

Miguel Fernandes Moita

Date of Birth: 04/03/1985

Summary

Physics engineer with a 6+ years of experience in research in academic and industrial context. PhD in the field of high energy photon polarimetry for astrophysics. Has experience developing gamma ray instrument simulations, integration, setting up test campaigns on X- and gamma-ray beamlines, leading extensive detector calibrations efforts and data analyses. Experience in product development in the field of analogue sound processing.

Work Experience

Researcher

01/09/2020 – Present

University of Ferrara - *Università degli Studi di Ferrara*

Ferrara, Italy

<http://www.unife.it>

- Working at the LARIX x-ray test facility.

Researcher

01/01/2015 – 21/02/2020

LIP - Experimental High Energy Physics and Associated Instrumentation

Coimbra, Portugal

<http://www.lip.pt/>

- Project future high-energy astrophysics mission proposals based on CdTe multilayer/3D detector technology optimized to perform polarimetric observations on the Compton regime.
- Design, development and test of a dual plane Compton spectro-imager based on 2 CdTe pixelated sensors when used as a scattering polarimeter for high-energy astrophysics. The prototype was tested twice (2017 and 2018) at the European Synchrotron Radiation Facility (ESRF), Grenoble, France, and at the LARIX facility located in the University of Ferrara, Italy, together with a Laue lens prototype. In parallel, a polarimeter prototype mass model simulation code based in the MEGALib software toolkit was developed and validated.
- Effect of proton irradiation on CdTe detector prototypes. The prototypes were irradiated by proton fluxes at the Instituto de Ciências Nucleares Aplicadas à Saúde (ICNAS) facility.
- Polarimetric simulations for the AMEGO-X mission (MIDEX call, NASA) using MEGALib toolkit.

Engineer

01/03/2014 – 30/11/2014

GLEXYZ

Lisbon, Portugal

Evaluation of ESA Proposals. Four proposals were made during this period in the fields of mechanical analysis and electronics.

Case Study of Efacec transformers on ANSYS Maxwell.

Engineer

01/03/2012 – 15/01/2014

LusoSpace

Lisbon, Portugal

<http://www.lusospace.com>

- Project OVAN (Óculos de Visão Aumentada com sistema de Navegação), and HIDO (Holographic Integrated Display and Optics). Projects which aim the design of a head-mounted display for space and ground applications.
- Development of two optical setups to record and analyze holographic optical elements.
- Development of a Stereoscopic Head-Mounted Display. System developed made during the master thesis of physics engineering in collaboration with LusoSpace and CEFITEC (FCT/UNL).

Education

PhD in Physics Engineering

01/01/2016 – 21/02/2020

Faculty of Science and Technology, Universidade de Coimbra

Coimbra, Portugal

- Thesis Title: “Polarimeter Development for Future Space Gamma-ray Telescopes”
- Supervisors: Rui Miguel Curado da Silva (LIP-Coimbra/UC); Jorge Manuel Maia Pereira (UBI/LIP-Coimbra)

Master Degree in Physics Engineering

01/09/2010 – 24/04/2013

Faculty of Science and Technology, Universidade Nova de Lisboa

Lisbon, Portugal

Thesis Title: “Design and Development of a Stereoscopic Head-Mounted Display”.
Supervisors: Yuri Nunes (CEFITEC/FCT-UNL); Ivo Vieira (LusoSpace)

Bachelor in Physics Engineering

01/09/2006–07/07/2010

Faculty of Science and Technology, Universidade Nova de Lisboa

Lisbon, Portugal

Personal Skills

Job-related Skills

- Instrumentation.
- X- /gamma ray spectroscopy.
- Polarimetry in the Compton regime.
- Monte Carlo simulation in MEGAlib software.
- Interaction of ions with matter (SRIM/TRIM).
- Optical design (ZEMAX) and optomechanics.
- Data analysis (Matlab, python, Root).
- Analogue and digital electronics, PCB design (Autodesk Eagle) and circuit simulation (NI Multisim).
- Microcontroller programming (Arduino, Microship PIC).
- Mechanical and electromechanical design (AutoCAD, SolidWorks).
- Data Acquisition and interface control (NI LabVIEW).
- Unix systems.
- Handling with workshop tools, CNC machining and circuit soldering.
- Programming (C/C++).

Other Skills

- Good communication skills for speaking in public, to groups, or via electronic media gained through my experience in conference presentations and working with international research teams.
- Travel passionate. Several travels to countries with different cultures that improved my adaptability, communication and negotiation skills.
- Musician since 5 years old. Instruments played: Piano, Bass and Guitar. Member of several musical groups of different musical styles and people.

Languages

- Portuguese: mother tongue.
- English: proficient user – reading, writing speaking and listening.
- Spanish: basic user – reading, writing speaking and listening.
- Italian: elementary – speaking.

Publication List

Journal Papers

- N.Simões, J.M.Maia, R.M.Curado da Silva, S.Ghithan, P.Crespo, S.J.C.do Carmo, Francisco Alves, M.Moita, N.Auricchio, E.Caroli, “Inflight proton activation and damage on a CdTe detection plane”, *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, vol. 877, 2018, pp. 183-191.
- M.Moita, E.Carol, J.M.Maia, R.M.Curado da Silva, N.Auricchio, J.B.Stephen, M.Páscoa, A.M.F.Trindade, “Compton polarimetry with a multi-layer CdTe focal plane prototype”, *Nucl. Instruments Methods Phys. Res. Sect. A Accel. Spectrometers, Detect. Assoc. Equip.*, vol. 918, October 2018, pp. 93–98, 2019.
- Marcela Páscoa, Jorge M Maia, Natalia Auricchio, Rui M Curado da Silva, Paulo Crespo, Sérgio J do Carmo, Miguel Moita, Francisco Alves, Ezio Caroli, “Orbit-like Proton Radiation Damage Analysis on CdTe Detectors,” *IEEE Trans. Nucl. Sci.*, vol. 66, 2019, pp 1.
- M. Moita, R. M. Curado da Silva, J. M. Maia, E. Caroli, E. Virgilli, N. Auricchio, J. B. Stephen, F. Frontera, S. Del Sordo, “Polarimetric performance of a Multilayer CdTe Spectro-imager for High-energy Astrophysics,” under preparation.
- E. Caroli, N. Auricchio, R. M. Curado da Silva, S. Del Sordo, C. Ferrari, J. M. Maia, M. Moita, J. B. Stephen, E. Virgilli, “Study of Bent Crystals Response for an Hard X-Ray Laue Lens with a Pixel CdTe Detector,” under preparation.

International Conference Proceedings Papers

- E. Caroli, G. De Cesare, R. M. Curado da Silva, L. Abbene, N. Auricchio, C. Budtz-Jørgensen, S. Del Sordo, P. Ferrando, J. L. Galvèz, M. Hernanz, J. Isern, I. Kuvvetli, P. Laurent, O. Limousin, J. M. Maia, M. Moita, N. Produit, J. B. Stephen A. Zappettini, “Monte Carlo evaluation of a CZT 3D spectrometer suitable for a Hard X- and soft- γ rays polarimetry balloon borne experiment,” in *Proceedings of 2015 IEEE NSS/MIC Conference (2016)*.
- Ezio Caroli, Miguel Moita, Rui M. Curado Da Silva, Stefano Del Sordo, Giovanni De Cesare, Jorge M. Maia, Marcela Páscoa, “Hard X-ray and Soft Gamma Ray Polarimetry with CdTe/CZT Spectro-Imager,” *Galaxies*, vol. 6, no. 3, p. 69, 2018.

Oral Communications in Conferences

- M. Moita, R. M. Curado Da Silva, J. M. Maia, “CdTe Polarimetric Analysis for Future High-Energy Space Missions”, *LIP PhD Students Workshop*, 24-25 March 2017, FCTUC, Coimbra, Portugal.
- M. Moita, R. M. Curado Da Silva, J. M. Maia, “Development of a Dual Plane Polarimeter for Future Gamma-ray Space Telescopes”, *2nd Doctoral Congress in Engineering – Symposium on Physics Engineering – DCE 2017*, 8-9 June 2017, FEUP, Porto, Portugal.
- M. Moita, R. M. Curado Da Silva, J. M. Maia, “Development of a Dual Plane Polarimeter for Future Gamma-ray Space Telescopes”, *ENAA – XXVII National Meeting of Astronomy and Astrophysics*, 20-21 July 2017, FCUL, Lisboa, Portugal.
- E. Caroli, R. M. Curado da Silva, M. Moita, N. Auricchio, S. del Sordo, J. M. Maia, J.B. Stephen, M. Páscoa, “Hard X-ray and Soft Gamma Ray Polarimetry with CdTe/CZT Spectro-imager”, *Alsatian Workshop on X-ray Polarimetry*, 13-15 November 2017, University of Strasbourg, Strasbourg, France.
- M. Moita, N. Auricchio, E. Caroli, R. M. Curado da Silva, J. M. Maia, J.B. Stephen, M. Páscoa, “Multilayer Polarimetric Analysis of a CdTe Focal Plane Prototype”, *2017 IEEE Nuclear Science Symposium*, 21-28 October 2017, Hyatt Regency, Atlanta, Georgia, USA.

- M. Moita, R. M. Curado Silva, J. Maia, M. Páscoa, A. Cortez, J. Escada, A. Trindade, F. P. Santos, T. Dias, A. De Angelis, “i-Astro Space Instrumentation Development Activities”, *Jornadas LIP 2018*, 16-18 February 2018, Évora Hotel, Évora, Portugal.
- M. Moita, R. M. Curado da Silva, J. M. Maia, E. Caroli, E. Virgilli, N. Auricchio, J. B. Stephen, F. Frontera, S. Del Sordo, “Polarimetric performance of a Multilayer CdTe Spectro-imager for High-energy Astrophysics,” *2019 IEEE Nuclear Science Symposium and Medical Imaging Conference*, 26 October-2 November 2019, Manchester Central Convention Centre, UK.

Poster Communications in Scientific Meetings & Conferences

- M. Moita, R. M. Curado da Silva, J. M. Maia, N. Auricchio, E. Caroli, N. Produit, “Development of a Polarimeter for Future Gamma-Ray Space Telescopes,” *XXVI National Meeting of Astronomy and Astrophysics*, 8-9 September 2016, Universidade de Aveiro, Portugal.
- M. Moita, R. M. Curado da Silva, J. M. Maia, E. Caroli, N. Auricchio, “Polarimetric performance of a multilayer CdTe spectro-imager for high-energy astrophysics,” *2nd International Workshop on Soft X-ray Single-order Diffraction Grating Technology and Application*, 16-20 October 2019, Universidade de Coimbra, Portugal.
- E. Caroli, N. Auricchio, R. M. Curado da Silva, S. Del Sordo, C. Ferrari, J. M. Maia, M. Moita, J. B. Stephen, E. Virgilli, “Study of Bent Crystals Response for an Hard X-Ray Laue Lens with a Pixel CdTe Detector,” *2019 IEE Nuclear Science Symposium and Medical Imaging Conference*, 26 October-2 November 2019, Manchester Central Convention Centre, UK.

- No signature is affixed to protect the data of the person concerned, pursuant to EU Regulation 2016/679 and Legislative Decree 196/2003 updated to Legislative Decree no. 101/2018.

- The substitutive declaration of certifications / deed of notoriety (DPR 28 December 2000, n. 445 - articles 46 and 47) relating to this CV is kept at the competent Office indicated in the attachment to the current PTPC of the University of Ferrara Studies.

Date: 31/08/2021