCRIPTION	Advanced machine learning architectures, including Deep Neural Networks, significantly boost the efficiency of reconstruction and calibration in fundamental physics events. Deep Graph Neural Networks take these improvements further by customizing neural network architectures to the data's structure, thereby enhancing reconstruction and identification performance. This project aims to investigate, identify, implement, and optimize machine learning models for reconstructing, calibrating, and identifying events detected by fundamental physics detectors. Managing and processing substantial volumes of data requires significant data engineering endeavors and the creation of suitable interfaces for contemporary computing infrastructures, utilizing technologies like multithreading and GPU processing.

SCHOLARSHIP N.	**29**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development, design and testing of metallic components for high-temperature nuclear physics applications produced using additive manufacturing technologies
CURRICULUM	Mechanics
CONTACTS	Mattia Manzolaro mattia.manzolaro@unipd.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INFN – Laboratori Nazionali di Legnaro
DEPARTMENT	INFN - Laboratori Nazionali di Legnaro Viale dell'Università, 2 – 35020- Legnaro (PD) – Italia https://www.lnl.infn.it/
DESCRIPTION	Additive Manufacturing (AM) is regarded as a cutting-edge technology to produce free-form geometries and optimised components. In the recent years, the Laser Powder Bed Fusion (LPBF) AM technique was successfully employed for the manufacture of refractory metals paving the way for complex geometries that are not feasible with the traditional techniques due to the limited machinability and weldability of the materials. Refractory metals and their alloys are fundamental for the realization of ion source components for stable and radioactive ion beams operating in extreme conditions such as high vacuum and ultra-high temperature. The current geometries exhibit limitations in terms of performance repeatability and reliability. With the advantages of the LPBF technique a new generation of ion source components could be developed. The aim of the project is to develop and test innovative ion source prototypes in collaboration with the SPES facility at LNL. There an experimental campaign will be performed to compare the existing ion sources with the developed prototypes.

SCHOLARSHIP N.	**30**
FUNDED BY	UNIVERSITY/OTHER BODIES – FREE RESEARCH TOPIC
TOPIC	Development and test of a readout system for a pixel detector with multi-Gbps interface
CURRICULUM	Electronics
CONTACTS	Giuseppe De Robertis giuseppe.derobertis@ba.infn.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INFN – Sezione di Bari
DEPARTMENT	INFN - Sezione di Bari via E. Orabona 4 - 70125 BARI https://www.ba.infn.it/it/
DESCRIPTION	The proposed research activity consists in the design of a test system for monolithic pixel detectors of dimensions as those of an entire silicon wafer, which are readout through numerous serial interfaces at speeds of 5-10 Gbps each. The study and design of possible detector reading and control architectures, to be implemented on an FPGA development board, will be addressed as well as the development of specific interface circuits for communication with the detector. The objective is to build up a scalable laboratory system, usable both for laboratory measurements and beam tests.

SCHOLARSHIP N.	**31**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Development of databases and archiving systems for real-time monitoring of scientific data for astroparticle physics missions
CURRICULUM	Computing and information technology
CONTACTS	Roberta Sparvoli roberta.sparvoli@roma2.infn.it
HOSTING UNIVERSITY/ RESEARCH CENTRE	INFN – Sezione di Roma Tor Vergata
DEPARTMENT	INFN - Sezione di Roma Tor Vergata Via della Ricerca Scientifica 1 – 00133 Roma – Italia https://www.roma2.infn.it/
DESCRIPTION	In astroparticle physics missions, scientific data is downloaded in real-time from data-taking detectors (on the ground or in flight) and must be collected, stored, organized in dedicated structures and processed to be ready for scientific analysis. During the doctoral course, database systems, archiving and data processing of mission currently in data-taking will be developed.

SCHOLARSHIP N.	**32**
FUNDED BY	UNIVERSITY/OTHER BODIES
TOPIC	Advanced acquisition system for hadrontherapy
CURRICULUM	Electronics
CONTACTS	Andrea Fabbri andrea.fabbri@infn.it
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DEPARTMENT	INFN - Sezione di Roma Tre VIA DELLA VASCA NAVALE 84, 00146 ROMA https://www.roma3.infn.it/
DESCRIPTION	Design, implementation and characterization, with laboratory instrumentation and with therapeutic beams, of multi-channel acquisition systems for dosimetric and microdosimetric devices based on single-crystalline synthetic diamond sensors.