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Training

- 2003-2007: Ph.D. in Nuclear and Particle Physics at the Department of Physics and INFN, University of L'Aquila, Italy. **"Ultra High Energy Cosmic Rays in AUGER: Hybrid Simulation and Reconstruction"**, supervisor Prof. Sergio Petrer. The Pierre Auger Observatory is the largest very high energy cosmic ray detector and the first based on the hybrid detection technique. The hybrid technique uses two different methods to measure the same swarm produced by a primary cosmic ray in the atmosphere: namely a surface array and a fluorescence detector. My doctoral thesis work has focused on the analysis of hybrid events and in particular on the calculation of the hybrid exposure of the Pierre Auger Observatory. For this purpose I wrote and validated part of the simulation program of the fluorescence detector still used by the Collaboration today. I then developed a method for calculating hybrid exposure based on a time-dependent Monte Carlo. This method dynamically takes into account the real data taking conditions of the Observatory. For this reason I have also implemented a method to evaluate in detail the alive time of the hybrid detector starting from all the Auger monitoring information. This method is the one currently adopted by the collaboration of Pierre Auger to evaluate the exposure of the detector and therefore to measure the spectrum of cosmic rays using the hybrid detection technique. The results obtained are included in several publications:
 - "The exposure of the hybrid detector of the Pierre Auger Observatory", *Astroparticle Physics* 34 (2011) 368–381.
 - "Measurement of the energy spectrum of cosmic rays above 10^{18} eV using the Pierre Auger Observatory", *Physics Letters B* 685 (2010) 239.
 - "Observation of the suppression of the flux of cosmic rays above 4×10^{19} eV", *Phys. Rev. Lett.* 101, 061101 17 (2008).

The calculation of the exposure for different primary cosmic rays was also fundamental for the study of the chemical composition of the primary radiation contributing to the publication of, among others:

- Depth of maximum of air-shower profiles at the Pierre Auger Observatory. II. Composition implications, A. Aab et al. (Pierre Auger Collaboration), DOI: 10.1103 / PhysRevD.90.122006
- Depth of Maximum of Air-Shower Profiles at the Pierre Auger Observatory: Measurements at Energies above $10^{17.8}$ eV, A. Aab et al. (Pierre Auger Collaboration), DOI: 10.1103 / PhysRevD.90.122005
- Measurement of the Depth of Maximum of Extensive Air Showers above 10^{18} eV, J. Abraham et al. (Pierre Auger Collaboration), DOI: 10.1103 / PhysRevLett.104.091101

E for the study of the proton-air hadronic cross section, as reported thus contributing to the publication of the article in the journal:

- "The Pierre Auger Collaboration" Measurement of the proton- air cross-section at $\sqrt{s} = 57$ TeV with the Pierre Auger Observatory ", Phys. Rev. Lett. 109 062002 (2012).

And finally they contributed to technical work on the detectors used by the Auger Observatory such as:

- The Fluorescence Detector of the Pierre Auger Observatory, J. Abraham et al. (Pierre Auger Collaboration), e-Print: 0907.4282 [astro-ph.IM], DOI: 10.1016 / j.nima.2010.04.023
- The Pierre Auger Cosmic Ray Observatory, A . Aab et al. (Pierre Auger Collaboration), e-Print: 1502.01323 [astro-ph.IM], DOI: 10.1016 / j.nima.2015.06.058
- **1998-2003:** Master's degree in Nuclear and Particle Physics at the Department of Physics and INFN, University of Lecce, Lecce, Italy. "**Study of gamma / hadron discrimination in the experiment onto ARGO-YBJ** ", speaker Ivan De Mitri. The thesis work is placed in the field of cosmic ray physics and in particular in the field of Gamma Astronomy. One of the main sources of noise for the detection of photons with apparatuses such as ARGO-YBJ are the Cosmic Rays produced by hadrons. My contribution was the development of a technique to distinguish events produced by photons from those originated by hadrons based on the study of the front images of the swarms revealed by the experimental apparatus. The discrimination factors obtained are among the best achieved with other detectors of the same type. The work has been presented at various conferences and published in the journal:
 - "Multiscale image analysis applied to gamma / hadron discrimination for the gamma-ray astronomy with ARGO-YBJ", I. De Mitri, G. Marsella, F. Salamida. [astro-ph / 0307535]. 10.1016 / j.nima.2004.03.052. Nucl.Instrum.Meth. A525 (2004) 132-136.

Professional experiences

- **since 2019:** Associate Professor at the University of L'Aquila, L'Aquila, Italy;
- **2016-2019:** University Researcher TD B at the University of L'Aquila, L'Aquila, Italy;
- **2014-2016:** Scientific collaboration contract at the University and Senior Post-Doc at the INFN Milano Bicocca, Milan, Italy. In this phase of my career I have broadened my field of interest to the physics of rare events, in particular to the research of the Double Beta Decay without emission of Neutrinos. Within GERDA I have been involved in the development, testing and assembly of the electronics for Phase II of the experiment. I also developed part of the analysis software for the GERDA Phase II experiment with particular reference to energy calibration and noise filtering from the acquired signals. In this phase I was also the Run Coordinator of the experiment for a year. The work I have done in these years is an integral part of the articles published in a journal by the GERDA Collaboration such as:

- Improved Limit on Neutrinoless Double- β Decay of Ge 76 from GERDA Phase II. PHYSICAL REVIEW LETTERS, vol. 120, ISSN: 1092-0145, doi: 10.1103 / PhysRevLett. 120.132503
- Background-free search for neutrinoless double- β decay of 76 Ge with GERDA. NATURE, vol. 544, p. 47-52, ISSN: 0028-0836, doi: 10.1038 / nature21717
- Probing Majorana neutrinos with double- β decay. SCIENCE, vol. 365, p. 1445-1448, ISSN: 0036- 8075, doi: 10.1126 / science.aav8613
- Final Results of GERDA on the Search for Neutrinoless Double- β Decay, M. Agostini et al. (GERDA Collaboration), e-Print: 2009.06079 [nucl-ex], DOI: 10.1103 / PhysRevLett.125.252502
- Development, test and installation of the front-end electronics of the Phase II GERDA experiment. Development of the analysis software for the Phase II GERDA experiment.
- **2011-2014:** Fixed-term CNRS Researcher Research fellow at Institut de Physique Nucléaire d'Orsay, Orsay, France. In this phase I worked in the field of very high energy cosmic ray physics, continuing my work as responsible for the task for the measurement of the spectrum in the international collaboration of the AUGER experiment. During this period I have also broadened my interests in the search for large-scale anisotropies in the direction of arrival of the Cosmic Rays. In addition to contributing in this field as part of the Pierre Auger Collaboration, I published a 2-named article on Astroparticle Physics:
 - Deligny, O., Salamida, F. (2013). Searches for large-scale anisotropies of cosmic rays: Harmonic analysis and shuffling technique. ASTROPARTICLE PHYSICS, vol. 46, p. 40-49, ISSN: 0927-6505, doi: 10.1016 / j.astropartphys.2013.05.003

I also completed the work related to the CROME experiment and the technique for measuring cosmic rays based on the physical phenomenon of molecular Bremsstrahlung, contributing to the publication of the following article in journal:

- I. Al Samarai (Orsay and Orsay, IPN), O. Deligny (Orsay and Orsay, IPN), D. Lebrun (LPSC, Grenoble), A. Letessier-Selvon (Paris, LPTHE), F. Salamida (Orsay and Orsay, IPN), "An Estimate of the Spectral Intensity Expected from the Molecular Bremsstrahlung Radiation in Extensive Air Showers", Astropart.Phys. 67 (2015), 26-32, DOI: 10.1016 / j.astropartphys.2015.01.004

Also in this period I participated in the development of the AMY experiment which had as its objective the absolute calibration of the physical process of microwave radiation emission in the 2-20 GHz range aimed at measuring very high energy cosmic rays by observing the electromagnetic radiation in this band. The first results of the test beams in which I participated were conducted in Frascati and were presented in:

- J.Alvarez Muniz et al. "The air microwave yield (AMY) Experiment to measure the GHz emission from air shower plasma", International Symposium on Future Directions in UHECR Physics, 1316 February 2012, CERN. EPJ Web of Conferences 53, 08011 (2013)
- **in 2011:** Scientific collaboration contract at the Department of Physics and INFN, University of L'Aquila, L'Aquila, Italy. Monte Carlo simulations and development of

calculation and analysis algorithms within the Pierre Auger Collaboration. In this period I also started my development activity of the very high energy cosmic ray propagation code in the interstellar medium called SimProp and started in Aquila in 2011 and still in existence. This work has led to the publication of several works including:

- Aloisio R., Boncioli D., Grillo AF, Petrera S, Salamida F. (2012). SimProp: a simulation code for ultra high energy cosmic ray propagation. JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS, vol. 2012, ISSN: 1475-7516, doi: 10.1088 / 1475-7516 / 2012/10/007
- Aloisio, Roberto, Boncioli, Denise, Di Matteo, Armando, Grillo, Aurelio F., Petrera, Sergio, Salamida, Francesco (2017) . “SimProp v2r4: Monte Carlo simulation code for UHECR propagation”. JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS, vol. 2017, p. 009, ISSN: 1475-7516, doi: 10.1088 / 1475-7516 / 2017/11/009
- R. Aloisio, D. Boncioli, A. di Matteo, AF Grillo, S. Petrera, F. Salamida, "Propagation of Ultra High Energy Cosmic Rays and the Production of Cosmogenic Neutrinos ". Nucl.Part.Phys.Proc. 265-266 (2015), 251-254 DOI: 10.1016 / j.nuclphysbps.2015.06.065.
- R. Aloisio, D. Boncioli, A. di Matteo, AF Grillo, S. Petrera, F. Salamida, "Cosmogenic neutrinos and ultra-high energy cosmic ray models". JCAP 10 (2015), 006 DOI: 10.1088 / 1475-7516 / 2015/10/006
- **2009-2010:** Postdoctoral Fellow at Forschungszentrum Karlsruhe, Institut für Kernphysik, Karlsruhe, Germany. In this phase of my scientific career I worked in the field of very high energy cosmic ray physics, also having the role of manager of the task for the measurement of the spectrum within the international collaboration of the AUGER experiment. In this period I also finalized the drafting of the following paper of which I am corresponding author:

- "The exposure of the hybrid detector of the Pierre Auger Observatory", Astroparticle Physics 34 (2011) 368–381

In addition, I started the design and construction phase of the CROME experiment (Cosmic-Ray Observation via Microwave Emission experiment). The experiment tried to develop a new cosmic ray measurement technique based on the physical phenomenon of molecular Bremsstrahlung by the charged particles of the atmospheric shower. According to laboratory measurements, the swarms were expected to emit in the microwave band of the electromagnetic spectrum. The main idea of the CROME experiment was to use the Cascade Grande detector located in Karlsruhe as a trigger for the microwave detector. My personal contribution was the complete writing of the simulation and analysis framework used in CROME. I also participated in the design and assembly of the data acquisition system. Furthermore, I calculated the absolute scale of the expected signal using the previously published accelerator measurements, an essential ingredient for estimating the expected signal. The work carried out has produced several participations in conferences and workshops as well as a publication in Physical Review Letters:

- "First Experimental Characterization of Microwave Emission from Cosmic Ray Air Showers", CROME Collaboration, DOI: 10.1103 / PhysRevLett.113.221101, Phys.Rev.Lett. 113 (2014) no.22, 221101.

- **2007-2009:** Research fellow at the Department of Physics and INFN, University of L'Aquila, L'Aquila, Italy. Monte Carlo simulations and development of algorithms for calculating and measuring the flow of Very High Energy Cosmic Rays with the hybrid events of the Pierre Auger Observatory. System administrator of the Linux computer cluster (100 CPUs) at LNGS. During this period I also consolidated myAIRFLY experiment which formally began in 2005 and ended with the end of the experiment in 2013. The excitation of atmospheric nitrogen by the charged particles of the showers produced in the atmosphere by cosmic rays of very high energy produces fluorescence emission, mainly in the wavelength range between 300 and 430 nm. A well-established experimental technique (eg Auger, Telescope Array) uses this light to measure the energy released by cosmic rays into the atmosphere and therefore the energy and mass of the primary. The AIRFLY experiment measured the absolute fluorescence yield, its dependence on atmospheric parameters and the emission spectrum with unprecedented precision. Several measurement campaigns, in which I also took part as regards the preparation of the experimental apparatus and the subsequent data analysis, were carried out at the BTF (Beam Test Facility) at the Frascati National Laboratory and in the Meson Test Facility of Fermilab. The results of the experiment led to a different number of publications of which I am co-authored:
 - "Precise measurement of the absolute fluorescence yield of the 337 nm band in atmospheric gases", AIRFLY Collaboration (M. Ave et al.). arXiv: 1210.6734 [astro-ph.IM]. 10.1016 / j.astropartphys. 2012.12.006. Astropart.Phys. 42 (2013) 90- 102.
 - "A novel method for the absolute fluorescence yield measurement by AIRFLY", AIRFLY Collaboration. arXiv: 0812.3649 [astro-ph]. 10.1016 / j.nima.2008.08.049. Nucl.Instrum.Meth. A597 (2008) 55-60.
 - "Energy dependence of air fluorescence yield measured by AIRFLY", AIRFLY Collaboration. 10.1016 / j.nima.2008.08.051. Nucl.Instrum.Meth. A597 (2008) 46-49.
 - "Spectrally resolved pressure dependence measurements of air fluorescence emission with AIRFLY", AIRFLY Collaboration, 10.1016 / j.nima.2008.08.052. Nucl.Instrum.Meth. A597 (2008) 41- 45.
 - "Measurement of the pressure dependence of air fluorescence emission induced by electrons", AIRFLY Collaboration, astro-ph / 0703132 [ASTRO-PH]. 10.1016 / j.astropartphys.2007.04.006. Astropart.Phys. 28 (2007) 41-57.

Languages and technical knowledge

- Languages: Italian, English, French, Spanish
- Programming languages: C / C ++, Python, Fortran, Perl, UNIX shell script, MySQL, PHP, HTML, XML, CSS, Javascript, jQuery,
- Software Packages: GEANT4, Emacs, LaTeX, Mathematica, MS Office

Editorial Board and Referee for International Journals

- **since 2012:** Occasionally Referee for the scientific journal "Astroparticle Physics" published by Elsevier (ISSN: 09276505)
- **2013-2017:** Member of the editorial board of the scientific journal "Journal of Astrophysics" published by Hindawi Publishing Corporation (ISSN: 2314-6192)

Organization of Conferences and Workshop

- Member of the local organizing committee of the "6th Air Fluorescence Workshop", 11-14 February 2009 National Laboratories of Gran Sasso (LNGS)
- Member of the local organizing committee of the "5th Workshop on Air Shower Detection at High Altitude", Paris 26-28 May 2014
- Convenor of the "Multimessenger Astrophysics" session at the Neutrino Oscillation Workshop NOW 2016, 4-11 September 2016, Otranto

Professional responsibilities and awards

- **2010-2015:** Head of the Physics task for the measurement of the hybrid spectrum in the context of the Pierre Auger
- **2010-2015:** Regular organizer of analysis sessions at meetings and workshops of the Pierre Auger collaboration
- **2004-2014:** participate pation to the construction and data acquisition phase of the Pierre Auger Observatory in Argentina
- **2010-2011:** Coordinator and corresponding author of the article: "The exhibition of the hybrid detector of the Pierre Auger Observatory", Astropart. Phys. 34, 368-381 (2011)
- **since 2012:** Member of the "Telescope Array - Auger Joint Spectrum Working Group" established on the occasion of the International Symposium on Future Directions in UHECR Physics at CERN and still operational
- **2014-2015:** Participation in the hardware upgrade of Phase II GERDA to LNGS
- **in 2016:** Run Coordinator of Phase II of the GERDA experiment
- **since 2017:** Local Manager of the AUGER Experiment at the Gran Sasso National Laboratories section of the National Institute of Nuclear Physics. The experiment is funded under commission II of the National Institute of Nuclear Physics
- **since 2017:** Member of the "Speakers Bureau" of the international collaboration of the GERDA experiment
- **since 2018:** Auger Detector Performance Coordinator: direction and coordination of all the analysis related to the performance of the Hybrid detector (Fluorescence + Surface) of the Pierre Auger Observatory. In this role I deal with the long-term performance of the detector, the production and quality of the data collected by both the fluorescence telescopes and the surface detectors of the Observatory. I therefore coordinate the activity of various tasks, such as Calibration, Monitoring, Atmospheric Conditions and Long Term Performance. This activity is essential to get to measure the energy scale of the observatory and monitor the stability over time of the detector

- **since 2018:** representative in the Collaboration Board of the LEGEND experiment for the University of L'Aquila
- **since 2018:** Participation as Secondary Proposer of COST action CA18108 "Quantum gravity phenomenology in the multi-messenger approach". The main objective of the COST action is to bring together theoretical and experimental working groups of the interested communities to work in the prediction and possibility of detection of physical phenomena characteristic of quantum gravity theories
- **from 2020:** member of the FAST experiment for the development of detectors Fluorescence of the latest generation for the Physics of Cosmic Rays of Very High Energy.
- **since 2020:** Responsible for the Department of Physical and Chemical Sciences of the Scientific Degree Plan (PLS) in Physics
- **since 2018:** Research assignment received by the National Institute of Nuclear Physics (INFN) for activities in the field of astroparticle physics (group 2) . Participation in the AUGER and GERDA experiments
- **in 2020:** member of the competition commission for 1 research grant at the Physical and Chemical Sciences Department of the University of L'Aquila.
- **in 2018:** Member of the examination commission for the achievement of the title of PhD in Physics XXXII cycle, Gran Sasso Science Institute
- **in 2021:** Member of the examination commission for the achievement of the title of PhD in Physics XXXII cycle, University of Studies of Salento
- **in 2018:** Member of the competition commission for 1 research grant at the Physical and Chemical Sciences Department of the University of L'Aquila
- **since 2018:** MIUR expert, Reprise register of scientific experts established at the MIUR for the "Basic Research" section
- **since 2015:** qualification in France to "Maître de conférences" in the "Constituants élémentaires" section similar to the qualification as Associate Professor.
- **in 2017:** Winner of the MIUR funding for basic research activities (law 232/2016)
- **since 2017:** co-chair of the Thursday Morning Science (TMS) at the University of L'Aquila, a project created with the aim of spreading science in interdisciplinary way and help university students in learning scientific English
- **from 2021:** collaboration with the Gran Sasso Science Institute in the NUSES project Academic

activity

- **2008-2009:** "Methods of Analysis in Particle Physics", lectures held at the University of the Studies of L'Aquila for students of Master's Degree and Doctorate
- **AY 2010-2011:** exercises in "Nuclear and Particle Physics", lectures held at the University of L'Aquila for students of Bachelor's Degree
- **AY 2016-2017:** teaching of the teaching of "Institutions of Nuclear Physics" (Bachelor's Degree in Physics)
- **AY 2016-2017:** co-teaching of the "Laboratory of Mechanics and Thermodynamics" (Bachelor's Degree in Physics)

- **since 2017:** teaching of the Graduation of "Nuclear and Subnuclear Physics" (Master's Degree in Physics)
- **since 2017:** co-teaching of the teaching of "Institutions of Nuclear Physics" (Bachelor's Degree in Physics)
- **from 2020:** co-teaching of "General and Atmospheric Physics"(Bachelor's Degree in Environmental Sciences and Technologies)
- **from 2020:** co-teaching of the teaching of" Advanced Simulation Technique "(Master's Degree in Physics)
- **AY 2020-2021:** co-teaching of the teaching of" Statistical Tools for Astroparticle Physics "at the Doctoral School in Physics of the Gran Sasso Science Institute.

Thesis supervisor

- **AY 2017-2018:** Camilla Petrucci, "The revelation of antineutrino", Bachelor's Degree in Physics
- **AY 2017-2018:** Nina Burlac, "Double beta decay without neutrino release", Bachelor's Degree in Physics
- **AY 2017 -2018:** Federico Ianni, "The Cosmic Rays of Very High Energy", Bachelor's Degree in Physics
- **AY 2017-2018:** Marco Di Cerbo, "Machine Learning applied to the measurement of Cosmic Rays in space very high energy cosmic rays", Master's Degree in Physics
- **AY 2018-2019:** Francesco Romano "Cherenkov effect in particle physics: the SuperKamiokande experiment", Bachelor's Degree in Physics
- **AA 2018-2019:** Caterina Trimarelli, "Study of the effects of Lorentz Invariance Violation in Ultra High Energy Cosmic Rays", Master's Degree in Physics
- **AY 2019-2020:** Andrea Migliarini, "Cosmic Rays Of Very High Energy", Bachelor's Degree
- **AY 2019-2020:** Camilla Petrucci, "Study of Ultra High Energy Cosmic Ray flux and cosmogenic neutrinos: a comparison with the Pierre Auger Observatory data ", Master's Degree in Physics
- **AA 2019-2020:** Nina Burlac," Towards a new approach for the Pulse Shape Discrimination in the Gerda experiment ", Master's Degree in Physics

Participation in PhD schools

- **since 2018:** member of Teaching staff of the Doctoral School in Physical and Chemical Sciences of the University of L'Aquila
- **since 2019:** member of the Teaching Committee of the Doctoral School in Medical Physics of the University of L 'Aquila

Tutor and Thesis Advisor of Doctorate

- Advisor to Valerio D'Andrea, "Improvement of Performances and Background Studies in GERDA Phase II", Gran Sasso Science Institute, Doctorate Ciclo XXIX

- Co-tutor of Gioacchino Alex Anastasi, "Reconstruction of events from the Surface Detector of the Pierre Auger Observatory using Air Shower Universality ", Gran Sasso Science Institute, Doctorate Cycle XXXI
- Tutor of Massimo Mastrodicasa, University of L'Aquila, Doctorate in Physics, Cycle XXXIII, in progress.
- Tutor of Caterina Trimarelli, University of L'Aquila, PhD in Physics, Cycle XXXV, in progress.

Participation in

- **POSTER Conferences:** National Meeting of High Energy Astrophysics, "Multiscale image analysis applied to gamma / hadron discrimination for VHE gamma-ray astronomy with ARGO-YBJ", Rome (Italy) from 15-05-2003 to 16-05-2003
- **POSTER:** Conference on Thinking, Observing and Mining the Universe, "Image analysis applied to gamma / hadron discrimination in the ARGO-YBJ experiment", Sorrento (Italy) from 22-09-2003 to 27-09-2003
- **TALK:** XCI Congresso National Italian Physics Society, "Hybrid Opening of the Pierre Auger Cosmic Rays Observatory", Catania (Italy) from 26-09-2005 to 01-10-2005
- **TALK:** Roma International Conference on AstroParticle Physics, "The analysis of hybrid events in Auger "Roma (Italy) from 22-06-2007 to 24-06-2007
- **TALK:** 5th Fluorescence Workshop, "Energy Dependence of Air Fluorescence Yield measured by AIRFLY ", El Escorial-Madrid (Spain) from 16-09-2007 to 16-09-2007
- **09-20-2007 INVITED TALK:** CRIS 2008 - Origin, Mass Composition and Acceleration Mechanisms of UHECRs, "The Hybrid Exposure and Spectrum of the Pierre Auger Observatory", Malfa-Salina Island (Italy) from 15-09-2008 to 19-09-2008
- **POSTER:** 31st International Cosmic Ray Conference, "Exposure of the Hybrid Detector of the Pierre Auger Observatory ", Lodz (Poland) from 07-07-2009 to 15-07-2009
- **TALK:** Deutsche Physikalische Gesellschaft (DPG), "Hybrid exposure of the Pierre Auger Observatory ", Bonn (Germany) from 15-03-2010 to 19-03-2010
- **INVITED TALK:** Microwave Detection of Air Showers Workshop, "CROME: Cosmic Ray Observation by Microwave Emission", University of Chicago, Chicago (USA) from 04-10-2010 to 04-10-2010
- **08-10-2010 INVITED TALK:** Microwave Detection of Air Showers Workshop, "Simulation of Gorham et al beam measurement and extrapolation to EAS", University of Chicago, Chicago (USA) from 04-10-2010 to 08-10-2010
- **TALK:** 32th International Cosmic Rays Conference, "Update on the measurement of the CR energy spectrum above 10^{18} eV made using the Pierre Auger Observatory ", Beijing (China) from 11-08-2011 to 18-08-2011
- **TALK:** 24th Rencontres de Blois - Particle Physics and Cosmology, "Recent Results from the Pierre Auger Observatory", Blois (France) from 27-05-2012 to 01-06-2012
- **TALK:** PONT 2014, "Search for Ultra-high energy neutrinos at the Pierre Auger Observatory ", Palais des Papes, Avignon (France) from 14-04-2014 to 18-04-2014
- **TALK:** 5th Workshop on Air Shower Detection at High Altitude, "Auger Spectrum and its implications ", Paris (France) from 26-05-2014 to 28-05-2014

- **TALK:** Scientific Committee of LNGS," GERDA Phase II: Installation and Startup ", LNGS, Assergi (Italy) from 11-04-2016 to 12 -04-2016
- **TALK:** International Workshop on Double Beta Decay and Underground Science, "GERDA Phase II: first results", Osaka (Japan) from 08-11-2016 to
- **10-11-2016 INVITED TALK:** Probing the spacetime fabric: from concepts to phenomenology, "Highlights from the Pierre Auger Observatory", SISSA / ISAS Trieste (Italy) from 10-07-2017 to 14-07-2017
- **INVITED TALK:** 103rd Congress of the Italian Physical Society, "Status and perspectives of 0 $\beta\beta$ decay search of Ge-76 isotope ", Trento (Italy) from 11-09-2017 to 15-09-2017
- **TALK:** 27th International Nuclear Physics Conference (INPC 2019)," Search for neutrinoless double-beta decays in Ge-76 in the LEGEND experiment ", Glasgow (UK) from 29-07-2019 to 02-08-2019
- **INVITED TALK:** 105th Congress of the Italian Physical Society," Ultra High Energy Cosmic Rays: an experimental (re) view ", GSSI L'Aquila (Italy) from 23-09-2019 to 27-09-2019

List of Publications

1. Latest results of ultra-high-energy cosmic ray measurements with prototypes of the Fluorescence detector Array of Single-pixel Telescopes (FAST), Toshihiro Fujii et al. (FAST Collaboration), e-Print: 2107.02949 [astro-ph.IM], published in: PoS ICRC2021 (2021), 402
2. Characterization of inverted coaxial ^{76}Ge detectors in GERDA for future double- β decay experiments, M. Agostini et al . (GERDA Collaboration), e-Print: 2103.15111 [physics.ins-det], DOI: 10.1140 / epjc / s10052-021-09184-8 (publication), published in: Eur.Phys.JC 81 (2021), 505
3. Calibration of the GERDA experiment, M. Agostini et al. (GERDA Collaboration), e-Print: 2103.13777 [physics.ins-det]
4. Extraction of the Muon Signals Recorded with the Surface Detector of the Pierre Auger Observatory Using Recurrent Neural Networks, A. Aab et al. (Pierre Auger Collaboration), and -Print: 2103.11983 [hep-ex]
5. Measurement of the Fluctuations in the Number of Muons in Extensive Air Showers with the Pierre Auger Observatory, A. Aab et al. (Pierre Auger Collaboration), e-Print: 2102.07797 [hep-ex], DOI: 10.1103 / PhysRevLett.126.152002, published in: Phys.Rev.Lett. 126 (2021) 15, 152002
6. Design and implementation of the AMIGA embedded system for data acquisition, A. Aab et al. (Pierre Auger Collaboration), e-Print: 2101.11747 [astro-ph.IM], published in: JINST_006T_0121 (2021)
7. The FRAM robotic telescope for atmospheric monitoring at the Pierre Auger Observatory, A. Aab et al. (Pierre Auger Collaboration), e-Print: 2101.11602 [astro-ph.IM], DOI: 10.1088 / 1748-0221 / 16/06 / P06027, published in: JINST 16 (2021) 06, P06027

8. Deep-Learning based Reconstruction of the Shower Maximum X_{\max} using the Water-Cherenkov Detectors of the Pierre Auger Observatory, A. Aab et al. (Pierre Auger Collaboration), e-Print: 2101.02946 [astro-ph.IM]
9. Calibration of the underground muon detector of the Pierre Auger Observatory, A. Aab et al. (Pierre Auger Collaboration), e-Print: 2012.08016 [astro-ph.IM], DOI: 10.1088 / 1748-0221 / 16/04 / P04003, published in: JINST 16 (2021) 04, P04003
10. Design, upgrade and characterization of the silicon photomultiplier front-end for the AMIGA detector at the Pierre Auger Observatory, A. Aab et al. (Pierre Auger Collaboration), e-Print: 2011.06633 [astro-ph.IM], DOI: 10.1088 / 1748-0221 / 16/01 / P01026, published in: JINST 16 (2021) 01, P01026
11. An automated all-sky atmospheric monitoring camera for a next-generation ultrahigh-energy cosmic-ray observatory, L. Chytka et al. (FAST Collaboration), DOI: 10.1088 / 1748-0221 / 15/10 / T10009, published in: JINST 15 (2020) 10, T10009
12. A Search for Ultra-high-energy Neutrinos from TXS 0506 + 056 Using the Pierre Auger Observatory, A. Aab et al. (Pierre Auger Collaboration), e-Print: 2010.10953 [astro-ph.HE], DOI: 10.3847 / 1538-4357 / abb476, published in: Astrophys.J. 902 (2020) 2, 105
13. Final Results of GERDA on the Search for Neutrinoless Double- β Decay, M. Agostini et al. (GERDA Collaboration), e-Print: 2009.06079 [nucl-ex], DOI: 10.1103 / PhysRevLett.125.252502, published in: Phys.Rev.Lett. 125 (2020) 25, 252502
14. Direct measurement of the muonic content of extensive air showers between 2×10^{17} and 2×10^{18} eV at the Pierre Auger Observatory, A. Aab et al. (Pierre Auger Collaboration), DOI: 10.1140 / epjc / s10052-020-8055-y, published in: Eur.Phys.JC 80 (2020) 8, 751
15. Features of the Energy Spectrum of Cosmic Rays above 2.5×10^{18} eV Using the Pierre Auger Observatory, A. Aab et al. (Pierre Auger Collaboration), e-Print: 2008.06488 [astro-ph.HE], DOI: 10.1103 / PhysRevLett.125.121106, published in: Phys.Rev.Lett. 125 (2020) 12, 121106
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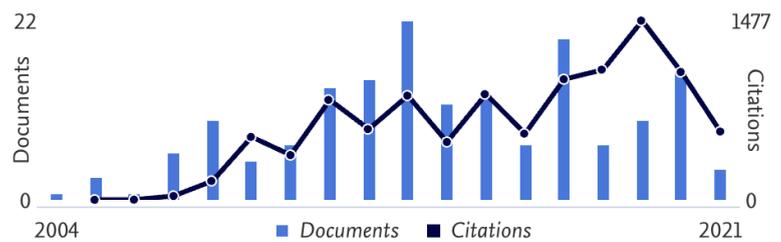
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