CV of Simone Dell'Agnello

INFN – LNF, National Institute of Nuclear Physics – Frascati Nat. Labs, Italy

Shortlist of most relevant recent roles/duties:

- Staff "Executive Technologist" (top Level I of III) at INFN-LNF, Frascati (Rome), Italy (≥2015)
- **Science-Technology Attaché**, Consulate General of Italy in San Francisco, CA, USA (2019-2021)
  - In **Silicon Valley/West Coast** he supports: Italian Institutions, Academia, Industries
  - Supported, promoted, co-organized "ITALY-USA Innovation Forum" held during the historical **visit of the President of the Italian Republic** to San Francisco in 2019
  - Board Member of the Italian Sci-Tech community, ISSNAF-BAC (www.issnafbac.org) Italian Scientist and Scholars in North America Foundation – Bay Area Chapter
- PI of 4 laser retroreflectors instruments on **4 Mars surface missions**: ESA ExoMars Lander (2016) and Rover (2022), NASA InSight Lander (2018) and Perseverance Rover (2020).
- Construction of the LARES-2 satellite for ASI, for the 1st flight of ESA's Vega C (2018-19)
- Member of **Scientific-Technical Council (CTS) of ASI** (2014-2018)
- Established a Joint Laboratory of INFN-LNF and ASI-Space Geodesy Center (2019-2025)
- Coordinator of all Technology Research at INFN-LNF for two mandates (2011-15, 2015-19)
- PI of **INFN & NASA–ARC/JPL Partnerships** on solar system exploration/research (≥2007)
- PI/PM of INFN Projects with **Space Agencies** (ASI, ESA, ISRO, NASA, CNSA) and Italian **Ministries** of Defence, of Foreign Affairs and of Research **(**2004-2019)
- PI/PM of INFN-funded research: 1 Moon-Mars Science project, 4 R&Ds (2004-2019)
- Founder and Leader of INFN-LNF space research infrastructure **SCF_Lab** (≥2004).

RESEARCH ACTIVITY IN SPACE PHYSICS & TECHNOLOGY (≥ 2004)

He won the position of Researcher Level II of III ("Primo Ricercatore") in '04 (formally hired in '06 due to blockage of public hiring). Since then he started from scratch a new INFN research activity in space science and technology: **precision positioning metrology in space based on laser retroreflectors for Satellite/Lunar Laser Ranging** (SLR/LLR).

The science goals and technological applications of this new INFN-LNF activity were: General Relativity, GNSS, Earth Observation (EO, including COSMO-SkyMed 1st and 2nd Generation), space exploration.

He formed and led a new research group of about 20 people, which developed (J. Adv. Sp. Res. 47, 822–842 (2011)):

- A unique space test infrastructure, the **SCF_Lab** (*Satellite/lunar/gnss laser ranging/altimetry and Cube/microsatellite Characterization Facilities Laboratory*): with two Optical Ground Support Equipment (**OGSE**) facilities in a new ISO 7 Clean Room
- A specialized space test, the **SCF-Test**: interdisciplinary Industrial procedures for integrated thermal-optical-vacuum characterization of Laser Retroreflector Arrays in accurately simulated space conditions
- Thermal, optical, orbital and structural sw analysis and simulation
- Full thermal and vacuum characterization for **Cube/Micro-satellites** with the 2 OGSEs
- **ETRUSCO** ('06-09, Extra Terrestrial laser Ranging to Unified Satellite COnstellations): R&D to characterize laser reflectors of Galileo (for Satellite Navigation), LAGEOS (for Space Geodesy) and optimize laser ranging to Galileo and GPS-3
  - International effort of INFN, Italian Air Force, ILRS (International Laser Ranging Service), NASA-GSFC (inventor of SLR), UMD
- **ETRUSCO-2** ('10-15, ASI-INFN Contract)**:** industry-level R&D for Galileo/GPS. Flight reflectors of GPS, GLONASS, GIOVE, Galileo have been SCF-Tested

  - Built a Retroreflector Array being proposed for Galileo V2 and, soon, for a patent
- **ETRUSCO-IRNSS** ('13-14, ISRO-INFN Contract) for the Indian navigation constellation
- **ETRUSCO-IOV** ('13-14, ESA-INFN Contract) for the Galileo Galileo In-Orbit Validation (IOV) satellites.
- **Laser Ranging to Galileo** ('15-16, ASI-INFN Project competitively awarded by the Italian Ministry of Research).

Membership of International Working Groups (WGs):
- ILRS: Core Properties and Performance Requirements for laser retroreflectors (≥'05)
- Internat. Lunar Network (ILN, 9 Space Agencies): Core Lunar Instruments ('08-10).

ASI Studies and NASA R&Ds ('07-12):
- 2 ASI studies on precision test of General Relativity, lunar science/exploration
- 4 R&Ds with NASA: GSFC (LAGEOS, hollow reflectors); JPL (deep space laser-ranged mass to test $1/r^2$); 2 Calls, one by **NASA-LSSO**, Lunar Sortie Scientific Opportunities, and one by **NASA-NLSI,** NASA Lunar Science Institute (both on lunar retroreflectors).

INFN projects ('07-19):
MoonLIGHT-ILN (R&D, '10-12), **MoonLIGHT-2** (Science, '13-25) are part of an advanced lunar research program (Moon Laser Instrumentation for General relativity High accuracy Tests) of INFN, led by SCF_Lab and Univ. of Maryland (UMD, PI of Apollo laser retroreflectors):
- Instruments:
  - MoonLIGHT: single, large LLR reflector payload observed by Earth
  - Microreflectors: miniaturized laser retroreflector array, developed for the Moon, Mars, other solar system moons, asteroids and comets, to be observed by orbiters equipped wit laser altimeters, (atmospheric) lidars, and/or lasercomm
- Collaborators: in US, UMD, Center for Astrophysics and APOLLO laser station; in Italy ASI-MLRO laser station in Matera and INFN/Univ. of Padua
- Work program: reflector construction/test, physics analysis (including Apollo/Lunokhod) for **precision tests of General Relativity (GR)**: weak and strong equivalence principle; PPN β; variation of gravitational constant (Gdot/G); $1/r^2$ Yukawa violations; geodetic precession; GR extensions with spacetime torsion and Non-Minimally Coupled gravity
- Mission opportunities:
  - **MoonLIGHT** has been selected by NASA LSITP (Lunar Surface Instrumentation and Technology Payloads) for 3 flights NASA CLPS (Commercial Lunar Payload Services) in 2023, 2024, 2025; selected by ESA for a mission of opportunity flight NASA CLPS in 2023; selected by CNSA for the Chang'E 6 flight in 2023-204.
  - **Microreflectors** have been selected for 4 laser retroreflectors instruments on 4 Mars surface missions: ESA ExoMars Lander (2016), NASA InSight (2018), NASA Perseverance (2020), ESA ExoMars Rover (2022).

SCF_Lab work program for Earth Observation Flagships: Copernicus and COSMO-SkyMed
- **ETRUSCO-GMES** ('13-15, Global Monitoring for Environment and Security), an INFN R&D experiment for Copernicus, Galileo and COSMO-SkyMed
- **AUGUSTUS** ('14-15), a Ministry of Foreign Affairs and Internat. Cooperation, **MAECI-INFN** High-Relevance Project for Copernicus and the USA
- **G-CALIMES** ('13-16, '18-19**,** Galileo-COSMO-SkyMed Absolute Laser Intercalibration with Measurements on Earth and in Space) a **Ministry of Defence-INFN** Contract
- Includes delivered and accepted devices, like:
  - **CORA**, COSMO-SkyMed Retroreflector Array, proposed for COSMO-SkyMed 2.

ISS:
- ASI-Scientific-Technical Council: consultant of ASI President for research, including ISS
- LNF Co-PI of Lazio-SiRad experiment) on ISS for ESA Soyuz Mission "ENEIDE" in 2007, launched from Baikonur
- Co-chairman of INFN-Space/2 (2005) and INFN-Space/3 (2013) national workshops on astroparticle missions and space experiments on ISS.

Collaboration with NASA-Ames (Silicon Valley) and NASA-JPL (Pasadena):

As NASA-NLSI broadened to NASA-**SSERVI** (Solar System Exploration Research Virtual Institute, sservi.nasa.gov), he established as PI an **INFN Partnership with NASA-SSERVI** based on the research program *SPRINGLETS*: Solar system Payloads of laser Retroreflectors of INfn for General reLativity, Exploration and planeTary Science. This also includes other particle and astroparticle test facilities of the LNF (for X/UV/Vis/IR synchrotron light, DAΦNE-Light, and for electron/positron/gamma of tagged energy up to 500 MeV/c, BTF).

- PI of INFN-CSN5 R&D experiment **NEW REFLECTIONS** ('16-'18), fully synergetic with work topics of the INFN-SSERVI research and R&D program
- PI of microreflectors for **2 Mars surface missions led by NASA-JPL**: InSight Lander (2018) and Perseverance Rover (2020)
- In-person visits to NASA-ARC and NASA-JPL several times a year (2007-2019).

On 11 Sep 2014 was appointed Member of **ASI's Scientific-Technical Council** for 4 years.

He has led an Italian team of ~20 INFN employees/associates: physicists, engineers, mathematicians, technicians, students, post-docs (LNF, Rome, Padua, Naples, Trento).

Publications: >250 papers, >7800 citations, H-index (ISI)>50 (since 1987). He passed the Italian Ministry of Research selection ("Abilitazione Scientifica Nazionale"), thus enabled to the role of Full Professor ("I Fascia", Sector 02/A1, Experimental Particle Physics) for the period 23/01/2014-23/01/2018.

Languages: speaks/writes fluent English; has fair French skills; Italian is his mother tongue.

CONTRIBUTIONS TO WORKSHOPS, CONFERENCES, EVENTS

He organized or co-organized more than 20 national European or international sci-tech workshops and conferences or sci-tech diplomatic events for MAECI. He has been the author and presenter of several tens of contributions for CDF, KLOE, CDF2 and the space research activities of the SCF_Lab described in this CV.

April 20, 2021

Simone Dell'Agnello

Executive Technologist (INFN-LNF, Italy)

Europass
Curriculum Vitae

Personal information

First name(s) / Surname(s)	**Roberta Sparvoli**
Address(es)	1, via della Ricerca Scientifica, I-00133 Rome, Italy
Telephone(s)	Mobile:
Fax(es)	
E-mail	roberta.sparvoli@roma2.infn.it
Nationality	Italian
Date of birth	
Gender	Female

Work experience

Dates	Since 4th April 2017
Occupation or position held	**Abilitazione Scientifica Nazionale 1 FASCIA, SC 02/A1**
Dates	Since 29th January 2015
Occupation or position held	**Associate 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	Understanding		Speaking		Writing
European level (*)	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 t 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 gala 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 an 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 al 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 publicatic 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 ballon-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 ans Sil-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.

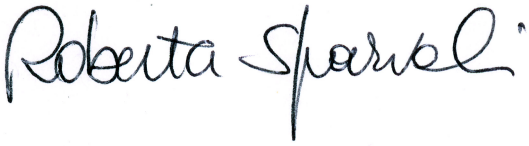
The scientific activity of Roberta Sparvoli is testified by 300 records as refereed articles in the SCOPUS database and by the numerous congress and meeting participations as invited speaker.

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 Reseacrh, Nuclear Instruments and Methods in Physics Research.

Rome, 13 September 2020



Curriculum Vitae

DATI PERSONALI

Nome e Cognome: Matteo Mario F. Beretta

STUDI

Laurea in Ingegneria Elettronica	c/o Politecnico di Milano
Data: 22/12/1995	
Titolo della tesi:	Proprietà dei mezzi elastici anisotropi.

Relatore Prof. Giuseppe Drufuca

STUDI POST UNIVERSITARI

(dottorato di ricerca, corsi di specializzazione, di perfezionamento, borse di studio)

Dottorato di Ricerca in Ingegneria Elettronica e delle Telecomunicazioni

Conseguito presso il Politecnico di Milano il 02/03/2001.
Tesi di dottorato di tipo teorico applicativo dal titolo: Fractured reservoir characterization from seismic data.

CONTRATTI

Assegno di Ricerca
Dal 13 Febbraio 2001 al 24 Novembre 2004 presso i Laboratori Nazionali di Frascati dell'INFN.

Contratto a tempo determinato: Art. 23
Dal 25 Novembre 2004 al 24 Novembre 2007 presso Laboratori Nazionali di Frascati dell'INFN.
Ai sensi delle disposizioni contenute nell'art.1, comma 519, della legge 296/2006, sono stato incluso nella graduatoria del personale stabilizzabile e mantenuto in servizio fino al 31/12/2012.

Contratto a tempo determinato: Art. 23
Dal 1 Gennaio 2013 con proroghe annuali fino al 31 Dicembre 2015 presso Laboratori Nazionali di Frascati dell'INFN.
Con deliberazione n. 12608 del 26 Novembre 2012 risulta stupilato il nuovo contratto di lavoro a tempo determinato in relazione alle necessità di collaborazione tecnica nell'ambito delle attività di progettazione, sviluppo, caratterizzazione, realizzazione e messa in opera di dispositivi e sistemi elettronici digitali e/o ASICs digitali per esperimenti di fisica.

Assunzione a tempo indeterminato
Dal 1 Gennaio 2015 assunto a tempo indeterminato come tecnologo presso i Laboratori Nazionali di Frascati dell'INFN.

INCARICHI DI RESPONSABILITÀ

- Periodo 2001 - 2004: responsabile installazione e setup camere MDT dei LNF al testbeam;
- periodo 2003 -2009: responsabile dei servizi di alte e basse tensioni dello spettrometro di ATLAS;
- periodo 2004-2008: responsabile del commisioning e installazione delle stazioni MDT sull'esperimento;
- periodo 2009-2014: responsabile progettazione del core memoria associativa per l'ASIC AMchip di Fast Track e test del chip;
- periodo 2009-2014: responsabile progettazione e produzione scheda di clustering di Fast Track;

- dal 2018: co-responsabile dei servizi di alte e basse tensioni dello spettrometro di ATLAS per l'upgrade di fase 2;
- dal 2018: responsabile dei servizi di alte e basse tensioni del rivelatore a muoni di ATLAS per l'upgrade di fase 2;
- dall' 1/05/2019 responsabile reparto Automatismi e Controlli del Servizio Elettronica e Automazione della Divisione Ricerca dei Laboratori Nazionali di Frascati.

CORSI DI FORMAZIONE

Tipo di corso: **Corso di Progettazione di dispositivi elettronici mediante l'uso di strumenti CAD**
Sede del Corso: INFN sez. BARI
Durata: Dal 4 al 7 Dicembre 2001

Tipo di corso: **Corso di Progettazione ASIC tenuto dall'Austria-microsystems: HIT-KIT Training**
Sede del Corso: Lulea University of Technology, Sweden
Durata: Dal 15 al 17 Marzo 2006

Tipo di corso: **Corso Cadence: Customized Encounter Bottom Up Flow**
Sede del Corso: INFN sez. Milano
Durata: Dal 19 al 20 Maggio 2014

Tipo di corso: **Public Speaking base**
Sede del Corso: INFN Laboratori Nazionali di Frascati
Durata: Dal 28 al 29 Marzo 2019

Tipo di corso: **ANSYS HFSS**
Sede del Corso: INFN Laboratori Nazionali di Frascati
Durata: Dal 15 Maggio 2019

ATTIVITÀ DIDATTICA

Docente del corso di *Cibernetica Applicata*, per la laurea specialistica in Fisica presso l'università di Tor Vergata, negli anni 2005 e 2006.

Docente del corso *Introduzione al VHDL per logiche programmabili* presso i Laboratori Nazionali di Frascati dell'INFN negli anni 2001, 2003, 2005, 2006, 2007, 2009, 2011.

Docente del corso *FPGA con processori embedded* nell'anno 2012.

Durante il dottorato di ricerca (1998 - 2000) ho svolto attivit didattica (seminari, esercitazioni) per il corso di *Telerilevamento e Diagnostica Elettromagnetica* presso il Politecnico di Milano, negli anni 1998,1999 e 2000.

LINGUE STRANIERE

Buona conoscenza della lingua inglese.

CONOSCENZE INFORMATICHE

Strumenti: **Pc, Workstation, CPU VME**

Buona conoscenza del Sistema operativo: **Windows, Unix e Linux**

Software utilizzati correntemente:

- Pacchetto applicativo: **Microsoft Office (Word, Excel, Power Point)**
- Software di calcolo numerico: **Matlab, Matematica, R**
- CAD elettronico: **Cadence, Synopsys, Dolphin Integration**
- Ambienti di sviluppo: **Xilinx Foundation ISE, Xilinx EDK, Xilinx Vivado, Xilinx SDK, Actel Libero, Modelsim, XJTAG**
- Linguaggi di programmazione: **C, C++, Fortran**
- Linguaggi di descrizione hardware: **VHDL, Verilog, SystemC**