



Fiodor Sorrentino

WORK EXPERIENCE

01/01/2023 Genova, Italy

SENIOR RESEARCHER INFN

- local scientific responsible for INFN collaborative experiments (ET, MIUR-PRIN 2015)
- national responsible for INFN collaborative experiments (OLAGS)
- Commissioning Coordinator for Advanced Virgo +
- Technical Coordinator for the Project Office of Einstein Telescope Organisation
- Risk Manager for Advanced Virgo + project office
- design, set up and operation of quantum optics benchtop experiments
- writing of scientific papers
- tutoring of PhD students
- referee for INFN experiments

03/09/2014 – 31/12/2022 Genova, Italy

RESEARCHER INFN

- local scientific responsible for INFN collaborative experiments (ET, MIUR-PRIN 2015)
- national responsible for INFN collaborative experiments (OLAGS)
- subsystem manager for the Advanced Virgo + project
- commissioning coordination of Virgo detector
- commissioning of AEGIS experiment
- design, set up and operation of quantum optics benchtop experiments
- writing of scientific papers
- fund raising for R&D projects
- scientific responsible for joint R&D projects
- tutoring of Master and PhD students
- referee for INFN experiments

01/07/2004 – 02/09/2014 Firenze, Italy

POST DOC FIRENZE UNIVERSITY AND LENS

- design, set up and operation of laboratory experiments for cold atom physics and high resolution spectroscopy
- design, set up and operation of laboratory experiments for atom interferometry
- design, set up and operation of compact quantum inertial sensors for space missions and geophysical applications
- writing of scientific papers
- fund raising for R&D projects
- scientific responsible for joint R&D projects (from ESA, EU, ASI, INFN)
- tutoring of Master and PhD students

01/01/2004 – 30/06/2004 Pisa, Italy

POST DOC NATIONAL INSTITUTE FOR THE PHYSICS OF MATTER (INFN)

- electronic control of femtosecond lasers
- realization of fiber-optic laser acoustic sensors

01/06/2000 – 30/11/2000 Pisa, Italy

FELLOWSHIP NATIONAL INSTITUTE FOR THE PHYSICS OF MATTER (INFN)

- laser frequency stabilization for optical frequency standards

● **EDUCATION AND TRAINING**

01/01/2001 – 07/05/2004
PHD IN APPLIED PHYSICS Pisa University

Website <https://www.df.unipi.it/>

01/01/1993 – 20/03/2000
DEGREE IN PHYSICS Pisa University

Website <https://www.df.unipi.it/>

● **LANGUAGE SKILLS**

Mother tongue(s): **ITALIAN**
Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C2	C2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● **DIGITAL SKILLS**

Google Drive | Microsoft Office | Power Point | Google Docs | Zoom | Skype | Internet user | Microsoft Word | Microsoft Powerpoint | LaTeX | Matlab | Python | Microsoft Excel | Gmail | Igor Pro

Research skills

Team-work oriented | Presenting | Teamwork | Creativity

Management skills

Problem-solving | Motivated | Organizational and planning skills | Responsibility | Critical thinking | Reliability | Decision-making | Strategic Planning | Ability to Work Under Pressure | Good listener and communicator | Written and Verbal skills | Analytical skills

● **PUBLICATIONS**

Scientific publications

I have authored more than 272 papers published in international peer-reviewed journals and more than 50 papers published in conference proceedings. These include over 40 publications in high-impact factor journals (Nature, Nature Communications, Physical Review Letters, Applied Physics Letters, The Astrophysical Journal Letters, The Astrophysical Journal). Number of citations: 62424; H-index: 79 (source Scopus, May 2024)

Patents

- I am the author of three patents:
- F. Italiano, M. Antonelli; G. M. L. Tino, F. Sorrentino, PILOTING METHOD OF A LASER SYSTEM OF AN ABSOLUTE GRAVIMETRIC MEASUREMENT DEVICE BY ATOMIC INTERFEROMETRY FOR GEOPHYSICAL APPLICATIONS PARTICULARLY FOR MONITORING HYDROCARBON RESERVOIRS, WO Patent 2,012,090,128 (2012)
 - F. Italiano, M. Antonelli; G. M. L. Tino, F. Sorrentino, M. de Angelis, ABSOLUTE GRAVIMETRIC MEASUREMENT DEVICE BY ATOMIC INTERFEROMETRY FOR GEOPHYSICAL APPLICATIONS PARTICULARLY FOR MONITORING HYDROCARBON RESERVOIRS, WO Patent 2,012,090,121 (2012)
 - F. Italiano, M. Antonelli; G. M. L. Tino, F. Sorrentino, M. de Angelis, AN ABSOLUTE GRAVIMETRIC MEASUREMENT DEVICE BY ATOMIC INTERFEROMETRY FOR GEOPHYSICAL APPLICATIONS PARTICULARLY FOR MONITORING HYDROCARBON RESERVOIRS, WO Patent 2,012,090,134 (2012)

● **NETWORKS AND MEMBERSHIPS**

1999 – 2005
Istituto Nazionale per la fisica della Materia (INFM)

2005 – CURRENT

Istituto Nazionale per la Fisica Nucleare (INFN)

2006 – 2008

Consorzio Nazionale Interuniversitario per le Scienze fisiche della Materia (CNISM)

2014 – CURRENT

European Geosciences Union (EGU)

2015 – CURRENT

Società Italiana di Fisica (SIF)

● **CONFERENCES AND SEMINARS**

As invited speaker

- Gravitational Waves Advanced Detector Workshop - GWADW 2008, La Biodola, Elba Island (LI), May 12-18, 2008 - title: "Cold atoms for Gravitational Waves detection and related applications."
- Atom interferometry in microgravity Workshop, Palaiseau (France), May 28÷29, 2009 - title: "SAI - Space Atom Interferometers"
- XIX SIGRAV conference, Italian Society of General Relativity and Gravitational Physics - Pisa, September 27÷October 1, 2010 - title: "Experimental Tests of Gravity with Cold Atoms."
- From Quantum to Cosmos 5 (Q2C5), space-based research in fundamental physics and astronomy, Cologne (Germany) 9 - 12 October 2012 - title: "Gravity measurements with atom interferometry"
- Gravitational Waves Advanced Detector Workshop - GWADW 2013, La Biodola, Elba Island (LI), May 19-25, 2013 - title: "The MAGIA Experiment: current status and future prospects".
- VULCANO Workshop 2014 - Frontier Objects in Astrophysics and Particle Physics - Vulcano, May 18÷24, 2014 - title: "Fundamental physics with space and ground atomic quantum sensors".
- 100th National Congress of the Italian Physical Society, Pisa September 22÷26, 2014 - title: "Atom Interferometry Sensors".
- What Next - Fundamental Physics, Florence 04÷06 May 2015 - F. Sorrentino, "Perspectives for gravity measurement and spectroscopy of cold antiH"
- Gravitational Waves Advanced Detector Workshop - GWADW 2016, La Biodola, Isola d'Elba (LI), May 22÷27, 2016 - title: "Sensitivity limits of atom interferometry gravity gradiometers and strainmeters".
- Metrology for Aerospace, Florence, June 22÷23, 2016 - title: "The Advanced Virgo Interferometer."
- Rencontres de Moriond - Gravitation, La Thuile, Aosta Valley, March 25÷April 1, 2017 - title: "Advanced Virgo Status"
- Quantum gases, fundamental interactions and cosmology Conference (QFC 2017) - Pisa, October 25÷27, 2017 - title: "Gravity tests with antimatter: the AEGIS experiment".
- 104th National Congress of the Italian Physical Society, Arcavacata di Rende (CS) September 17÷21, 2018 - title: "Advanced Virgo Status."
- Gravitational Waves Advanced Detector Workshop - GWADW 2019, La Biodola, Elba Island (LI), May 19÷25, 2019 - title: "Squeezing status from LIGO & VIRGO".
- Quantum Technologies within INFN: status and perspectives - Padua, January 20÷21, 2020, <https://agenda.infn.it/event/21070/>, title: "Optical links for atomic gravity sensors".
- Machine Learning for Advanced Control Techniques, <https://indico.ego-gw.it/event/172/>, March 22-23, 2021, title: "Squeezed light benches and optical alignment issues"
- Gravitational Wave Detector Vacuum workshop – GWDVac'22, La Biodola, Elba Island (LI), September 25 ÷ October 1, 2022 - title: "Status and Ongoing research at EGO"
- Cosmology 2023 in Miramare, <https://indico.cern.ch/event/850500/>, Miramare, Trieste, August 28 ÷ September 2 2023, title: "Gravitational waves observations by LIGO-Virgo and prospects for the future".
- XIII International Conference on New Frontiers in Physics 2024 (ICNFP 2024), Crete, Greece, August 25 ÷ September 4 2024, title: "LVK detectors status and future plans"

As speaker

- Euro-Mediterranean Symposium on Laser-Induced Breakdown Spectroscopy (EMSLIBS 2005), Aachen (D) September 6÷9, 2005 - title of the paper "New technological developments for the industrial application of the LIBS technique".
- 38th European Group on Atomic Systems (EGAS2006), Ischia (NA), 7÷10 June 2006 - title of the paper: "A Strontium sample for ultracold atomic physics, high-precision spectroscopy and quantum sensors".
- First Mediterranean Photonics Conference, Ischia (NA), June 25÷28, 2008 - title of the paper: "Precision measurements using cold atom sensors".
- 41st European Group on Atomic Systems (EGAS2009), Gdansk (PL) July 8÷11, 2009 - title of paper: "Precision gravity measurements using cold atom interferometry."

- Laser Metrology Workshop '09, Lerici (SP) October 19÷21, 2009 - title of paper: "Precision gravity measurements with cold atom interferometry."
- Euro-Mediterranean Symposium on Laser-Induced Breakdown Spectroscopy (EMSLIBS 2009), Tivoli Terme (RM) September 27÷October 1, 2009 - title of paper: "Unassisted element identification from Laser Induced Breakdown Spectra with automatic ranking techniques inspired by text retrieval."
- National Group on Solid Earth Geophysics, GNGTS 2010 conference, Prato October 26÷28, 2010 - title of paper "Gravity measurements with atom interferometry".
- 46th European Group on Atomic Systems (EGAS2014), Lille (FR) July 1÷4, 2014 - title of paper: "Measurement of the gravitational constant G by atom interferometry."
- European Geosciences Union General Assembly 2015, Vienna April 12÷17, 2015 - title of the paper: "Fiber Bragg grating sensors for strain changes measurements at volcanic sites (MED-SUV project; WP 2; Sub-Task 2.2.2)".
- Fourteenth Marcel Grossmann Meeting - MG14, Rome 12÷18 July 2015 - title of paper: "Testing gravity with antimatter: the A.E.g.I.S. experiment"

● **PROJECTS**

INTAS program

in collaboration with the Novosibirsk Institute of Laser Physics (Ru)

FINAQS (Future Inertial Atomic Quantum Sensors)

STREP project of the 6th Framework Program of the European Community, in collaboration with partners from: Institute for Quantum Optics (Hannover), Humboldt University (Berlin), SYRTE (Paris), Institut d'Optique (Palaiseau, France)

MAGIA (Accurate Measurement of G with Atom Interferometry)

Absolute Measurement of G with Atom Interferometry, INFN experiment (National Institute of Nuclear Physics)

Observation of the Universe from the Moon

ASI project (Italian Space Agency)

iSense (Integrated Quantum Sensors)

STREP project of the 6th Framework Program of the European Community, in collaboration with partners from: University of Birmingham, University of Nottingham, University of Hamburg, Leibniz University of Hannover, Forschungsverbund Institute of Berlin, CNRS (France).

SLCA (High-performance Space Source for Laser-Cooled Atoms)

ESA contract 18330/05/NL/PM)

SAI (Space Atom Interferometer)

ESA contract 20578/07/NL/VJ), in collaboration with partners from: Institute for Quantum Optics (Hannover), Humboldt University (Berlin), SYRTE (Paris), Istitute d'Optique (Palaiseau, France), Hamburg University, ZARM institute (Bremen), ULM University

APPIA (APplication and Implementation of Atom interferometry in space)

ESA contract 21583/08/NL/HE

STE-QUEST (Space-Time Explorer and Quantum Equivalence Principle Space Test)

ESA Cosmic Vision 2011

Q-WEP (Atom Interferometry Test of the Weak Equivalence Principle in Space)

ESA ITT AO/1-6763/11/NL/AF

ADVANCED ATOMIUM INTERFEROMETER FOR EXPERIMENTS ON GRAVITY AND QUANTISTIC PHYSICS AND APPLICATIONS TO GEOPHYSICS

Scientific Research Programs of Significant National Interest (PRIN 2015)

SIRF (Interferometric Roughness Sensor for Railway Rails)

Regione Toscana, 2006 SPD program; Marwan Technology Srl in collaboration Pisa University

Development of a portable instrument for real-time chemical analysis using LIBS technique

Regione Toscana - 2008 Program for Precompetitive Development; Marwan Technology Srl in collaboration with National Research Council (CNR Pisa)

ALMA (Laser Analysis of Precious Metals and Ambre) in collaboration with CNR Pisa and University of Pisa

Regione Toscana, POR-CREO Program 1.5, 2009; Marwan Technology Srl in collaboration with National Research Council (CNR Pisa) and Pisa University

MONDI (Monitoring and Diagnostics of the frescoes of the Monumental Cemetery of Pisa)

Regione Toscana, POR-FSE axis IV program, 2009; Marwan Technology Srl in collaboration with National Research Council (CNR Pisa)

SSOA (Development of Advanced Optical Sensors)

Regione Toscana, POR-CREO program 1.6, 2009; Marwan Technology Srl in collaboration with Aerospazio Tecnologie Srl and National Research Council (CNR Firenze)

2013 – 2016

MED-SUV (MEDiterranean Supersite Volcanoes)

FP7-ENV-2012-6.2-2., EU contract no. 308665; Marwan Technology Srl

2014 – 2017

SHREDDERSORT (Selective REcovery of Non-Ferrous Metal Automotive Shredder by Combined Electromagnetic Tencos Spectroscopy and Laser-Induced Plasma Spectroscopy)

FP7-ENV-2013.6.3-1 contract. no. 603676; Marwan Technology Srl

2016 – 2018

DIAST (Development of an Integrated Diagnostic System for Space and Terrestrial Applications)

Regione Toscana, Programa FAR-FAS 2014; Marwan Technology Srl in collaboration with Aerospazio Tecnologie Srl and National Research Council (CNR Firenze)

2016 – 2018

SUPREMAL (Surface-enhanced Raman spectroscopy for early detection of Alzheimer's disease), since 2016

Regione Toscana, FAS Salute 2014 program; Marwan Technology Srl in collaboration with National Research Council (CNR Firenze)

2018 – 2020

MITOS (Magnetic Induction Tomography with Optical Sensors)

EU & Tuscany Region, ERANET Program; Marwan Technology Srl in collaboration with National Research Council (CNR Firenze)

● **HONOURS AND AWARDS**

for research activities

- EOS prize 2009 from the European Optical Society as the first author of the paper "Precision measurements of gravity using cold atom sensors".
- Unioncamere prize 2006 for technological developments in the field of LIBS as a member of Spin-Off Marwan Technology.
- Vespucci Innovation Prize for technological developments in the field of LIBS as a partner in Spin-Off Marwan Technology.

- Special Breakthrough Prize in Fundamental Physics, May 2, 2016, for gravitational wave detection (<https://breakthroughprize.org/News/32>).
- 2016 Gruber Cosmology Prize, May 4, 2016, for gravitational wave detection (<http://gruber.yale.edu/cosmology/press/2016-gruber-cosmology-prize-press-release>).
- National scientific qualification under Art. 16 of Law 240/2010 for S.C. 02/B1 and 02/B3 as a full professor (2012 call), for S.C. 02/A1 as a full professor and for S.C. 02/B1 as a full professor (2016 call), for S.C. 02/A1 as a full professor (2018 call)

● **MANAGEMENT AND LEADERSHIP SKILLS**

ORGANISATION AND COORDINATION of research groups

- Since May 2024 I hold the role of Technical Coordinator for the Einstein Telescope Organisation (ETO) management board
- Since May 2024 I hold the role of Risk Manager in the Project Office for the Advanced Virgo + project of the Virgo Collaboration
- From June 2022 to April 2024 I held the role of Commissioning Coordinator for the Virgo collaboration, as such I am a member of the Management Team and Project Science Board for the Advanced Virgo + project.
- Since 2019, I have been responsible within the Virgo collaboration for a subsystem for the Advanced Virgo + (SVS: squeezed vacuum source) project.
- Since 2017, I have been coordinating a research group with the INFN sections of Genoa, Naples, Padua, Pisa, Perugia, the APC institute in Paris and the KASI institute (Korea) within the INFN Virgo-Italy experiment for the development of a frequency-dependent squeezing system using EPR entanglement.
- I have participated in the preparation and management of numerous research projects at national and international levels (see section Projects).
- In particular, I have served **as scientific leader** for my research group in the FINAQS, SLCA, SAI, APPIA, iSense, STE-QUEST, Q-WEP, PRIN2015 projects and as **scientific coordinator** in the SAI project.
- As a partner in the University of Pisa spin-off Marwan Technology Srl, I **coordinated and directed** several integrated R&D projects funded by the Tuscany Region and the European Community

● **INSTITUTIONAL RESPONSIBILITIES**

2017 – 2020

Local INFN unit coordinator for a 2015 PRIN project (prot. 2015L33WAK_002)

2020 – CURRENT

Local responsible for the ET-Italy experiment of CSN2 INFN

2020 – 2023

National responsible for the CSN5 INFN experiment OLAGS (Optical Links for Atomic Gravity Sensors)

01/06/2022 – 10/04/2024

Commissioning Coordinator for the Virgo collaboration

01/05/2024 – CURRENT

Technical Coordinator for Einstein Telescope Organisation (ETO)

01/05/2024 – CURRENT

Risk Manager for Advanced Virgo +

● **TEACHING AND TUTORING**

2002 – 2005

Lecturer (Cultore della materia), General Physics for Environmental Science course, University of Pisa

Classroom exercises in mechanics, thermodynamics, electromagnetism, and lectures on measurement theory. Laboratory experiences in mechanics, electromagnetism and geometrical optics (about 60 students/year)

2006 – 2007

Assistant professor (Cultore della materia), General Physics 2 course for Electrical Engineering, University of Florence

Theoretical lectures and classroom exercises on the topics of electromagnetism and optics

2008 – 2009

Metrology, Physics Department, University of Florence

Seminars

2010 – 2014

Examination committees (Cultore della materia), Atomic Physics, Physics Department, University of Florence

2016 – CURRENT

Gravitational Waves course for the PhD School in Physics at the University of Genoa

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2017 – CURRENT

Gravitational Waves course for the Master School in Physics at the University of Genoa

Lake Como School of Advanced Studies" of the Italian Society of General Relativity and Physics of Gravitation (SIGRAV), Como

2017 – CURRENT

Optics courses for engineers on behalf of the company ISO Sistemi S.r.l.

Introduction to electromagnetic theory, optical sensors, quantum sensors and radars

28/05/2018 – 01/06/2018

Class for the school "Waves on the lake: the astrophysics behind gravitational waves"

Co-supervisor for undergraduate and doctoral theses at the University of Florence since 2009.

External thesis advisor for doctoral theses at the University of Rome Tor Vergata since 2015.

Supervisor for master's thesis for graduate course in Physics at the University of Genoa since 2018 (two theses).

Supervisor for PhD thesis in Physics at the University of Genoa since 2018 (three theses).

External thesis advisor for a doctoral thesis at the APC institute in Paris since 2019

2021 – CURRENT

Lecturer for the Radar & Sensors Academy, Leonardo S.p.a.

Tutoring

● **RESEARCH ACTIVITY ABROAD**

11/2002 – 11/2002

Institute of Laser Physics, Novosibirsk, Russia: development of control systems for diode and femtosecond lasers for frequency metrology

09/2016 – 09/2016

- AstroParticule et Cosmologie (APC), Paris, France: study of experimental configurations for application of atomic interferometry gravity gradiometers in early detection of seismic events

● **PEER REVIEW**

Peer review activities

- Referee for INFN experiments (DORELAS, LISA-PF, ADAMANT) since 2012.
- Referee for research projects of the French National Research Agency (ANR) since 2016.
- Referee for several international scientific journals (including Physical Review A, Applied Physics B) since 2010.
- Member of the "Register of Expert Peer Reviewers for Italian Scientific Evaluation" of MIUR.
- Expert evaluator for the Horizon Europe program of the European Commission.
- **Member of the expert committee "W&T2: Physics" for the evaluation of research projects for the Research Foundation Flanders (FWO) since 2019**

● **SCIENTIFIC OUTREACH**

2002 – 2003

Optics, laser and atomic physics

I collaborated with INFN on the science popularization exhibitions "Fragments of Learning" in Pisa in 2002 and "The Wonders of Science" in Genoa in 2003. In particular, for the Genoa exhibition, I made an interactive experiment on optical frequency duplication.

2014 – CURRENT

Gravitational waves

- I gave several public talks on Virgo and gravitational waves science at schools and conference centers
- I regularly serve as a guide for visitors at the Virgo site.

● **INDUSTRY**

2003 – 2021

Spin-off

I was a partner in the INFN-CNR spin-off Marwan Technology (since 2004 also a spin-off of the University of Pisa); in this field I was mainly involved in laser sensing, inertial sensing and LIBS spectrometry. By way of example, I have been responsible for the realization of profile and distance laser sensors, control electronics for seismic attenuation systems used in interferometers for the detection of gravitational waves, integrated systems for LIBS (Laser Induced Breakdown Spectroscopy) analysis, instruments for interferometric measurements of road profile on moving vehicles, optical instruments for quality control in food industry plants, fluorimeters for analysis of trace pollutants, fiber optic Bragg sensors for geophysical applications, photochemical sensors for biomedical applications

● **ORGANISATION OF CONFERENCES AND SCHOOLS**

15/07/2013 – 20/07/2013

International School of Physics "E. Fermi" of the Italian Physical Society, course CLXXXVIII "Atom Interferometry", Varenna

Scientific secretary

16/12/2015 – 18/12/2015

IFD2015 - INFN workshop on future detectors, Turin,

Member of the scientific committee

08/04/2019 – 12/04/2019

13th European Conference on Atoms, Molecules and Photons (ECAMP13), Florence April 8÷12, 2019.

Member of the organizing committee

● **EDITORIAL RESPONSIBILITIES**

18/03/2024 – CURRENT

Academic Editor in the editorial board of Academia Quantum <https://www.academia.edu/journals/academia-quantum>
