

Luca Baldini @ UNIPI/INFN

CURRICULUM VITÆ

I am an active member of the [Fermi Large Area Telescope](#) collaboration since 2002. As such, I have contributed to several different aspects of the LAT (a space-based, high-energy gamma-ray telescope) development and operation: from the construction of the silicon tracker to the assessment and monitoring of the instrument performance and, the scientific data analysis. Within the Fermi LAT collaboration I served as analysis coordinator and coordinator of the *Cosmic-Ray bubble* and the *Calibration and Analysis and Dark Matter and New Physics Science Working Groups*.

Since 2001 I have participated in a successful [R&D activity](#) on gas pixel detectors for x-ray astronomical polarimetry—giving significant contributions to the implementation of the data acquisition system, the event reconstruction software and the Monte Carlo simulation of the detector. I am the Italian Co-PI, as well as the convener of the *Science Analysis and Simulation Working Group* for the [IXPE](#) (Imaging X-ray Polarimetry Explorer) *Small Explorer* mission, due to be launched in 2021.

POSITIONS HELD

- Dec. 1, 2017–present ○ Associate professor, Università di Pisa.
- Mar. 15, 2015–Mar. 15, 2016 ○ Visiting scientist, SLAC National Accelerator Laboratory.
- Dec. 23, 2011–Dec. 1, 2017 ○ Assistant professor (ricercatore universitario), Università di Pisa.
- Nov. 3, 2010–Dec. 22, 2011 ○ Post-doc (ricercatore art. 23 DPR 12/2/1991-171), INFN–Pisa.
- Oct. 2, 2008–Oct. 1, 2010 ○ Post-doc (assegnista di ricerca INFN), INFN–Pisa.
- Jul. 2, 2007–Sep. 30, 2008 ○ Post-doc (ricercatore art. 23 DPR 12/2/1991-171), INFN–Pisa.
- Jun. 17, 2005–Jun. 16, 2007 ○ Post-doc (assegnista di ricerca INFN), INFN–Pisa.

EDUCATION

- Jul. 18, 2005 ○ Ph.D., Applied Physics, Università di Pisa.
- Sep. 24, 2001 ○ M.S., Physics, Università di Pisa (110/110 cum laude).
- Jul., 1995 ○ High-school diploma, Liceo Ginnasio A. da Pontedera (60/60).

RESPONSIBILITIES

- Jan., 2017–present ○ Italian Co-PI for the IXPE mission.

- Jan., 2017–present ○ Convener of the IXPE *Science Analysis and Simulation* working group.
- Mar., 2015–Mar. 2016 ○ analysis coordinator for the Fermi-LAT collaboration (on leave at SLAC).
- Mar., 2014–Mar. 2015 ○ deputy analysis coordinator for the Fermi-LAT collaboration.
- Mar., 2014–present ○ member of the Fermi-LAT publication board.
- Mar., 2014–present ○ member of the Fermi-LAT speakers bureau.
- Sep., 2013–Mar. 2014 ○ coordinator of the Fermi-LAT *Dark Matter and New Physics* science working group.
- Jan., 2011–Mar., 2012 ○ coordinator of the Fermi-LAT *Calibration and Analysis* science working group.
- Mar., 2009–Mar., 2011 ○ coordinator of the Fermi-LAT *Cosmic-ray* group.

CONFERENCE ORGANIZATION

Member of the Local Organizing Committee for the 15th Pisa Meeting on Advanced Detectors.

Member of the [Local Organizing Committee](#) (and convener for the session about gas detectors) for the [14th Pisa Meeting on Advanced Detectors](#) (Pisa, May 27–June 2, 2018).

Member of the [Science Organizing Committee](#) for [SciNeGHE 2016: High-energy Gamma-ray Experiments at the Dawn of Gravitational-Wave Astronomy](#) (Pisa, October 18–21, 2016).

Member of the [Science Organizing Committee](#) for the [Sixth International Fermi Symposium](#) (Washington, November 9–13, 2015).

JOURNAL REFEREE

I am a referee for [The Astrophysical Journal Letters](#), [Astronomy and Astrophysics](#), [New Journal of Physics](#), [Nuclear Instruments and Methods in Physics Research Section A](#), [Advances in Space Research](#), [Journal of Instrumentation](#), and [IEEE Journal on Emerging and Selected Topics in Circuits and Systems](#).

SCIENTIFIC ACTIVITY

- 2016–present ○ I am deeply involved in the development of the [IXPE](#) (Imaging X-ray Polarimetry Explorer) mission, to be launched in 2021. I am the Italian Co-PI of the mission and the convener of the *Science Analysis and Simulation* working group.
- 2014–2016 ○ I have been deputy analysis coordinator (from March 2014 to March 2015) and analysis coordinator (from March 2015 to March 2016) for the Fermi-LAT collaboration. Since March 2014 I am member of the Fermi-LAT publication board and speakers bureau.
- 2014–present ○ I am a member of the [Extreme Energy Events](#) (EEE) collaboration. I have given a prominent contribution to the implementation of the data-processing pipeline for the experiment and the associated data quality monitoring infrastructure.

- 2010–2014 ○ I have been heavily involved in a long-term project (*Pass 8*) for a comprehensive revision of the Fermi LAT event level analysis, based on the experience gained while operating the instrument on orbit through the prime phase of the mission. Released on June 24, 2015, *Pass 8* will be used for the archival form of the Fermi LAT data and constitutes a major step toward the full realization of the LAT scientific potential.
- 2011–2012 ○ While serving as a coordinator of the *Calibration and Analysis* LAT science working group I have been working on the study and characterization of the systematic uncertainties connected with the LAT response functions. I am one of the three corresponding authors of the reference [paper](#) on the analysis of publicly-released LAT data.
- 2008–2010 ○ I played a key role in the measurement of the inclusive Cosmic-ray electron spectrum. I gave significant personal contributions to several aspects of the analysis, including the event selection, the evaluation of the background contamination and the study of the systematic uncertainties. The first paper published on this subject by the collaboration in 2009 is still one of the most cited LAT papers. I am one of the three co-authors of a solicited review [paper](#) about cosmic-ray studies with the Large Area Telescope, published in a special issue of [Astroparticle Physics](#).
- 2007–present ○ I have been regularly working on the implementation and fine tuning of the LAT data monitoring infrastructure. I am one of the developers of the software used by the *Instrument Science Operation Center* for monitoring the data integrity and detector performance. I am the main developer and maintainer of the automated alarm system running on the LAT data processing pipeline.
- 2006–2007 ○ I participated in the preparation and execution of the beam test campaign, at CERN and GSI, of the LAT *Calibration Unit*. During the assembly of the unit and the actual test I coordinated the activities related to the electronics, data acquisition system and online monitoring.
- 2002–2005 ○ During the construction of the LAT silicon tracker I played a major role in the production and testing of the flight hardware, contributing to the definition and implementation of the test strategy and the characterization of the instrument performance. I took part to the environmental tests of the tracker modules, during which I was responsible for the electronics and DAQ.
- 2000–2010 ○ Since my master thesis I participated in a [R&D activity](#) on gas pixel detectors aimed at exploiting the photoelectric effect for the measurement of linear polarization in x-ray astronomical sources. We designed, produced and successfully tested three generations of dedicated ASICs where the charge collecting anode and the readout electronics are fully integrated. In its current implementation, the sensor is essentially ready to be flown at the focus of an x-ray optic.

TEACHING ACTIVITY

- 2016–present ○ I am teaching the lab course (*Laboratorio di Fisica I*) for the first-year of the undergraduate Physics curriculum at the University of Pisa. I am one

of the main developers of [plasduino](#), a project for an inexpensive, general purpose data acquisition system for didactic experiments based on the [arduino](#) board. The work has been awarded a honorable mention at the [XCIX Congresso Nazionale della Società Italiana di Fisica](#) and the corresponding paper is publicly available [here](#).

- 2012–2016 ○ Responsible for part of the lab course (*Laboratorio di Fisica I/II*) of the first-year undergraduate Physics curriculum at the University of Pisa.
- 2007 ○ I was the technical coordinator of a project aimed at transferring some didactic experiments developed at the University of Pisa to local high schools.
- 2002–2011 ○ I regularly served as a teaching assistant for the lab course for the first-year undergraduate Physics students (*Laboratorio di Fisica I/II*, Proff. L. Martinelli, M. M. Massai, F. Angelini) at the University of Pisa. I am co-author of the corresponding [introductory book](#) in statistics and data analysis (in Italian). I'm the original developer and maintainer of [PLAS](#), the data acquisition system used from 2002 to 2012 in the first-year physics lab at the University of Pisa.

PUBLIC OUTREACH

I have participated in the organization of various public outreach activities and I have been giving public seminars in many different venues.

Curriculum vitae

MIRKO BOEZIO

a) Attività di ricerca:

Dal 1991 l'attività di ricerca del Dr. Boezio si è svolta principalmente nel campo della fisica sperimentale delle astroparticelle, in particolare per quanto riguarda la ricerca di segnali di antimateria e materia oscura e lo studio della composizione nucleare ed isotopica dei raggi cosmici. Questa ricerca è stata condotta sia con esperimenti a bordo di palloni stratosferici che a bordo di satelliti. Questi esperimenti hanno prodotto risultati molto importanti che stanno influenzando in modo significativo i modelli sull'origine e propagazione nella Galassia dei raggi cosmici e della materia oscura.

Fin dall'inizio del progetto alla fine degli anni Novanta, il Dr. Boezio è stato coinvolto nell'esperimento spaziale PAMELA. Il 15 giugno 2006 PAMELA, realizzato dalla Collaborazione Wizard/PAMELA (una collaborazione internazionale tra istituti italiani, svedesi, tedeschi e russi) e collocato a bordo del satellite russo Resurs-DK1, è stato lanciato con successo nello spazio dal Cosmodromo di Baikonur in Kazakistan. Inizialmente prevista per tre anni, la missione PAMELA è durata fino a gennaio 2016 quando la trasmissione dei dati dal satellite alla stazione di terra di Mosca è stata interrotta a causa di problemi tecnici con il satellite. L'esperimento, effettuando misure di lunga durata della radiazione cosmica su un esteso intervallo di energia, ha rappresentato un importante passo avanti negli studi sui raggi cosmici migliorando di un ordine di grandezza le statistiche rispetto ai precedenti dati sperimentali. Particolarmente significativi sono stati i risultati ottenuti dall'esperimento PAMELA riguardanti antiparticelle come antiprotoni e positroni. Insieme i risultati sugli antiprotoni e sui positroni sono stati citati da più di 2000 altri articoli e centinaia di lavori teorici sono stati presentati per spiegare i risultati. Inoltre, i dati riguardanti l'accelerazione dei raggi cosmici ed i meccanismi di propagazione, la modulazione solare, i brillamenti solari e la magnetosfera terrestre hanno generato una quantità significativa di lavoro teorico. Ad esempio, nel 2011 la collaborazione PAMELA ha pubblicato su "Science" nuovi risultati sugli spettri di protoni ed elio nei raggi cosmici che hanno richiesto di rivedere l'attuale paradigma dell'accelerazione dei raggi cosmici nei resti di supernova seguita dalla propagazione diffusiva nella Galassia.

Il Dr. Boezio ha partecipato allo sviluppo del calorimetro elettromagnetico di PAMELA, studiandone la funzionalità e le prestazioni utilizzando sia dati Monte Carlo che da fasci di particelle. Successivamente, il Dr. Boezio è stato incaricato di progettare le funzionalità del software della CPU di PAMELA di cui poi ne ha guidato lo sviluppo e la fase di test. Successivamente, è stato uno dei responsabili delle fasi di test ed integrazione dell'apparato PAMELA col satellite russo Resurs-DK1.

Il Dr. Boezio ha inoltre guidato lo sviluppo del software PAMELA necessario sia per l'immediato controllo dei dati presso la stazione di terra che per la successiva analisi online.

Insieme al Principal Investigator (Prof. Piergiorgio Picozza), ha curato le operazioni quotidiane di PAMELA. Inoltre, ha coordinato, e lo fa tuttora, l'analisi dei dati dell'intero esperimento seguendo personalmente le analisi più rilevanti per il successo dell'esperimento come lo studio

della componente di antiparticelle nella radiazione cosmica. Dal 2013 al 2017, il Dr. Boezio è stato il Responsabile Nazionale dell'esperimento per l'INFN.

Attualmente il Dr. Boezio è coinvolto nel progetto internazionale GAPS (General AntiParticle Spectrometer), per il quale è Institutional-PI. GAPS è un apparato che volerà su pallone aerostatico in Antartide per cercare antinuclei nei raggi cosmici di bassa energia ($< 0.25 \text{ GeV/n}$) con un primo volo previsto nell'estate australe del 2022. GAPS è stato progettato per misurare con precisione i flussi di bassa energia di antideuteroni, antiprotoni ed antielii. Ad oggi, non c'è stata un'osservazione inequivocabile di antideuteroni o antielio nei raggi cosmici e l'osservazione da parte di GAPS anche di un singolo antideutrone darebbe informazioni molto importanti sulla natura particellare della materia oscura. GAPS è un progetto supportato dalla NASA e sviluppato da una collaborazione internazionale tra istituzioni statunitensi, italiane e giapponesi. Il Dr. Boezio guida i gruppi italiani che partecipano all'esperimento GAPS con finanziamenti da parte dell'INFN e dell'Agenzia Spaziale Italiana (ASI). I gruppi italiani stanno sviluppando e producendo il sistema di lettura ed il sistema di alimentazione del tracker di GAPS. Inoltre, contribuiscono allo sviluppo del software, alla simulazione, all'analisi ed interpretazione dei dati.

Il Dr. Boezio è stato anche coinvolto in attività multidisciplinari come lo studio dell'ambiente di radiazione all'interno delle stazioni spaziali MIR ed ISS e lo studio degli effetti che le radiazioni ionizzanti possono causare ai sistemi visivi e neurali umani.

Il Dr. Boezio è stato invitato a parlare a molteplici Conferenze Internazionali e ha tenuto circa 100 seminari e colloqui su invito presso numerose Università e laboratori internazionali.

Il Dr. Boezio è stato referee per le riviste internazionali:

- Advances in Space Research,
- Astroparticle Physics,
- Astrophysical Journal,
- Astrophysics and Space Sciences Transactions,
- European Journal of Physics,
- Journal of Physics G: Nuclear and Particle Physics,
- IEEE Transactions on Nuclear Science,
- Nuclear Instruments and Methods in Physics Research A,
- Physical Review D,
- Physical Review Letters,
- Science,
- Science Advances,
- Software: Practice and Experience,
- Space Science Reviews.

Il dott. Boezio è stato referee per:

- due progetti per ASI,
- vari progetti di ricerca per la "National Research Foundation (NRF)" del Sudafrica,
- un esperimento di raggi cosmici per l'American National Science Foundation,
- un progetto presentato al 2013 Interdivisional Innovational Research Incentives Scheme dell'Organizzazione olandese per la ricerca scientifica (NOW),
- un progetto spaziale per l'Istituto giapponese di spazio e astronautica (ISAS) e l'Agenzia spaziale giapponese (JAXA),
- una proposta presentata alla Japan Society for the Promotion of Science (JSPS),
- un progetto di ricerca presso l'Università di Firenze,
- il finanziamento di un assegno di ricerca per l'Università degli Studi dell'Insubria,
- promozioni a vari ranghi per gli istituti statunitensi: NASA, Columbia University, Massachusetts Institute of Technology, University of New Hampshire e University of Hawaii, Manoa.

Infine, il Dr. Boezio è referee per l'Istituto Nazionale di Fisica Nucleare, principalmente per esperimenti della Commissione Scientifica Nazionale 2.

(b) Biografia e preparazione professionale:

- Laurea (vecchio ordinamento): Università degli Studi di Trieste, Trieste, Italia, "Laurea in Fisica" conseguita con "110/110 e lode", 1992.
- Dottorato: Royal Institute of Technology (KTH), Stoccolma, Svezia. titolo:"Teknologie Doktor" (PhD), 1999.

c) Incarichi:

- "Dirigente di Ricerca": Istituto Nazionale di Fisica Nucleare (INFN), sezione di Trieste, 2019-
- Membro del Consiglio Direttivo dell'Istituto di Fisica Fondamentale dell'Universo (IFPU), 2018-
- Responsabile Nazionale dell'esperimento GAPS per l'INFN, 2016-.
- Membro del Collegio dei Docenti del Corso di Dottorato in Fisica presso l'Università degli Studi di Trieste, Trieste, Italia, 2015-
- Coordinatore locale della Sezione INFN di Trieste della Commissione Scientifica Nazionale 2 dell'INFN, 2012-2020.
- Responsabile Nazionale dell'esperimento PAMELA per l'INFN, 2013-2017.
- "Primo Ricercatore": INFN, sezione di Trieste, 2007-2019.
- Membro del comitato esecutivo e scientifico di PAMELA, dal 2006 ad oggi.
- Pamela Analysis Coordinator, 2006-oggi.
- Rappresentante dei Ricercatori della Sezione INFN di Trieste, 2001-2007.
- "Ricercatore": INFN, sezione di Trieste, 1999-2006.
- Post-Doc: Royal Institute of Technology, Stoccolma, 1999.

d) Pubblicazioni:

Il Dr. Boezio è autore e co-autore di quasi 300 articoli e proceedings di conferenze. Dieci delle pubblicazioni più rappresentative sono le seguenti:

1. M. Boezio, R. Munini, P. Picozza, *Cosmic ray detection in space*, Prog. Part. Nucl. Phys. **112** (2020) 103765.
2. M.S. Potgieter, E.E. Vos, R. Munini, M. Boezio, V. Di Felice, *Modulation of galactic electrons in the heliosphere during the unusual solar minimum of 2006 -2009: a modelling approach*, Astrophys. J. **810** (2015) 141.
3. O. Adriani *et al.*, *Cosmic-Ray Positron Energy Spectrum Measured by PAMELA*, Phys. Rev. Lett. **111** (2013) 081102, arXiv:1308.0133 [astro-ph.HE].
4. O. Adriani *et al.*, *PAMELA Measurements of Cosmic-ray Proton and Helium Spectra*, Science **332** (2011) 69, arXiv:1103.4055 [astro-ph.HE].
5. O. Adriani *et al.*, *PAMELA results on the cosmic-ray antiproton flux from 60 MeV to 180 GeV in kinetic energy*, Phys. Rev. Lett. **105** (2010) 121101, arXiv:1007.0821 [astro-ph.HE].
6. O. Adriani *et al.*, *New measurement of the antiproton-to-proton flux ratio up to 100 GeV in the cosmic radiation*, Phys. Rev. Lett. **102** (2009) 151101, arXiv:0810.4994 [astro-ph.HE].
7. O. Adriani *et al.*, *An anomalous positron abundance in cosmic rays with energies 1.5-100 GeV*, Nature **458** (2009) 607, arXiv:0810.4995 [astro-ph].
8. M. Boezio *et al.*, *A high granularity imaging calorimeter for cosmic-ray physics*, Nucl. Instrum. Meth. A **487** (2002) 407.
9. M. Boezio *et al.*, *The cosmic-ray electron and positron spectra measured at 1 AU during solar minimum activity*, Astrophys. J. **532** (2000) 653.
10. J. Kremer, M. Boezio, M.L. Ambriola, G. Barbiellini, *et al.*, *Measurements of ground-level muons at two geomagnetic locations*, Phys. Rev. Lett. **83** (1999) 4241



Europass
Curriculum Vitae

Personal information

First name(s) / Surname(s)	Roberta Sparvoli	
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Fax(es)		
E-mail	roberta.sparvoli@roma2.infn.it	
Nationality	Italian	
Date of birth		
Gender	Female	

Work experience

Dates	Since 30th December 2021
Occupation or position held	Full Professor SSD FIS/04, SC 02/A1 at the Rome “Tor Vergata” University, Rome, Italy
Dates	Since 1st January 2017
Occupation or position held	Visiting Professor at the National Research Nuclear University MEPHI, Moscow, Russia

Main activities and responsibilities

Teaching, Research

- Teacher of the course “**Nuclear and Subnuclear Physics**” for the Physics Master classes.
- Teacher of the course “**Informatics Lab**” for the Material Science Master classes.
- Member of the **PHD Commission** at the University of Rome Tor Vergata.
- **Coordinator of the INFN National Commission** for Astroparticle Physics on behalf of the Rome Tor Vergata INFN Structure.
- National Coordinator of the “**CSES/Limadou**” experiment at the INFN Research Committee.
- Coordination of the “**WiZard**” research group at the University of Rome Tor Vergata.
- Local coordinator of the **GAPS** experiment at the INFN Research Committee.
- Delegate of the University of Rome Tor Vergata at the **CIFS (Consorzio Interuniversitario di Fisica Spaziale) Consortium for Space Physics**.

Name and address of employer Rome “Tor Vergata” University

Type of business or sector Public University

Dates 2004-2015

Occupation or position held **Researcher**

Main activities and responsibilities Research, Assistant to Teaching

Name and address of employer Rome “Tor Vergata” University

Type of business or sector Public University

Dates 2000-2004

Occupation or position held **TD Researcher**

Main activities and responsibilities Data analysis and simulation for the space experiments NINA and PAMELA. Scientific analysis of the galactic and solar data coming from the telescope NINA in space. Simulation of the performance of the space telescope PAMELA. Coordination of the data analysis groups.

Name and address of employer Italian National Institute of Nuclear Physics INFN

Type of business or sector Public Research Institution

Dates 1998-2000

Occupation or position held **Post-Doc**

Main activities and responsibilities Data analysis and simulation for the space experiment NINA. Scientific analysis of the galactic and solar data coming from the telescope NINA in space.

Name and address of employer Italian National Institute of Nuclear Physics INFN

Type of business or sector Public Research Institution

Education and training

Dates 1994-1997
 Title of qualification awarded **Ph.D. in Physics**
 Principal subjects/occupational skills covered Title of thesis: “NINA: a New Instrument for Nuclear Analysis of primary cosmic rays”. Development of a space mission, simulation of the scientific performance, data analysis.
 Name and type of organisation providing education and training Rome “Tor Vergata” University

Dates 1989-1994
 Title of qualification awarded **Physics Degree**
 Principal subjects/occupational skills covered Solid preparation in modern theoretical, experimental and applied physics; deep understanding of the method scientific investigation; thorough knowledge of mathematics and computing; ability to model complex systems in different fields
 Name and type of organisation providing education and training Rome “Tor Vergata” University

Dates 1984-1988
 Title of qualification awarded **Scientific Diploma**
 Principal subjects/occupational skills covered High level preparation in Sciences, Humanities and Art. English preparation up to level B2. Primer in technology and computer science.
 Name and type of organisation providing education and training Liceo Scientifico Pitagora

Personal skills and competences

Mother tongue(s) Italian

Other language(s)

Self-assessment <i>European level (*)</i>	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
German	C2	C2	C2	C2	C1

(*) Common European Framework of Reference for Languages

Organisational skills and competences Experienced teacher for several Physics courses. Participation and Coordination of research groups at national and international levels. Lecturer for the International School of Astrophysics and for the International School of Space Sciences

Technical skills and competences Analysis and interpretation of scientific data, writing of scientific articles, organization and management of research groups.

Computer skills and competences Software management of PC and workstation platforms. Proficient with both Linux OS and Windows OS at SysManager Level. Programming skills in Fortran, C, LaTeX, HTML languages.

Additional information

Nuclear, antimatter and dark matter component in cosmic rays

The scientific activity of Prof. Roberta Sparvoli has been mainly dedicated to the field of Astroparticle Physics, in particular with regard to the study of nuclear and isotopic component of cosmic rays and the antimatter component (positrons and antiprotons, detection of any antinuclei), and search for possible indirect evidence of dark matter. These studies were carried out in space, by stratospheric balloons and on satellites, as part of the experimental program of the WIZARD collaboration. Among the most important missions on balloon of this collaboration we can remember MASS89, MASS91, TS93, CAPRICE94 and CAPRICE98. As for space missions, the WIZARD collaboration sent into space the telescopes NINA, NINA2 and PAMELA. The space mission PAMELA represents a state-of-the-art of the investigation of cosmic radiation, addressing the most compelling issues facing astrophysics and cosmology: the nature of the dark matter that pervades the universe, the apparent absence of cosmological antimatter, the origin and evolution of matter in the galaxy. PAMELA, a particle identifier using a permanent magnet spectrometer with a variety of specialized detectors, is an instrument of extraordinary scientific potential that is measuring with unprecedented precision and sensitivity the abundance and energy spectra of cosmic rays electrons, positrons, antiprotons and light nuclei over a very large range of energy from 50 MeV to hundreds GeV, depending on the species. One of the main scientific objectives of PAMELA is also the detection of SEP events and solar phenomena, in view of the Space Weather. PAMELA has been put in orbit, on board of the Resurs-DK1 Russian satellite by a rocket Soyuz, on the 15th of June 2006. More than 70 outstanding publications have been already produced by PAMELA.

Roberta Sparvoli is member of the CALET collaboration too, who has sent in orbit on board the ISS a sophisticated calorimeter in August 2015. Aim of the CALET experiment is to measure electrons and nuclei in cosmic rays up to the hundreds of TeV energies.

Currently Roberta Sparvoli participates to the experiment GAPS, that is a balloon-borne experiment located in the USA, aimed at searching for anti-deuteron in cosmic rays as signature of dark matter annihilation.

Life science in space

A parallel scientific interest of Roberta Sparvoli is in the field of life science in space, with the missions Si-Eye1 and Si-Eye2 on the Russian MIR space station, respectively, in the periods 1995-1998 and 1998-2000, and the missions

Si-Eye3 (in 2002) and ALTEA (in 2006), on the ISS, the latter still in progress. These experiments performed a continuous monitoring of radiation within the Space Stations and allowed a detailed study of the risks to the astronauts due to ionizing particles.

Monitoring of the seismic activity from space

In the last years, Roberta Sparvoli became part of the collaboration CSES/Limadou. The main scientific objective of the mission CSES (China Seismo-Electromagnetic Satellite) is studying electromagnetic phenomena and their correlation with the geophysics activity, contributing to the monitoring of earthquakes from space.

The satellite CSES was put in space in February 2018. It hosts an Italian payload. The Italian contribution to the mission CSES, in fact, consists of an

innovative instrument to measure energetic particles that precipitate from the Van Allen belts as a result of electromagnetic interference.

The satellite has aboard a wide range of instruments (magnetometers fluxgate and search-coil, high energy particle detectors, LP-RPA and ion drift meter) designed to jointly detect perturbations of different parameters and physical variables. Roberta Sparvoli is coordinating the data analysis of this first mission.

A second version of the CSES satellite will be put in orbit in 2022. The Italian participation to the Chinese mission will imply the construction and test of a particle instrument and a detector for the measurement of the ionospheric electric field.

The scientific activity of Roberta Sparvoli is testified by 300 records as refereed articles in the SCOPUS database and by the numerous congress and meeting participations as invited speaker.

Additional information

Affiliations and Committee Memberships:

- INFN (Italian National of Nuclear Physics)
- SIF (Società Italiana di Fisica)
- CIFS (Consorzio Italiano di Fisica Spaziale)
- ISE (Istituto Scientifico Europeo)
- Editor for "Special Issue of Advances in Space Research: Origins of Cosmic Rays"
- Referee for Astrophysical Journal, Astronomy & Astrophysics, Astroparticle Physics, Advances in Space Research, Nuclear Instruments and Methods in Physics Research.

Rome, 02 January 2022

