

CURRICULUM VITAE – ALBERTO MANFREDA

PERSONAL INFORMATION	<i>Name:</i> Alberto Manfreda <i>Birth date:</i> 19 December 1988 alberto.manfreda@na.infn.it
CURRENT POSITION	Scientist researcher at Istituto Nazionale di Fisica Nucleare (INFN), Napoli. ¹ (Since Nov. 2022).
PAST POSITIONS	Postdoc researcher at INFN, Pisa. ² (Nov. 2019 - Nov 2022). Subject: "Development of the science-analysis tools for the Imaging X-ray Polarimetry Explorer (IXPE) mission". Postdoc researcher at INFN, Pisa. (Nov. 2017 - Nov. 2019). Subject: "Study of charged cosmic rays with the Fermi Large Area Telescope".
RESEARCH ACTIVITY	My primary areas of study are high-energy astrophysics and cosmic rays, with a focus on detector R&D, software development and data analysis.

Since January 2023 I am participating to the construction of KM3NeT³a network of deep-sea neutrino detectors, currently under deployment in the Mediterranean Sea, that will perform neutrino astronomy (ARCA on KM3NeT-It site) and oscillation studies (ORCA on KM3NeT-Fr site). I am the responsible, at the CAPACITY laboratory in Caserta, of the integration of the so called Base Modules, the modules which provide the electro-optical interface between the detectors and the sea infrastructure.

My other scientific activity concerns x-ray polarimetry. Since 2016 I took part to the construction, testing, calibration and characterization of the gas detectors sensitive to x-ray polarization (the Gas Pixel Detectors) that are hosted in the focal plane of the Imaging X-Ray Polarimetry Explorer (IXPE) mission⁴a joint NASA-ASI space observatory which was launched on December 9, 2021.

For IXPE, I have also worked to the development of the event reconstruction algorithm, as well as having written its current software implementation for the

¹Complesso Universitario di Monte Sant'Angelo, via Cinthia, Napoli (Italia).<http://www.na.infn.it/>

²Largo Bruno Pontecorvo 3, Pisa (Italia).<http://www.pi.infn.it/>

³<https://www.km3net.org/>

⁴<https://ixpe.msfc.nasa.gov/>

mission analysis pipeline. I am the main developer of the online data acquisition and data monitoring applications used during ground calibrations, as well as having contributed significantly to the GEANT4-based simulation of the detector.

Currently, I am involved in the analysis of the scientific data collected by IXPE.

Previously, I have studied charged cosmic rays with the Fermi Large Area Telescope⁵, focusing on measuring the spectrum and anisotropies of their leptonic component.

Between September 2017 and September 2019 I served, within the Fermi-LAT collaboration, the role of coordinator of the science group dedicated to the study of cosmic rays and cosmic-ray induced gamma diffuse emission.

TEACHING

2021/2022 and 2022/2023 Teacher at the class of Computing Methods for Experimental Physics and Data Analysis of the master degree course at the Physics department "E.Fermi", University of Pisa.

2020 and 2021 Teacher at Intensive School for Advanced Graduate Studies - Machine Learning, University of Pavia

2015/2016, 2016/2017, 2018/2019 and 2019/2020 Tutor activity for the class of Physics Laboratory I of the bachelor degree course at the Physics department "E.Fermi", University of Pisa.

OTHER ACTIVITIES

Reviewer for Nuclear Instruments and Methods in Physics Research, Section A

EDUCATION

PhD in Physics at University of Pisa (2014 - 2017)

Supervisor: Prof. Luca Baldini (University of Pisa).

PhD thesis title: *"Cosmic-ray electrons and positrons with the Fermi Large Area Telescope"*.

Final grade: Ottimo e Lode⁶.

Master's degree in Physics at University of Pisa (2011 - 2014)

Supervisor: Prof. Luca Baldini (University of Pisa).

Graduation thesis title: *"Pass 8: development and science prospects for the new Fermi LAT event-level analysis"*.

Final grade: 109/110.

⁵<https://www-glast.stanford.edu/>

⁶Corresponding to grade A with honors

Bachelor's degree in Physics at University of Salento (2007 - 2010)

Supervisor: prof. Giampaolo Co' (University of Salento).

Graduation thesis title: "*White dwarfs: a model for internal structure and equilibrium condition numerically integrated*".

Final grade: 110/110 e lode.

Secondary School Diploma at Liceo Scientifico Statale C. De Giorgi of Lecce (2002-2007)

Final grade: 100/100.

OTHER FORMATION
ACTIVITIES

June 2021 *8th Thematic CERN School of Computing (tCSC spring 2021)* online.
Seminar dedicated to the development of high-performance scientific software for heterogeneous architectures.

<https://indico.cern.ch/event/1017080/>

June 2018 *Looking at Cosmic Sources in Polarized Light* in Asiago (Italy).

Summer school dedicated to multi-wavelength astrophysical polarimetry.

<https://www2.pd.infn.it/astro/pers/asiago2018/>

June 2016 *XIII Seminar on Software for Nuclear Subnuclear and Applied Physics* in Porto Conte, Alghero (Italy).

Seminar dedicated to the study of software commonly employed in fundamental and applied physics (Geant4) and to an introduction to GPU parallel programming.

<https://agenda.infn.it/conferenceDisplay.py?confId=10583>

Jan 2006 5 days stage at CERN laboratories, as part of the Extreme Energy Events (EEE) project, taking part in the building of a Resistive Plate Chamber (RPC) cosmic-ray detector.

<http://eee.centrofermi.it/>

LANGUAGES

Italian (mother tongue), **English**.

COMPUTER SKILLS
AND COMPETENCES

OS: Linux, Microsoft Windows.

Programming languages: Python, C, C++

Markup languages: L^AT_EX

Scientific software: Geant4, ROOT, Scikit-learn.

CONFERENCE
CONTRIBUTIONS

IXPE Event Detection and Reconstruction (talk)

20th Meeting of the High Energy Astrophysics Division of the AAS, Waikōloa

(Mar 2023)

<https://aas.org/meetings/head20>

IXPE view of GRB 221009a (talk)

IXPE: la nuova finestra osservativa sul cosmo ad alte energie, Rome (Feb 2023)

<https://www.asi.it/event/workshop-ixpe-la-nuova-finestra-osservativa-sul-cosmo-ad-alte-energie/>

Looking at x ray sky with polarized lenses (talk)

Tenth International Fermi Symposium, Johannesburg (Oct 2022)

<https://indico.cern.ch/event/1091305/>

The Gas Pixel Detectors for the Imaging X-ray Polarimetry Explorer (talk)

15th Pisa Meeting on Advanced Detectors, La Biodola (May 2022)

<https://www.pi.infn.it/pm/>

Nuove prospettive per l'astronomia X nello spazio (invited talk)

107° Congresso Nazionale della Società Italiana di Fisica, online (Sep 2021)

<https://www.sif.it/attivita/congresso/107>

Construction and test of the Gas Pixel Detectors for the IXPE Mission (talk)

High Precision X-ray Measurements 2021 (HPXM2021), Frascati (Jun 2021)

<https://agenda.infn.it/event/22007/>

The Gas Pixel Detector for the IXPE mission (talk)

15-th Topical Seminar on Innovative Particle and Radiation Detectors (IPRD19), Siena (Oct 2019)

<https://www.bo.infn.it/sminiato/siena19.html>

The first 10 years of the Fermi Large Area Telescope (talk)

The 9th international Workshop on Air Shower Detection at High Altitudes (WASHDA), Moscow (Sep 2018)

<http://wasdha2018.inr.ac.ru/>

IXPE: Una nuova finestra sull'Universo (talk)

IFAE, XVII Edizione, Milano (Apr 2018).

<https://agenda.infn.it/conferenceDisplay.py?confId=14895>

A new measurement of cosmic-ray electrons and positrons with the Large Area Telescope (poster)

35th International Cosmic Ray Conference 2017(ICRC2017), Busan (Jul 2017).

<http://www.icrc2017.org>

A new measurement of cosmic-ray electrons and positrons with the Large Area Telescope (talk)

APS April Meeting 2017, Washington DC (Jan 2017).

<http://meetings.aps.org/Meeting/APR17/PersonIndex/3246>

Highlights from the Fermi Large Area Telescope (talk)

IFAE, XVI Edizione, Trieste (Apr 2017).

<https://agenda.infn.it/conferenceDisplay.py?confId=12289>

A new measurement of cosmic-ray electrons and positrons with the Large Area Telescope (talk)

SciNeGHE 2016, Pisa (Oct 2016).

<https://agenda.infn.it/conferenceDisplay.py?confId=11102>

Geomagnetic effects on the CR Electron Spectrum measured by the Fermi-LAT
(poster)

Sixth International Fermi Symposium, Washington DC (Nov 2015)

<https://fermi.gsfc.nasa.gov/science/mtgs/symposia/2015/>