

Curriculum vitae Felicia Carla Tiziana Barbato, PhD

PERSONAL INFORMATION

Family name, First name: BARBATO, FELICIA CARLA TIZIANA

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Date of birth: [REDACTED]

Nationality: [REDACTED]

ASN: National Scientific Qualification (ASN) 2018/2020 - 02/A1 "Seconda Fascia" – Awarded in September 2019

SCIENTIFIC ACTIVITY REPORT

I'm an assistant professor at the Gran Sasso Science Institute (GSSI) with a PhD in Novel Technologies for Materials Sensors and Imaging and a Master degree in Particle and Astroparticle Physics. My research activity is focused on **R&D of new detectors for astroparticle physics experiments**.

I started working with photodetectors in 2012, when as a master student I joined the VSiPMT project, a R&D project for an innovative photodetector invented by my master and PhD supervisor, prof. G. Barbarino, designed to exploit SiPMs' detection features in big experiments, like KM3NeT. For my **master thesis**, I provided the **detector's proof of feasibility**.

During my PhD (2013-2016) I continued to work on the Vacuum Silicon PhotoMultiplier Tube (VSiPMT). My PhD was configured in the framework of the KM3NeT collaboration where the VSiPMT was proposed as low power consumption and high detection performances alternative to the classical PMT. In those years, I **provided simulations to design a larger and usable prototype for astroparticle physics experiments**.

With the aim of realizing a 1-inch VSiPMT prototype, I followed a massive training in the laboratories of University of Bari (3-months) and UCLA (1-month) where I gained a good experience in **thin films deposition techniques** learning by experts. I then used the prototype I realized as experimental test bench to verify the simulations I provided.

My master and PhD results were the basis of a strict **collaboration** I started **with Hamamatsu Photonics**, a world leader company in photodetection. They used my results to realize prototypes I tested in order to give them a feedback about, before the commercialization.

During the years, I presented my work in many conferences both national and international and I was **awarded twice as best presentation in national conferences** (2013 – 99° Conference of the Italian Physical Society, 2015 – 14° Meeting on high energy physics, IFAE). This last award led me to be the **convenor of the New technology session at the 15° IFAE**.

Thanks to the massive experience in handling photodetectors gained in the VSiPMT project, I contributed to the proposal and the beginning phase of several experiments, i.e. T2K (proposal of the optical module for TITUS), Pierre Auger (setup of the PMTs test facility for AugerPrime, the upgrade of the observatory).

In the T2K experiment panorama, I was part of the **JENNIFER** (*Japan and Europe Network for Neutrino and Intensity Frontier Experimental Research*) **program, funded by MSCA-RISE – Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE)**.

Since 2016, I am **part of the Pierre Auger collaboration**. Here, I was given the responsibility to **setup a facility** able to give the complete characterization of 16 PMTs simultaneously, as well as to **provide the test** of more than a half of PMTs necessary for the upgrade of the observatory (~2500 PMTs).

I actively participated to the proposal of the **VSiPMT project** which has been funded for ~250k€ by the Italian Space Agency. Here, I was **responsible of three tasks**. Within these tasks, I coordinated the thesis activities of five students.

I also participated to the scientific proposal of a new detector for imaging, **i-APS (imaging-Avalanche Pixel Sensor)** which has been funded by the Italian Space Agency for ~192k€.

The variety of my research experiences together with my longstanding passion for cosmology lead me to conceive the **Crystal Eye**, a detector aimed at hunting the electromagnetic counterpart of gravitational waves. A start-up phase of the project has been **financed with 90k€ by the Program STAR2018 for Junior**

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Principal Investigators cured by UniNA and Intesa Sanpaolo: the project was ranked 2° in the general funding list, and was the only selected project in the physics department. As **Principal Investigator** of this project I coordinated a team of 5 researchers, 2 specialized electronics technicians and 3 engineers. WINK, the **Crystal Eye pathfinder** made by 3 pixels, has been selected by ESA for the **Space RIDER Maiden flight in 2027**. The flight model has been financed with PRIN2022, where I am principal investigator. The WINK project is carried on by GSSI and UniNA sections. Together with ALTEC SPA (the sub-aggregator company for the Space Rider Mission) we obtained the financement for the Space Rider flight and ground segment from the Italian Space Agency.

In the framework of **PNRR - Ecosistemi per l'innovazione territoriale**, the realization of a **full scale** flight model **Crystal Eye** has been **financed to GSSI with 4.5M€**. This will be a breakthrough project that will increase the know-how both from the scientific and the technological point of view. The project indeed includes a close collaboration with Thales Alenia Space and FBK which will profit of this innovative detector to push the technological innovation of both small satellites and light sensors. Moreover a fruitful collaboration with the multimessenger astrophysics group of GSSI has already started in order to address the optimization of the detector design to achieve hot science goals beyond GRB observations (e.g. SN lines, magnetars).

Here at GSSI, I am driving the R&D activities for space missions. In addition to the work for the Crystal Eye pathfinder, I joined the HERD and NUSES collaborations. HERD is an R&D for a future cosmic-ray observatory to be installed on the Chinese Space Station, as a product of an international collaboration, involving researchers, institutes and universities from China, Italy, Switzerland and Spain. Here, I am participating to the design of the **Plastic Scintillator Detector (PSD)** which will be used for cosmic ray charge measurements and photon tagging. Here, I am also leading the PSD mechanical design in collaboration with engineers from University Federico II.

NUSES is a new project aiming to explore and test innovative technological and observational approaches for satellite-borne particle detectors for cosmic radiation, astrophysical neutrinos, Sun-Earth environment. The satellite will host two payloads, TERZINA and ZIRE'. I am working on the design of the ZIRE' experiment which will exploit new technological approaches devoted to flux measurements of electrons, protons and light nuclei with energies spanning from few to hundreds of MeVs, but also (exploiting the Crystal Eye detection technique) to the detection of cosmic MeV photons. Thanks to the extensive experience I gained with both HERD and Crystal Eye, I am now the **ZIRE' detector responsible**.

In September 2019, I've been awarded with the **National Scientific Qualification (ASN) 02/A1**.

My missions as researcher have always been **innovation and education**. With these aims I started teaching just after the PhD, joining the *Laboratory of Electronics* (a course of the Physics Bachelor Program) in 2016.

At GSSI-PhD program, I am teaching *Radiation Measurement, Front-end and readout electronic systems for High Energy Astroparticle Physics* and *High Energy Radiation Measurements*. I am also part of the **local organizing committee** of the GSSI – Astroparticle Colloquia for 2020/2021 and 2021/2022.

In past, I also gave seminars for high school teachers about experimental physics in high schools within a MIUR program. I **co-supervised** 1 master thesis and 4 bachelor theses about the VSiPMT project, 3 bachelor theses about the AugerPrime experiment, 5 bachelor and 3 master theses about the Crystal Eye project and 2 master thesis about HERD experiment. I am now supervising one PhD about DAMPE and HERD experiment. Since 2014, I joined the *Physics and Optics Naples Young Students* (PONYS), a group dedicated to the diffusion of the scientific culture and became member of the European Physical Society joining the Young Minds Project. In this group, my contributions grew and found the main expression in the proposal of a new format for workshops named *Aperitivo sotto le stelle*. The workshops are made to be accessible to the largest number of people possible. The atmosphere is relaxed thanks to the cocktail dinner, the amazing location and the possibility of stargazing.

In 2020 I have been **faculty advisor of the SPIE** – chapter of Naples, part of the PONYS activities dedicated to the field of photonics.

This passion for the diffusion of the scientific culture together with my passion for technology, lead me to be

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part of the **management board of the EPS Technology and Innovation Group** and to write articles for the **Huffington Post Italy**.

- **CURRENT POSITION**

2022-present **RTDb, Gran Sasso Science Institute**

Since October 2022 I am assistant professor (RTDb) at GSSI.

Here I am coordinating the R&D activities of new technologies for particle detection in satellite and ground-based experiments. In particular, I am PI of the WINK project for Space Rider Mission, detector responsible of ZIRE' payload for the NUSES mission and I am coordinating the activities to realize the full Crystal Eye EQM.

- **PREVIOUS POSITIONS**

2020-2022 **RTDa, Gran Sasso Science Institute**

Since August 2020 I am assistant researcher (RTDa) at GSSI.

Here I am working on the development of new technologies for particle detection in satellite and ground-based experiments. In particular, I am working on the development of the Crystal Eye flight model for Space RIDER, the Plastic Scintillator Detector for the HERD experiment and the design of ZIRE' detector for NUSES mission.

2019-2020 **STAR2018 Fellowship – Junior Principal Investigator**

From March 2019 I am the principal investigator of the project *Crystal Eye: a wide sight to the Universe looking for the electromagnetic counterpart of gravitational waves*, financed by UniNA and Intesa San Paolo with the competitive call STAR2018 – Junior Principal Investigator, today financed with 4.5M€ by PNRR.

Here I worked on simulation in Geant4 and on detector development. Moreover, I coordinated the work of other scientists and engineers, in order to realize a prototype of the detector that will be launched in orbit in 2024 with the Space RIDER (ESA).

2016-2019 **Postdoctoral researcher, Physics Department - University of Naples Federico II**

In these years, I worked both for the VSIPMT project and Pierre Auger collaboration. In the former case, I worked on the engineering of the 1 and 2 inches VSIPMT prototypes (the *Vacuum Silicon PhotoMultiplier Tube* is a new photodetector invented by prof. G. Barbarino patent n. WO2015004689 A1, financed by the Italian Space Agency) for astroparticle physics applications (space, cherenkov detectors).

In the Pierre Auger collaboration, I was responsible for the setup of a PMT test facility, able to test up to 16 PMTs together and the realization of the DAQ system. In this facility are under test more than a half of the PMTs that are being installed for the upgrade of the observatory.

2018-ongoing **Freelancer - Huffington Post (Italia)**

I'm working as a freelancer for the journal, by writing articles on scientific discoveries and events.

- International Cosmic Day: le cinque cose da sapere sui raggi cosmici
- "Un pasto cosmico": così un telescopio ha immortalato un buco nero che "mangia" una stella
- La scienza supera la fantascienza: scoperto il primo sistema planetario con 3 soli
- Scoperto il primo pianeta orbitante intorno a una stella nana bianca. Passo in avanti nella ricerca di nuovi mondi
- Osservato il più grande buco nero nato da fusione di buchi neri: la scoperta di LIGO apre nuovi scenari
- La Nasa ha registrato per la prima volta il rumore di un terremoto su Marte
- State guardando per la prima volta un buco nero

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- Rivelati per la prima volta i dettagli dell'atmosfera di un esopianeta
- C'è ossigeno sufficiente per ospitare la vita nell'acqua salata nel sottosuolo di
- Marte - È stata scoperta la prima "esoluna": si trova a 4mila anni luce da noi
- Il 2017 è stato il secondo anno più caldo dal 1880 (lo dice la Nasa)
- Il 27 luglio puntate gli occhi al cielo: la Luna torna a dar spettacolo
- 5 cose da sapere sulla stazione spaziale cinese in caduta
- C'è acqua (e forse vita) su Marte. La straordinaria scoperta di un team di italiani
- Stephen Hawking, l'icona mediatica dietro la stella della cosmologia
- Dai ghiacci dell'Antartide la scoperta della prima sorgente extragalattica di neutrini

2016-2017

Scientific writer - Hamamatsu Photonics (Japan)

I worked under an independent contractor agreement with the company, by writing articles on HEP community and detectors to make their website accessible to students.

<https://hep.hamamatsu.com/jp/en/index.html>

- High Energy Physics
- Trackers/Hodoscopes
- Beam diagnostic & experiment
- RICH – Ring Imaging Cherenkov Detectors
- Hadron and Nuclei Spectroscopy
- Spaceborne Experiments

1/3-1/7/2016

Research Fellow, Physics Department - University of Naples Federico II

Fellowship Title: Study of photocathodes for the realization of an innovative photodetector for the SOLAR project.

During this period, I had the opportunity to move to the "Thin films lab" of the University of Bari and to UCLA, where I learned how to deposit thin films by IBS and evaporation techniques and made some test to find a new high transparency conductive layer to supply voltage to the photocathode.

2015-2016

Consultant – MAPRad

MAPRad is working in the field of space and high-reliability electronics design and qualification. Since January 2015 I worked under an independent contractor agreement for the company as consultant for radiation hardness measurements on electronics and detectors for satellite missions.

• **EDUCATION**

9-5-2016

PhD in Novel Technologies for Materials, Sensors and Imaging

University of Naples Federico II, (Italy)

Title: *Research and development for a pioneering system for single photon detection*

Supervisor: Prof. G. Barbarino

During my PhD, I worked on the R&D of an innovative photodetector, the Vacuum Silicon PhotoMultiplier Tube (VSiPMT), invented by my supervisor. This research activity was conducted with the aim to realize a fast high-gain photon counter with low power consumption for the KM3NeT experiment, an underwater neutrino telescope to be realized in the Mediterranean Sea. In particular, I conducted the following research activities:

- Proof of feasibility of a new photodetector for water Cherenkov
- Simulations for the photoelectrons focusing optimization (SimION8.0 tool)
- Study, realization and test of photochatodes
- Realization and test of 1-inch VSiPMT prototype at DAFNE LIGHT facility (LNF)
- Ageing tests of Km3NeT PMTs and their electronics

2015

EDIT – Excellence in Detectors and Instrumentation Technologies International School (INFN, CERN, AIDA 2020)

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EDIT - Excellence in Detectors and Instrumentation Technologies - is an International School devoted to young researchers, in their graduate studies or in their first year as post docs, seeking to acquire a deeper knowledge on the major aspects of detectors and instrumentation technologies.

I joined the Laser Ranging and the Accelerator Laboratories

2014

LabVIEW core 1, core 2 - National Instruments

I followed the LabVIEW course organized by National Instruments where I learned the bases for data acquisition and systems control.

18-7-2012

Master degree (110/110 cum laude) Physics Department - University of Naples Federico II

Title: Characterization of a SiPM with an electron source to proof the feasibility of a new high-gain silicon-based hybrid photomultiplier: VSiPMT

Supervisor: Prof. G. Barbarino

During my master theses, I realized the first proof of feasibility of the VSiPMT, an innovative photodetector invented by my supervisor, by testing the response of a special SiPM to electrons. In order to realize this test, I designed the experimental setup based on the stripping effect of protons on Carbon thin film and an electrostatic mirror. The impact of protons, accelerated by the TTTandem Accelerator of Naples, on a Carbon thin film extract backscattered electrons which were collected and accelerated towards the sensor under test thanks to the electrostatic mirror. The results obtained were the start of a collaboration with Hamamatsu Photonics.

17-6-2009

Bachelor degree (106/110), Physics Department - University of Naples Federico II

Title: The correlation functions for the LSS of the Universe

Supervisor: Prof. S. Capozziello

• FELLOWSHIPS AND AWARDS

2023-present

Call ASI per Space Rider Mission

Call Title: “le proposte selezionate in risposta all’Announcement of Opportunity (AO) per Space Rider (SR) (ESASTSSR-AO-2021-0001. Issue 1 del 22/09/2021) da parte dell’ESA”

With this call we have been financed 407.8k€ for the Space Rider launch and ground segment.

2023-present

PRIN2022 – Principal Investigator

Project Title: WINK: the pathfinder for Crystal Eye X and gamma ray all sky monitor. The project has been awarded with 199k€ to realize the flight model for the Space Rider Mission. Today the full detector is financed with 4.5M€ by PNRR.

2019-2021

STAR2018 L1 – Junior Principal Investigator

Project Title: Crystal Eye – A wide sight to the Universe looking for the electromagnetic counterpart of gravitational waves.

My project was second in the Top-priority list and have been financed for 90k€ for the realization of a prototype of the detector. Today the full detector is financed with 4.5M€ by PNRR.

2017

Young Minds Activity Grant by European Physical Society

Project Title: Aperitivo sotto le stelle

Summer outreach seminars made in collaboration with the Astronomical Observatory of Capodimonte (Napoli) to put people in contact with hot topics in physics. These seminars were financed 1.5k€ each year by EPS. For each seminar we had 280 visitors.

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03-08/2016 **Research fellow, Physics Department - University of Naples Federico II**
Fellowship Title: Study of photocathodes for the realization of an innovative photodetector for the SOLAR project.

01-03/2016 **Member of the JENNIFER project**
PROJECT: JENNIFER H2020-RISE (Research and Innovation Staff Exchange)
Host country: Japan, Host institution: J-Park (Tokai)
I collaborated at the start.up phase of the multiPMT optical module for HyperK, where the VSiPMT was proposed as an alternative to the classical PMTs. I also provided shifts at J-Park for the T2K experiment.

INDIVIDUAL AWARDS:

1. Awarded as **best communication** in the field of Applied Physics at the 99^o Conference of the Italian Physical Society (2013)
2. Awarded as **best presentation** in the field of New Technologies at the 14^o Italian Conference on High Energy Physics (2015)

AWARDS AS MEMBER OF THE PONYS GROUP:

1. Awarded for the by the European Physical Society (2016)
2. Italian Physical Society prize for **best outreach activity** the diffusion of the scientific culture (2017)

• SUPERVISION OF STUDENTS

2017 – 2019 **Supervisor of 10 Bachelor Students, Physics Department - University of Naples Federico II**

1. A. Langella, *Misura di TTS di un innovativo rivelatore di fotoni ad alto guadagno: il VSiPMT*, tesi triennale in fisica AA 2017/2018
2. M. Mormile, *VSiPMT: un nuovo fotorilevatore dall'idea all'ultimo prototipo*, tesi triennale in fisica AA 2018/2019
3. L. Lavitola, *Misure di timing del nuovo prototipo di fotorilevatore VSiPMT*, AA 2018/2019
4. M. Esattore, *Caratterizzazione di un prototipo da 2 pollici di VSiPMT*, AA 2018/2019
5. L. Ferrentino, *Caratterizzazione di fotomoltiplicatori per l'upgrade dell'esperimento Auger*, AA 2017/2018
6. A. Abbondanza, *Caratterizzazione della risposta spettrale dei fotomoltiplicatori per l'upgrade dell'Osservatorio Auger*, AA 2017/2018
7. E. De Simone, *Determinazione dei parametri di test per i fotomoltiplicatori dell'upgrade AugerPrime e caratterizzazione del primo prototipo*, AA 2018/2019
8. R.A. Ronca, *Simulazione con Geant4 del rivelatore di raggi X e gamma Crystal Eye*, AA 2018/2019
9. M. Peluso, *Simulazione e test di radiation hardness per i sensori del rivelatore Crystal Eye*, AA 2019/2020
10. E. Huber, *Calibrazione in energia di un pixel del prototipo di rivelatore per raggi gamma Crystal Eye*, AA 2019/2020

2019 **External co-supervisor of 2 Bachelor Students, Aerospace Engineering Department - University of Naples "Federico II", Naples**

1. R. Guida, *Progettazione e Modellazione 3D del prototipo di rilevatore di raggi X e γ Crystal Eye* AA 2018/2019

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2. C. Gobbi, *Progettazione e stampa 3D del prototipo di rivelatore di raggi X e γ Crystal Eye* AA 2018/2019

2016 – 2021

Co-Supervisor of 3 Master Student, Physics Department - University of Naples Federico II

1. E. Nocerino, *The Semiconductor Multiplication System for Photoelectrons in a Vacuum Silicon Photomultiplier Tube (VSiPMT) and Related Front End Electronics*, tesi magistrale in Fisica AA 2015/2016
2. A. Manna, *Localization of Short Gamma-Ray Bursts with Crystal. Eye*, AA 2020/2021
3. L. Ferrentino, *Realization of the firmware for the DAQ board for the Crystal Eye pathfinder*, AA 2020/2021

2021-2022

External co-supervisor of 3 Master Students, Aerospace Engineering Department - University of Naples "Federico II", Naples

1. D. Musella, *MULTI-PHYSICAL ANALYSES ON THE CRYSTAL EYE EXPERIMENT* AA 2020/2021
2. C. Macrì, *Analisi meccaniche e multifisiche per i rivelatori Crystal Eye ed HERD* AA 2021/2022
3. A. Suma, *High Energy cosmic-Radiation Detection (HERD) facility: Progettazione e prototipazione virtuale del "Plastic Scintillator Detector (PSD)*, AA 2021/2022

2020-May 2023

Co-Supervisor of 3 PhD Student, Gran Sasso Science Institute

1. D. Kyratzys, *Detection and study of high energy galactic cosmic rays with spaceborne detectors*, PhD in Astroparticle Physics GSSI
2. A. Smirnov, *Detection and Study of medium-low energy gamma rays with novel spaceborne detectors*, PhD in Astroparticle Physics GSSI
3. U. Atalay, *Thermal design of spaceborne detectors*, PhD in Innovative Technologies for Space missions and radiation detectors

• TEACHING ACTIVITIES

2023 – ongoing

Radiation detection techniques

PhD in Innovative technologies for space missions and radiation detection
UNINA engineering master program foresees a mandatory internship for the students. In 2021, thanks to the longstanding collaboration with the group of engineers lead by prof. Fabrizio Renno, it's born an agreement between UNINA and GSSI where the interns contribute to our experimental activities working on the mechanical design and simulations of the payloads we are developing.

2021 – 2023

GSSI referent for UNINA mechanical and aerospace engineering internship

UNINA engineering master program foresees a mandatory internship for the students. In 2021, thanks to the longstanding collaboration with the group of engineers lead by prof. Fabrizio Renno, it's born an agreement between UNINA and GSSI where the interns contribute to our experimental activities working on the mechanical design and simulations of the payloads we are developing.

2021 – present

High Energy Radiation Measurements (HE3),

PhD in Astroparticle Physics GSSI, in Space Science and Technology, in Tecnologie per la Ricerca fondamentale e astrofisica
The course is a laboratory course with some activity at LNGS external labs. The first part is an introduction to advanced instruments and photon detector characterization. The second part instead is about measurement of secondary cosmic radiation and setup of a cosmic ray muon detector.

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- 2020 – 2021 **Radiation Measurements**, Gran Sasso Science Institute
The course is a laboratory course with some activity at LNGS external labs. It will be divided in two parts. The first one is about measurement of radioactivity, low background and ultra-low background techniques. The second part instead is about measurement of secondary cosmic radiation and setup of a cosmic ray muon detector. I will care about the activities on the second part of the course.
- 2020 – present **Front-end and readout electronic systems for High Energy Astroparticle Physics (HE5)**
PhD in Astroparticle Physics GSSI, in Space Science and Technology, in Tecnologie per la Ricerca fondamentale e astrofisica
The course is about basic concepts of front-end electronics and pulse processing, basic noise concepts, processing the signal from a radiation detector, identification of noise sources, general consideration about signal shaping, preamplifiers and amplifiers, radiation hardness, specific examples on space-based detectors. Here I will share the course lessons with another professor.
- 2016 – 2020 **Teaching assistant – Laboratory of electronics**, Physics Department - University of Naples Federico II
The course was organized in two modules: the first is about transistors and operational amplifiers while the second is about bases of digital electronics, radiation interaction with matter and detectors. My duty is to follow the students during the laboratory sessions (~60 students/year) and help them to realize circuits to drive standard signals. Moreover, in the last part I also give frontal lessons about detector physics.

- **ORGANISATION OF SCIENTIFIC MEETINGS AND SEMINARS**

- 2024-ongoing **Scientific Advisory Board – ASAPP conference**
- 2022-2023 **Local Organizing Committee – UHECR Symposium 2022**
- 2020-2022 **Local Organizing Committee – GSSI Astroparticle Colloquia**
- 2020/2021 **Organizing Committee – 2nd EPS TIG Hands-on Event for Science, Technology and Interfaces (CERN)**
- 2019 **Organizing Committee - 1st EPS TIG Hands-on Event for Science, Technology and Interfaces (CERN)**
- 2018 **Local Organizing Committee - AtmoHEAD 2018 (Italy)**
- 2016 **Local Organizing Committee - EPS Young Minds Leadership Meeting (Italy)**

- **GRANTS AND INSTITUTIONAL RESPONSIBILITIES**

- 2023-ongoing **PI for WINK the Crystal Eye pathfinder**
PRIN2022
- 2021-ongoing Zirè detector responsible for the NUSES project
- 2019- 2021 **PI for the Crystal Eye project**
Competitive call STAR 2018 – L1 Junior Principal Investigator
- 2015 – 2019 **Manager of 3 WPs for the VSIPMT project-** Bando di ricerca per Nuove idee di strumentazione scientifica per missioni future di Osservazione ed Esplorazione

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dell'Universo

- Task 2000 Realization of VSiPMT prototype;
- Task 3000 Characterization of the prototype in the UV and vis region (coordination of 3 persons);
- Task 4000 Study of the temperature dependence of the VSiPMT and realization of a stabilization circuit (coordination of 2 persons).

2014 – 2015 **Technical coordinator and detector responsible for the VSiPMT project –INFN CSN5**
Design and realization of a system for the production of an electron beam with tunable energy and intensity for the realization of the proof of feasibility of the VSiPMT.
Characterization of the first VSiPMT industrial prototype realized by Hamamatsu.

• REVIEWING ACTIVITIES

2022 - 2023 **UHECR2022 Editorial board, Web of Conferences**

2019 - 2023 **Editorial Board “Grand Challenges in Physics for Society in the Horizon 2050”– EPS** - Coordination of the chapter *PHYSICS FOR SECURE AND EFFICIENT SOCIETIES*

2018 Management Board Technology and Innovation Group, European Physical Society

2018 - ongoing Reviewer, MDPI Journals (Coatings, Materials, Micromachines, Nanomaterials, Applied Science)

2017 Reviewer, Applied Physics Letters

2017 Reviewer, Optics Communications

2016 Convenor and chair, 15° IFAG, Sessione Nuove Tecnologie

• MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2014 Member, European Physical Society

2012-date Associated Member, Istituto Nazionale di Fisica Nucleare (Italy)

• MAJOR COLLABORATIONS

KM3NeT, Cosmic Neutrinos physics and detector engineering

Here I realized ageing test and infant mortality tests on samples of PMTs and electronics to be deployed in the Mediterranean Sea. I also contributed during the startup phase to the assembly of the optical modules of the experiment and I provided shifts both for NEMO tower and for KM3NeT detection unit.

Pierre Auger, Cosmic Rays

The group of Naples is responsible for the tests of the PMTs for the upgrade of the Pierre Auger Observatory, in particular I am responsible for the DAQ and control system of the facility.

I realized the PMTs' test facility, positioned in the Auger Lab at the Physics Department of the University of Naples Federico II, starting from the preliminary measurements for the design of the test-facility. Once the optical setup and the test parameters were defined, I realized the DAQ and control system by means of LabVIEW, for the automatization of the measurements' system and data acquisition.

HERD DMP, Cosmic Rays

The GSSI group is working on both data analysis, simulations and hardware. Here, I am working on the R&D for the Plastic Scintillator Detector (PSD) for HERD experiment. I am providing test on scintillator bars and SiPMs from different companies and at the same time I am working on the setup of the DAQ system based on CITIROC ASIC from WEEROC.

NUSES, Cosmic Rays

The GSSI group is leading the realization of 3 payloads for the NUSES mission: ZIRE', TERZINA and LEM. I am coordinating the activities for the realization of the ZIRE' payload aimed at the observation of tens of keV-hundreds of MeV cosmic rays.

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Crystal Eye and WINK, Gamma Rays

Crystal Eye is a novel design for a X and gamma ray all sky monitor aimed at enhancing the multimessenger observations. The GSSI group is leading the realization of WINK, the Crystal Eye pathfinder for the Space Rider Mission in 2027. WINK will exploit the same technology of the full Crystal Eye in a small prototype made of 3 Crystal Eye pixel and the related electronics. I am Principal Investigator for WINK and I am coordinating the effort for the realization of an optimized Engineering Qualification Model of the full Crystal Eye

• **OUTREACH**

1. **Organization of the “Particle zoo” Exhibit at**
Futuro remoto 29th Edition (2015)
Passione Fisica 4th Edition (2016)
European Researchers Night (2016-2017)
Futuro Remoto 30th Edition (2016)
Futuro Remoto 31st Edition (2017)
2. **Organization of the Smart Materials Exhibit at Parchi Avventura Scientifici (2017)**
3. **Proposal and organization of *Aperitivo sotto le stelle*, granted by EPS (2017-2019)**
Aperitivo sotto le stelle is a series of summer scientific seminars with the aim of breaking the barrier among scientist and people. It is held at the Astronomical Observatory of Naples and followed by a light cocktail dinner where the scientific discussion goes ahead in a relaxed atmosphere. I obtained a 3 years grant by European Physical Society for the organization of the seminars.
4. **Author of four outreach articles**
 - Ponys Outreach Activities, Nuclear and Particle Physics Proceedings, Volumes 306–308, 2019, Pages 170-174
 - Di scienza e bollicine, Media INAF (2019)
 - A Napoli un sorso di scienza, Media INAF (2018)
 - Aperitivo sotto le stelle: un sorso di scienza, SIF Prima Pagina (2018)
5. **Participation in International Cosmic Day 2020**
6. **Seminars for high school students about space science**
7. **Participation to TEDx conference**
8. **Collaboration with Liceo Artistico Fulvio Muzi for the realization of an art installation inspired to Crystal Eye**

• **CONFERENCES**

24 talks at conferences, 19 at international conferences and 5 at national conferences

SIF 2012

"Caratterizzazione di un VSiPMT mediante sorgente di elettroni: risultati preliminari"

SIF 2013

"Verso una nuova generazione di fotorivelatori: il VSiPMT"

IEEE-NSS-MIC-RTSD 2013

"Characterization of the first prototype of VSiPMT: preliminary results"

NDIP 2014

"Towards a new generation of photodetectors: the VSiPMT"

SIF 2014

Curriculum vitae Felicia Carla Tiziana Barbato, PhD

"Il Vacuum Silicon PhotoMultiplier Tube: sviluppi recenti."

IFAE 2015

"I VSiPMT: una nuova generazione di fotorivelatori per la fisica astroparticellare"

PHOTODET 2015

"Progress in the realization of a VSiPMT prototype"

RICAP 2016

"Recent development on the realization of a 1-inch VSiPMT prototype"

RICH 2016

"R&D of a pioneering system for a high-resolution photodetector: the VSiPMT"

Pisa Meeting on Advanced Detectors 2018

"Another step in photodetection innovation: the 1-inch VSiPMT prototype"

CRIS 2018

"PONYS outreach activities"

RICH 2018

"Another step in photodetection innovation: the 1-inch VSiPMT prototype"

Vienna Conference on Instrumentation 2019

"The 2 inches VSiPMT industrial prototype"

SPIE Optics+Photonics 2019, San Diego (USA) - Conference for Hard X-Ray, Gamma-Ray, and Neutron Detector Physics XXI

"VSiPMT: a new solution in photon detection"

"Crystal Eye: a wide sight on the Universe looking for the electromagnetic counterpart of gravitational waves"

"i-APS (imaging-Avalanche Pixel Sensor): an innovative single-photon imaging detector with sub-nanosecond time response"

SIF 2019

"Crystal Eye: a wide sight on the Universe looking for the electromagnetic counterpart of gravitational waves"

IEEE-NSS-MIC-RTSD 2019

"The VSiPMT 2-inches industrial prototype"

"Crystal Eye: a wide sight on the Universe looking for the electromagnetic counterpart of gravitational waves"

SPIE Astronomical Telescopes + Instrumentation 2020

"Preliminary results of the pixel characterization for the Crystal Eye, a new X and gamma ray satellite detector for multi-messenger astronomy"

TIPP 2021 Technology and Instrumentation in Particle Physics conference

"Characterization of the Crystal Eye pathfinder"

37th International Cosmic Ray Conference

"The Crystal Eye X and gamma ray detector for space missions"

Sixteenth Marcel Grossmann Meeting - MG16

"The HERD space mission"

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15th Pisa Meeting on Advanced Detectors

“The High Energy cosmic Radiation Detector”

“Crystal Eye: a new X and gamma ray all sky monitor for space missions”

ASAPP2023 – Advances in Space AstroParticle Physics

“Crystal Eye: a new X and gamma ray all sky monitor for space missions”

• ARTICLES

Author of 73 articles (12 as first author)

Auger Collaboration

- [1] **Impact of the magnetic horizon on the interpretation of the Pierre Auger Observatory spectrum and composition data** *Journal of Cosmology and astroparticle physics*
2024 | journal-article
 - DOI: [10.1088/1475-7516/2024/07/094](https://doi.org/10.1088/1475-7516/2024/07/094)
- [2] **Large-scale Cosmic-ray Anisotropies with 19 yr of Data from the Pierre Auger Observatory** *The astrophysical journal*
2024 | journal-article
 - DOI: [10.3847/1538-4357/ad843b](https://doi.org/10.3847/1538-4357/ad843b)
- [3] **Constraining models for the origin of ultra-high-energy cosmic rays with a novel combined analysis of arrival directions, spectrum, and composition data measured at the Pierre Auger Observatory** *Journal of Cosmology and astroparticle physics*
2024 | journal-article
 - DOI: [10.1088/1475-7516/2024/01/022](https://doi.org/10.1088/1475-7516/2024/01/022)
- [4] **Demonstrating Agreement between Radio and Fluorescence Measurements of the Depth of Maximum of Extensive Air Showers at the Pierre Auger Observatory** *Physical Review Letters*
2024 | journal-article
 - DOI: [10.1103/physrevlett.132.021001](https://doi.org/10.1103/physrevlett.132.021001)
- [5] **Radio measurements of the depth of air-shower maximum at the Pierre Auger Observatory** *Physical Review D*
2024 | journal-article
 - DOI: [10.1103/physrevd.109.022002](https://doi.org/10.1103/physrevd.109.022002)
- [6] **Constraints on metastable superheavy dark matter coupled to sterile neutrinos with the Pierre Auger Observatory** *Physical Review D*
2024 | journal-article
 - DOI: [10.1103/physrevd.109.1081101](https://doi.org/10.1103/physrevd.109.1081101)
- [7] **Testing hadronic-model predictions of depth of maximum of air-shower profiles and ground-particle signals using hybrid data of the Pierre Auger Observatory** *Physical Review D*
2024 | journal-article
 - DOI: [10.1103/physrevd.109.102001](https://doi.org/10.1103/physrevd.109.102001)
- [8] **AugerPrime surface detector electronics** *Journal of Instrumentation*
2023 | journal-article
 - DOI: [10.1088/1748-0221/18/10/p10016](https://doi.org/10.1088/1748-0221/18/10/p10016)
- [9] **Search for photons above 1019 eV with the surface detector of the Pierre Auger Observatory** *Journal of Cosmology and astroparticle physics*
2023 | journal-article
 - DOI: [10.1088/1475-7516/2023/05/021](https://doi.org/10.1088/1475-7516/2023/05/021)

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- [10] Constraining the sources of ultra-high-energy cosmic rays across and above the ankle with the spectrum and composition data measured at the Pierre Auger Observatory *Journal of Cosmology and astroparticle physics*
2023 | journal-article
 - DOI: [10.1088/1475-7516/2023/05/024](https://doi.org/10.1088/1475-7516/2023/05/024)
- [11] Search for Ultra-high-energy Photons from Gravitational Wave Sources with the Pierre Auger Observatory *The Astrophysical Journal*
2023 | journal-article
 - DOI: [10.3847/1538-4357/acc862](https://doi.org/10.3847/1538-4357/acc862)
- [12] Cosmological implications of photon-flux upper limits at ultrahigh energies in scenarios of Planckian-interacting massive particles for dark matter *Physical Review D*
2023 | journal-article
 - DOI: [10.1103/PhysRevD.107.042002](https://doi.org/10.1103/PhysRevD.107.042002)
- [13] Limits to Gauge Coupling in the Dark Sector Set by the Nonobservation of Instanton-Induced Decay of Super-Heavy Dark Matter in the Pierre Auger Observatory Data *Physical Review Letters*
2023 | journal-article
 - DOI: [10.1103/PhysRevLett.130.061001](https://doi.org/10.1103/PhysRevLett.130.061001)
- [14] A Catalog of the Highest-energy Cosmic Rays Recorded during Phase I of Operation of the Pierre Auger Observatory *Astrophysical Journal Supplement Series*
2023 | journal-article
 - DOI: [10.3847/1538-4357/ac6def](https://doi.org/10.3847/1538-4357/ac6def)
- [15] Arrival Directions of Cosmic Rays above 32 EeV from Phase One of the Pierre Auger Observatory *The Astrophysical Journal*
2022 | journal-article
 - DOI: [10.3847/1538-4365/aca537](https://doi.org/10.3847/1538-4365/aca537)
- [16] Testing effects of Lorentz invariance violation in the propagation of astroparticles with the Pierre Auger Observatory *Journal of cosmology and astroparticle physics*
2022 | journal-article
 - DOI: [10.1088/1475-7516/2022/01/023](https://doi.org/10.1088/1475-7516/2022/01/023)
- [17] A search for photons with energies above 2×10^{17} eV using hybrid data from the low-energy extensions of the Pierre Auger Observatory *The Astrophysical Journal*
2022 | journal-article
 - DOI: [10.3847/1538-4357/ac7393](https://doi.org/10.3847/1538-4357/ac7393)
- [18] Search for Spatial Correlations of Neutrinos with Ultra-High-Energy Cosmic Rays *The Astrophysical Journal*
2022 | journal-article
 - DOI: [10.3847/1538-4357/ac6def](https://doi.org/10.3847/1538-4357/ac6def)
- [19] Searches for Ultra-High-Energy Photons at the Pierre Auger Observatory *Universe*
2022 | journal-article
 - DOI: [10.3390/universe8110579](https://doi.org/10.3390/universe8110579)
- [20] Testing effects of Lorentz invariance violation in the propagation of astroparticles with the Pierre Auger Observatory *Journal of Cosmology and Astroparticle Physics*
2021 | journal-article
 - DOI: [10.1088/1475-7516/2022/01/023](https://doi.org/10.1088/1475-7516/2022/01/023)
- [21] Testing effects of Lorentz invariance violation in the propagation of astroparticles with the Pierre Auger Observatory *Journal of Cosmology and Astroparticle Physics*
2021 | journal-article
 - DOI: [10.1088/1475-7516/2022/01/023](https://doi.org/10.1088/1475-7516/2022/01/023)

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- [22] The energy spectrum of cosmic rays beyond the turn-down around 10^{17} eV as measured with the surface detector of the Pierre Auger Observatory *The European Physical Journal C* volume 2021 | journal-article
▪ DOI: [10.1140/epjc/s10052-021-09700-w](https://doi.org/10.1140/epjc/s10052-021-09700-w)
- [23] Design and implementation of the AMIGA embedded system for data acquisition *Journal of Instrumentation* 2021 | journal-article
▪ DOI: [10.1088/1748-0221/16/07/T07008](https://doi.org/10.1088/1748-0221/16/07/T07008)
- [24] Deep-learning based reconstruction of the shower maximum X_{\max} using the water-Cherenkov detectors of the Pierre Auger Observatory *Journal of Instrumentation* 2021 | journal-article
▪ DOI: [10.1088/1748-0221/16/07/P07019](https://doi.org/10.1088/1748-0221/16/07/P07019)
- [25] Extraction of the muon signals recorded with the surface detector of the Pierre Auger Observatory using recurrent neural networks *Journal of Instrumentation* 2021 | journal-article
▪ DOI: [10.1088/1748-0221/16/07/P07016](https://doi.org/10.1088/1748-0221/16/07/P07016)
- [26] The FRAM robotic telescope for atmospheric monitoring at the Pierre Auger Observatory *Journal of Instrumentation* 2021 | journal-article
▪ DOI: [10.1088/1748-0221/16/06/P06027](https://doi.org/10.1088/1748-0221/16/06/P06027)
- [27] Measurement of the Fluctuations in the Number of Muons in Extensive Air Showers with the Pierre Auger Observatory *Physical Review Letters* 2021 | journal-article
▪ DOI: [10.1103/PhysRevLett.126.152002](https://doi.org/10.1103/PhysRevLett.126.152002)
- [28] Calibration of the underground muon detector of the Pierre Auger Observatory *Journal of Instrumentation* 2021 | journal-article
▪ DOI: [10.1088/1748-0221/16/04/P04003](https://doi.org/10.1088/1748-0221/16/04/P04003)
- [29] Design, upgrade and characterization of the silicon photomultiplier front-end for the AMIGA detector at the Pierre Auger Observatory *Journal of Instrumentation* 2021 | journal-article
▪ DOI: [10.1088/1748-0221/16/01/P01026](https://doi.org/10.1088/1748-0221/16/01/P01026)
- [30] A 3-Year Sample of Almost 1,600 Elves Recorded Above South America by the Pierre Auger Cosmic-Ray Observatory *Earth and Space Science* 2020 | journal-article
▪ DOI: [10.1029/2019EA000582](https://doi.org/10.1029/2019EA000582)
▪ EID: 2-s2.0-85083673851
- [31] A facility to validate photomultipliers for the upgrade of the Pierre Auger Observatory *Journal of Instrumentation* 2020 | journal-article
▪ DOI: [10.1088/1748-0221/15/07/P07011](https://doi.org/10.1088/1748-0221/15/07/P07011)
▪ EID: 2-s2.0-85094969755
- [32] A Search for Ultra-high-energy Neutrinos from TXS 0506+056 Using the Pierre Auger Observatory *Astrophysical Journal* 2020 | journal-article
▪ DOI: [10.3847/1538-4357/abb476](https://doi.org/10.3847/1538-4357/abb476)
▪ EID: 2-s2.0-85094605895
- [33] Cosmic-Ray Anisotropies in Right Ascension Measured by the Pierre Auger Observatory *Astrophysical Journal* 2020 | journal-article

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- DOI: [10.3847/1538-4357/ab7236](https://doi.org/10.3847/1538-4357/ab7236)
 - EID: 2-s2.0-85084243113
- [34] **Direct measurement of the muonic content of extensive air showers between 2×10^{17} and 2×10^{18} eV at the Pierre Auger Observatory** *European Physical Journal C*
2020 | journal-article
- DOI: [10.1140/epjc/s10052-020-8055-y](https://doi.org/10.1140/epjc/s10052-020-8055-y)
 - EID: 2-s2.0-85089537583
- [35] **Features of the energy spectrum of cosmic rays above 2.5×10^{18} eV using the pierre auger observatory** *Physical Review Letters*
2020 | journal-article
- DOI: [10.1103/PhysRevLett.125.121106](https://doi.org/10.1103/PhysRevLett.125.121106)
 - EID: 2-s2.0-85092348814
- [36] **Measurement of the cosmic-ray energy spectrum above 2.5×10^{18} eV using the Pierre Auger Observatory** *Physical Review D*
2020 | journal-article
- DOI: [10.1103/PhysRevD.102.062005](https://doi.org/10.1103/PhysRevD.102.062005)
 - EID: 2-s2.0-85095124738
- [37] **Reconstruction of events recorded with the surface detector of the Pierre Auger Observatory** *Journal of Instrumentation*
2020 | journal-article
- DOI: [10.1088/1748-0221/15/10/P10021](https://doi.org/10.1088/1748-0221/15/10/P10021)
 - EID: 2-s2.0-85095118470
- [38] **Search for magnetically-induced signatures in the arrival directions of ultra-high-energy cosmic rays measured at the Pierre Auger Observatory** *Journal of Cosmology and Astroparticle Physics*
2020 | journal-article
- DOI: [10.1088/1475-7516/2020/06/017](https://doi.org/10.1088/1475-7516/2020/06/017)
 - EID: 2-s2.0-85089239314
- [39] **Studies on the response of a water-Cherenkov detector of the Pierre Auger Observatory to atmospheric muons using an RPC hodoscope** *Journal of Instrumentation*
2020 | journal-article
- DOI: [10.1088/1748-0221/15/09/P09002](https://doi.org/10.1088/1748-0221/15/09/P09002)
 - EID: 2-s2.0-85092409618
- [40] **Data-driven estimation of the invisible energy of cosmic ray showers with the Pierre Auger Observatory** *Physical Review D*
2019 | journal-article
- DOI: [10.1103/PhysRevD.100.082003](https://doi.org/10.1103/PhysRevD.100.082003)
 - EID: 2-s2.0-85074339449
- [41] **Limits on point-like sources of ultra-high-energy neutrinos with the Pierre Auger Observatory** *Journal of Cosmology and Astroparticle Physics*
2019 | journal-article
- DOI: [10.1088/1475-7516/2019/11/004](https://doi.org/10.1088/1475-7516/2019/11/004)
 - EID: 2-s2.0-85080059488
- [42] **Measurement of the average shape of longitudinal profiles of cosmic-ray air showers at the Pierre Auger Observatory** *Journal of Cosmology and Astroparticle Physics*
2019 | journal-article
- DOI: [10.1088/1475-7516/2019/03/018](https://doi.org/10.1088/1475-7516/2019/03/018)
 - EID: 2-s2.0-85065184409
- [43] **Multi-Messenger Physics With the Pierre Auger Observatory** *Frontiers in Astronomy and Space Sciences*
2019 | journal-article
- DOI: [10.3389/fspas.2019.00024](https://doi.org/10.3389/fspas.2019.00024)
 - EID: 2-s2.0-85079427553

Curriculum vitae Felicia Carla Tiziana Barbato, PhD

- [44] **Probing the origin of ultra-high-energy cosmic rays with neutrinos in the EeV energy range using the Pierre Auger Observatory** *Journal of Cosmology and Astroparticle Physics*
2019 | journal-article
▪ DOI: [10.1088/1475-7516/2019/10/022](https://doi.org/10.1088/1475-7516/2019/10/022)
▪ EID: 2-s2.0-85076364690
- [45] **A laser-based system for a fast and accurate measurement of gain and linearity of photomultipliers** *Journal of Instrumentation*
2018 | journal-article
▪ DOI: [10.1088/1748-0221/13/01/T01007](https://doi.org/10.1088/1748-0221/13/01/T01007)
▪ EID: 2-s2.0-85041457790
- [46] **An Indication of Anisotropy in Arrival Directions of Ultra-high-energy Cosmic Rays through Comparison to the Flux Pattern of Extragalactic Gamma-Ray Sources** *Astrophysical Journal Letters*
2018 | journal-article
▪ DOI: [10.3847/2041-8213/aaa66d](https://doi.org/10.3847/2041-8213/aaa66d)
▪ EID: 2-s2.0-85041621635
- [47] **Large-scale Cosmic-Ray Anisotropies above 4 EeV Measured by the Pierre Auger Observatory** *Astrophysical Journal*
2018 | journal-article
▪ DOI: [10.3847/1538-4357/aae689](https://doi.org/10.3847/1538-4357/aae689)
▪ EID: 2-s2.0-85057212039
- [48] **Observation of inclined EeV air showers with the radio detector of the Pierre Auger Observatory** *Journal of Cosmology and Astroparticle Physics*
2018 | journal-article
▪ DOI: [10.1088/1475-7516/2018/10/026](https://doi.org/10.1088/1475-7516/2018/10/026)
▪ EID: 2-s2.0-85056142828
- [49] **Calibration of the logarithmic-periodic dipole antenna (LPDA) radio stations at the Pierre Auger Observatory using an octocopter** *Journal of Instrumentation*
2017 | journal-article
▪ DOI: [10.1088/1748-0221/12/10/T10005](https://doi.org/10.1088/1748-0221/12/10/T10005)
▪ EID: 2-s2.0-85051401630
- [50] **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** *Physical Review D*
2017 | journal-article
▪ DOI: [10.1103/PhysRevD.96.122003](https://doi.org/10.1103/PhysRevD.96.122003)
▪ EID: 2-s2.0-85040174448
- [51] **Multi-messenger observations of a binary neutron star merger** *Astrophysical Journal Letters* 2017 | journal-article
▪ DOI: [10.3847/2041-8213/aa91c9](https://doi.org/10.3847/2041-8213/aa91c9)
▪ EID: 2-s2.0-85037171677
- [52] **Observation of a large-scale anisotropy in the arrival directions of cosmic rays above 8×10^{18} eV** *Science*
2017 | journal-article
▪ DOI: [10.1126/science.aan4338](https://doi.org/10.1126/science.aan4338)
▪ EID: 2-s2.0-85029867353
- [53] **Search for High-energy Neutrinos from Binary Neutron Star Merger GW170817 with ANTARES, IceCube, and the Pierre Auger Observatory** *Astrophysical Journal Letters*
2017 | journal-article
▪ DOI: [10.3847/2041-8213/aa9aed](https://doi.org/10.3847/2041-8213/aa9aed)
▪ EID: 2-s2.0-85037994950
- [54] **Spectral calibration of the fluorescence telescopes of the Pierre Auger Observatory** *Astroparticle Physics*
2017 | journal-article
▪ DOI: [10.1016/j.astropartphys.2017.09.001](https://doi.org/10.1016/j.astropartphys.2017.09.001)
▪ EID: 2-s2.0-85029600900

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KM3NeT collaboration

- [55] **Long term monitoring of the optical background in the Capo Passero deep-sea site with the NEMO tower prototype** *European Physical Journal C*
2016 | journal-article
▪ DOI: [10.1140/epjc/s10052-016-3908-0](https://doi.org/10.1140/epjc/s10052-016-3908-0)
▪ EID: 2-s2.0-84958040959
- [56] **Measurement of the atmospheric muon flux at 3500 m depth with the NEMO Phase-2 detector** *EPJ Web of Conferences*
2016 | conference-paper
▪ DOI: [10.1051/epjconf/201612105015](https://doi.org/10.1051/epjconf/201612105015)
▪ EID: 2-s2.0-84978731951
- [57] **The prototype detection unit of the KM3NeT detector: KM3NeT Collaboration** *European Physical Journal C*
2016 | journal-article
▪ DOI: [10.1140/epjc/s10052-015-3868-9](https://doi.org/10.1140/epjc/s10052-015-3868-9)
▪ EID: 2-s2.0-84961379414
- [58] **Measurement of the atmospheric muon depth intensity relation with the NEMO Phase-2 tower** *Astroparticle Physics*
2015 | journal-article
▪ DOI: [10.1016/j.astropartphys.2014.12.010](https://doi.org/10.1016/j.astropartphys.2014.12.010)
▪ EID: 2-s2.0-84921422712
- [59] **Deep sea tests of a prototype of the KM3NeT digital optical module: KM3NeT Collaboration** *European Physical Journal C*
2014 | journal-article
▪ DOI: [10.1140/epjc/s10052-014-3056-3](https://doi.org/10.1140/epjc/s10052-014-3056-3)
▪ EID: 2-s2.0-84920465549
- [60] **Long-term optical background measurements in the Capo Passero deep-sea site** *AIP Conference Proceedings*
2014 | conference-paper
▪ DOI: [10.1063/1.4902780](https://doi.org/10.1063/1.4902780)
▪ EID: 2-s2.0-84912019521
- [61] **Status and first results of the NEMO Phase-2 tower** *Journal of Instrumentation*
2014 | journal-article
▪ DOI: [10.1088/1748-0221/9/03/C03045](https://doi.org/10.1088/1748-0221/9/03/C03045)
▪ EID: 2-s2.0-84899574003
- [62] **The trigger and data acquisition for the NEMO-Phase 2 tower** *AIP Conference Proceedings*
2014 | conference-paper
▪ DOI: [10.1063/1.4902796](https://doi.org/10.1063/1.4902796)
▪ EID: 2-s2.0-84911997029
- [63] **Underwater acoustic positioning system for the SMO and KM3NeT - Italia projects** *AIP Conference Proceedings*
2014 | conference-paper
▪ DOI: [10.1063/1.4902790](https://doi.org/10.1063/1.4902790)
▪ EID: 2-s2.0-84912010295
- [64] **Detection potential of the KM3NeT detector for high-energy neutrinos from the Fermi bubbles** *Astroparticle Physics*
2013 | journal-article
▪ DOI: [10.1016/j.astropartphys.2012.11.010](https://doi.org/10.1016/j.astropartphys.2012.11.010)
▪ EID: 2-s2.0-84872411689

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- [65] **Erratum: The optical modules of the phase-2 of the NEMO project (Journal of Instrumentation)** *Journal of Instrumentation*
2013 | journal-article
▪ DOI: [10.1088/1748-0221/8/08/E08001](https://doi.org/10.1088/1748-0221/8/08/E08001)
▪ EID: 2-s2.0-84883312995
- [66] **Expansion cone for the 3-inch PMTs of the KM3NeT optical modules** *Journal of Instrumentation*
2013 | journal-article
▪ DOI: [10.1088/1748-0221/8/03/T03006](https://doi.org/10.1088/1748-0221/8/03/T03006)
▪ EID: 2-s2.0-84875715981
- [67] **The optical modules of the phase-2 of the NEMO project** *Journal of Instrumentation*
2013 | journal-article
▪ DOI: [10.1088/1748-0221/8/07/P07001](https://doi.org/10.1088/1748-0221/8/07/P07001)
▪ EID: 2-s2.0-84881248773

T2K collaboration

- [68] **Search for Lorentz and CPT violation using sidereal time dependence of neutrino flavor transitions over a short baseline** *Physical Review D*
2017 | journal-article
▪ DOI: [10.1103/PhysRevD.95.111101](https://doi.org/10.1103/PhysRevD.95.111101)
▪ EID: 2-s2.0-85022325389

Crystal Eye

- [69] **CRYSTAL EYE: A new X and gamma ray all-sky-monitor for space missions** *NIM A*
2023 | journal-article
▪ DOI: [10.1016/j.nima.2023.168045](https://doi.org/10.1016/j.nima.2023.168045)
- [70] **Virtual Prototyping and FEM Analysis of the Crystal Eye Detector** *Lecture Notes in Mechanical Engineering*
2022 | conference-paper
▪ DOI: [10.1007/978-3-030-91234-5_67](https://doi.org/10.1007/978-3-030-91234-5_67)
- [71] **Preliminary results of the pixel characterization for the Crystal Eye, a new x- and gamma ray satellite detector for multi-messenger astronomy**, *Proc. SPIE 11444, Space Telescopes and Instrumentation 2020: Ultraviolet to Gamma Ray*, 114449A
2020 | conference-paper
▪ DOI: [10.1117/12.2575885](https://doi.org/10.1117/12.2575885)
- [72] **AHP and multi-voting approaches for conceptual design of new detectors: The crystal eye case study** *Engineering Letters*
2020 | journal-article
▪ EID: 2-s2.0-85085841236
- [73] **Systems Engineering approach for the concept design of the Crystal Eye detector** *International Journal on Interactive Design and Manufacturing*
2020 | journal-article
▪ DOI: [10.1007/s12008-020-00724-2](https://doi.org/10.1007/s12008-020-00724-2)
▪ EID: 2-s2.0-85092445211
- [74] **Crystal Eye: A wide sight on the Universe looking for the electromagnetic counterpart of gravitational waves** *Proceedings of SPIE - The International Society for Optical Engineering*
2019 | conference-paper
▪ DOI: [10.1117/12.2529095](https://doi.org/10.1117/12.2529095)
▪ EID: 2-s2.0-85076883424

VSIPMT

Curriculum vitae Felicia Carla Tiziana Barbato, PhD

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