

## CURRICULUM VITÆ – CATERINA PETRILLO

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Caterina Petrillo is full professor with a Chair in Experimental Physics at the University of Perugia where she led the Department of Physics for 5 years (2009-2014) and the Department of Physics and Earth Science for 3 years (2014- 2017).

A physicist by training, she began her research career in condensed matter physics, largely benefitting of neutron and X-ray scattering techniques available at the European large-scale facilities, where she also contributed to design and construction of neutron instruments and components. She served as a member of several scientific evaluation and advisory committee (ESRF-SAC, ESFRI-PSE, ESFRI-NLG, H2020-RI Advisory Group, Helmholtz Association, Research Foundation Flanders FWO) and governing bodies of international research facilities (Institut Laue-Langevin, the European Spallation Source ESS), both as a scientific expert and an appointed representative of the Italian Ministry of Education, University and Research (MIUR). She also served as the appointed Italian Delegate to the Programme Committee Research Infrastructures of FP7 and the elected Vice-Chair of the ESS Council. Caterina Petrillo is a member of the Italian Delegation to the Group of Senior Officials of the G8-5 on Global Research Infrastructures. Recently, she has been nominated the representative of the Research Ministry in the Board of Directors of the INFN and a member of the Italian delegation to the ESFRI Forum. She has been elected by the University Senate as one of the members of the Executive Board of the University of Perugia. She has a broad experience of global facilities and the strategies for their long-term sustainability. Very recently, she has been honored to be elected as the new Foreign Member of the prestigious Royal Swedish Academy of Engineering Sciences (Kungliga Ingenjörsvetenskapsakademien/IVA). His majesty King Carl XVI Gustaf is the patron.

### Education and Training

1988	Visiting scientist at Monash University (Melbourne, AUS) and the HIFAR Reactor of the Lucas Heights Research Center (Sydney, AUS).
1985 – 1986	Visiting scientist at the Institut Laue-Langevin (ILL, Grenoble, FR)
1984 – 1985	Visiting scientist at the Physics Department of Reading University (Reading, UK) and the Rutherford Appleton Laboratory - ISIS Spallation Neutron Source (Chilton, Didcot, UK)
March 1984	Laurea in Fisica, 110/110 cum Laude, University of Perugia, IT
July 1979	Diploma di Maturità Classica, 60/60, Perugia, IT

### Employment History

2018 - 2019	<i>Member (elected) of the Executive Board (Consiglio di Amministrazione) of the University of Perugia.</i>
2014 - 2016	<i>Director (elected) of the Department of Physics and Earth Science of the University of Perugia. Member of the Academic Senate of the University of Perugia. Delegate of the Rector to the Joint Research Committee University of Perugia – Italian National Research Council (CNR) for the development of common research strategies and programs.</i>
2009 - 2013	<i>Director (elected) of the Physics Department of the University of Perugia.</i>
Since 2007	<i>Full Professor in Experimental Physics at the University of Perugia, School of Science, Physics Department (Perugia, IT).</i>
2003 – 2006	<i>Associate Professor in Experimental Physics at the University of Perugia, School of Science, Physics Department (Perugia, IT).</i>
1999 – 2003	<i>Associate Professor in Experimental Physics at the Politecnico di Milano, School of Engineering, Physics Department (Milano, IT).</i>
1991 – 1999	<i>University Researcher in Condensed Matter Physics at the University of Perugia, School of Science, Physics Department (Perugia, IT).</i>
1986 – 1991	<i>Researcher at the Consiglio Nazionale delle Ricerche, Istituto di Struttura della Materia (Frascati, Roma, IT).</i>
1984 – 1986	<i>Post-doctoral fellowships at the University of Rome “La Sapienza”, working as instrument responsible of the polarized neutron diffractometer installed at the TRIGA Reactor of ENEA-Casaccia (Roma, IT).</i>

## Major career steps

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In **1984**, she began her scientific career as a researcher in **experimental condensed matter physics**. Along more than 30 years of activity, she has worked on topics ranging from electronic states and the magnetic properties of transition metals and alloys, to high frequency collective excitations and the effects of electronic shielding in molten metals and alloys, up to the more recent developments in the study of elementary excitations and atomic scale dynamics in complex and low-dimensional systems, such as protein hydration water and water confined in porosity of polymeric membranes.

Her research activity has been carried out mostly under **international collaborations** and has largely benefitted of neutron and X-ray scattering techniques available at the **major large-scale facilities** (ILL, ISIS, LLB, ESRF, Elettra, FERMI) by either gaining access as a user or managing and leading long term instrument and science projects financed under national and international research programmes. A consistent thread in her research activities has been the **design and development of beam line components and neutron spectrometers** nowadays operated at the major European facilities (PRISMA@ISIS, BRISP@ILL, IN4C@ILL), whose implementation was supported by European funding or financed within international agreements between Italian research institutions and the research centers in France, Germany, the UK and the US.

In **1999**, she was appointed national **Coordinator of the Neutron Committee** of the Italian Institute for the Physics of Matter (INFM), a 3-member policy-advising body to the President. Until 2005, she was responsible for setting up the scientific strategy of the INFM in the neutron field, which included coordination and funding of research projects for design and construction of neutron spectrometers and ancillary equipment, management of the Italian participation in the neutron sources of the Institut Laue-Langevin (Grenoble, FR) and the Laboratoire Leon Brillouin (Saclay, FR), organization of support initiatives to the neutron users community, dissemination, outreach and training initiatives. Under this role, she had the scientific responsibility of the Italian Neutron Research Group made up of 10 young researchers and technicians seconded to the OGG (Gruppo Operativo Grenoble) and working at the High Flux Reactor of the ILL. Also, she was in charge of representing Italy as a Scientific Partner to the **Steering Committee of the ILL** (2002 – 2009).

From **2009 to 2013**, as the **Director of the Physics Department** of the University of Perugia she had responsibilities for the administration, personnel, budget of the Department, the research strategy and the implementation of the science programme. This implies also fund-raising activities for projects from the public and private sector, both at national and international level, which, under her Directorship, were successfully accomplished. The Department is strongly and successfully involved in international research projects and collaborations in the fields of particle and nuclear physics (CERN), astro-particles and astrophysics (ESA, ESO, NASA), and research in condensed matter physics carried out at the major synchrotron and neutron facilities (ILL, ISIS, ESRF, EMBL).

In Jan **2014**, she took charge of the new **Department of Physics and Earth Science** of the University of Perugia as the **Director elected** with a three years mandate, with doubled personnel and budget, and a synergetic network of in-house laboratories and optimized services. Within the mandate of the new Department was also the organization of the (3+2)-years degree courses (Physics; Earth Science; Hydrocarbons) and the higher education programme of the PhD courses. Notably, the Physics curriculum of the PhD School is under the Bilateral Agreement for International Doctorate with the Niels Bohr Institute of the University of Copenhagen. The Department also takes care of organizing lectures, examinations, and training in basic Physics courses to more than 1500 students of the University of Perugia. As the Director of the Department, she has been a member of the University Senate.

In **2007**, Caterina Petrillo was appointed by the Italian Ministry of Research as the **Italian representative** in the international group **Round Table ESS-Lund**, then the delegate in the **ESS Steering Committee**, and finally the **Council** of the ESS-ERIC, a major European research infrastructure project she had been contributing since 1999 as the national coordinator of the INFM Neutron Committee. In 2015, she was elected the **Vice-Chair of the ESS-ERIC Council**, a supra-national role that she maintained until 2017. In this function, she was in charge of coordinating the Operation Working Group consisting of eight members of the Council, with the mandate of developing a model for the contributions to the operational phase of the ESS source by the ERIC member countries and potential non-members of the organization. The model was presented to the Council in June 2017.

In **2018**, she has been nominated by the Research Minister as a member of the Italian Delegation to the **European Strategy Forum on Research Infrastructures**. The experience developed within the international governing bodies of the Institut Laue-Langevin (Steering Committee) and, more recently, the ESS is an added value for her new positions as a member of the **Executive Board** of the University of Perugia and the representative of MIUR in the **Board of Directors** of the INFN, both starting in 2018.

## Research interests and major achievements

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She has always been interested to the understanding of the **electronic states** and their impact on material properties and functionalities. To achieve this goal she adopted the approach of measuring physical quantities like the ground state energy, the density and the spin-density distributions of the interacting electron system, which play a key role in many-body theories. She studied systems where the relationships between the electron ground state and the preferred magnetic state or the effect of the electronic shielding on the collective vibrational dynamics could be revealed by properly designed scattering experiments.

Particularly notable are the experimental results on the ground state electron distributions in **ordered magnetic systems**, obtained from **spin density measurements** by polarized neutron scattering, which offered a rare and important experimental reference for the validity of the functional density theory, in local spin density approximation, applied to the computation of interacting electrons ground state. Seeking for the experimental determination of the physical observables directly related to the many-body dynamic interaction between electrons, it is worth mentioning the series of **x-ray scattering experiments in alkali and simple metals** aimed at measuring the **spin-dependent electron pair correlation functions**. These experiments are described by Winfried Schülke in the book "*Electron Dynamics by Inelastic X-Ray Scattering*" (Oxford University Press, USA, 2007, Chapter 2.7, page 164) and are considered as a reference for the specific research field.

To further push the experimental study of the interacting electron gas, special emphasis was placed on the investigation of **high frequency collective excitations in molten alkali metals**, aimed at the analysis of static and dynamic "screening" phenomena of the electronic plasma, also in relation to the effective interatomic potential. This study took advantage of inelastic **neutron scattering experiments in Brillouin scattering regime**. The best examples of this experimental approach are given by the first results published in the selected papers "*Neutron investigation of collective excitations in liquid K-Cs alloys: the role of the electron density*", Physical Review Letters **85**, 5352 (2000) and "*Neutron investigation of the ion dynamics in liquid mercury: evidence for collective excitations*", Physical Review Letters **87**, 215504-1, (2001), until the more recent paper "*Collective Ion Dynamics in Liquid Zinc: Evidence for Complex Dynamics in a Non-Free-Electron Liquid Metal*", Physical Review Letters **114**, 187801 (2015).

The potential of neutron and x-ray scattering techniques has been exploited in the more recent studies of the microscopic **THz dynamics of complex, disordered and low-dimensional systems**, with special attention to the dynamics of bio-systems and the "networking properties" of protein hydration water and confined water in living cells or within polymeric membranes. [*Collective Dynamics of Protein Hydration Water by Brillouin Neutron Spectroscopy*], Journal of the American Chemical Society **131**, 4664 (2009); "*Fingerprints of amorphous icelike behavior*", Physical Review Letters **101**, 148104 (2008); "*Multiple Interacting Collective Modes and Phonon Gap in Phospholipid Membranes*", The Journal of Physical Chemistry Letters **9**, 4367 (2018)].

To optimize the experiments, special components for sample manipulation or sample containers have been designed in-house and mounted on the beam-lines at the major neutron and x-ray scattering facilities in Europe. Caterina Petrillo has specific experimental skills in scattering techniques and has constantly worked to the **development of instrumentation**, from design and construction of neutron spectrometers to prototyping and testing advanced components, such as monochromators, collimators and detectors, currently installed at the major European neutron sources.

In the nineties, her pioneering work on **solid state detectors**, based on Silicon diodes and microstrips coupled to a neutron converter to achieve high speed and high resolution performances, was carried out under one of the first European programmes to support the networks of excellence. [*Solid state neutron detectors*], Nuclear Instruments and Methods in Physics Research **A 378**, 541 (1996)]. The searching for novel neutron detector concepts has continued along the years [*Development of pulse shape analysis for noise reduction in Si-based neutron detectors*], Nuclear Instruments and Methods in Physics Research **A 910**, 184 (2018)] and it is nowadays an important issue considering the recent  $^3\text{He}$ , the typical filling gas of a neutron detector, shortage at global level.

She is co-author of more than 170 publications in international peer-reviewed journals, which have received 1665 (1981) citations altogether, corresponding to a Hirsch factor  $h=22$  (25) according to Scopus (Google Scholar), of several institutional reports and invited communications to international Conferences and Workshops. She has also contributed to several **policy documents for the European Commission** (ESFRI Roadmap and ESFRI Scripta Series <http://www.esfri.eu/esfri-scripta-series#overlay-context=>) and science policy-making authorities in Italy (Italian Roadmap of Research Infrastructures, 2010). The full list of publications, available at the institutional web-site <http://www.unipg.it/personale/caterina.petrillo>, is here reported.

## Academic Activity

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Since **1991**, as a staff member of the **University of Perugia** and the **Politecnico di Milano**, she has been regularly teaching courses of Mechanics, Thermodynamics, Electromagnetism to student classes of Engineering, Biotechnology and Earth Sciences, and courses of Spectroscopy, Solid State Physics and Many-body Physics to student classes of Physics. She has been the supervisor of many student theses, both graduate and PhD, being a member of the **PhD School of Physics** at Politecnico di Milano (from 1999 to 2002), at Perugia University (PhD School in Physics and Physical Technologies, Cycles 25, 26, 27 and 28 from the Academic Year 2009/10 up to the Academic Year 2014/2015), and currently at University of Roma 3 (PhD School in Matter, Nanotechnology and Complex Systems, Academic Year 2018/2019 - Cycle 34). Many of her former students now share responsibilities for experimental work in research institutions of France, Switzerland, Germany and the UK. As the Director of the Physics and Earth Science Department, she has been a member of the Academic Senate of the University of Perugia and she has been serving in several University Committees for supporting research and staff mobility at international level. She is presently a member of the Executive Board of the University of Perugia.

## Evaluation activity

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Caterina Petrillo has broad and in-depth experience as scientific evaluator of research projects and programs, scientific structures and laboratories, both **national and international**, matured since 1986 as a member of evaluation and selection committees. We recall the activities as evaluator of research infrastructures projects in **H2020** (mid-term reviews) and of Marie-Curie projects in **FP6** for the European Commission; of the competitive LAB-EX projects (Laboratory of Excellence) for **CNRS** (France); of scientific projects for the **Romanian Research Council** and for the **Ministry of Research of the Czech Republic**; of experimental proposals in the Scientific Review Committees of the **ESRF**, the **ILL** Colleges and the **ISIS** International Selection Panels. Recently on appointment of the German Helmholtz Association, she served on the international committees for scientific evaluation of the Deutsches Elektronen-Synchrotron **DESY** and for the scientific evaluation of R&D in the research field Matter at the **Forschungszentrum Jülich**.

She has been member of the international **Scientific Advisory Committee (SAC) of the ESRF** and of the Scientific Council of CNISM as an expert in large-scale research infrastructures. She took part in many international Search Committees for the selection at the directorship of international research institutions and bodies.

Since 2016, she has been part of the group of advisors appointed by the **European Commission** for Horizon 2020 Advisory Group for European Research Infrastructures (including e-Infrastructures) and since 2013 she is part of the **ESFRI** Physical Sciences and Engineering Expert Working Group. For her specific experience in neutron scattering, she was co-chair of the international group of experts **Neutron Landscape Group** appointed by ESFRI and Scientific Editor of the volume *Neutron scattering facilities in Europe. Present status and future perspectives*. She is a member of several international expert groups, including ESFRI Expert Group on Long Term Sustainability; ILL Associates' Working Group on Neutrons in Europe for 2025; The Expert Group on Analytical Research Infrastructures (EGARI); The Expert Working Group on Large Neutron Infrastructure of ESFRI; Comité Directeur of the Collaborating Research Group Project IN-13@ILL; Instrument Working Group for the European Spallation Source. In these roles, she contributed to the preparation of strategy and research policy papers for the EC and ESFRI and was invited to give keynote speeches at several international conferences on research infrastructures.

For **MIUR**, she carried out evaluation activities of the Scientific Culture Dissemination projects and was a member of the Selection Committee for the PRIN-2012 projects (ERC sector PE\_3).

From 2007 to 2013, on the appointment of the Minister, she represented MIUR as the Delegate to the **Program Committee Capacities-Infrastructures of the Seventh Framework Program of the European Union**, taking part in the working groups established at the Directorate for Research Internationalization of MIUR to develop the first Italian Roadmap of Research Infrastructures ([http://www.ricercainternazionale.miur.it/media/3151/roadmap\\_infrastrutture.pdf](http://www.ricercainternazionale.miur.it/media/3151/roadmap_infrastrutture.pdf)).

At regional level, she evaluated projects of industrial relevance financed by the **Umbria Region** for the development of Innovation Platforms on Energy and Special Materials.

### Review and evaluation Panels

- Member of the *International Selection Panel* of the experiment proposals for the TFXA spectrometer (ISIS, Rutherford Appleton Laboratory, U.K.), 1986-1987.
- Member of the Crystallography Committee of Consiglio Nazionale delle Ricerche, 1995.



- Member of the international Instrument Working Group for the European Spallation Source - Single Crystal Spectroscopy - Coherent Excitations, 1995-1996.
- Member of the International Selection Panel College 5B - Crystallography and Magnetic Structures of the Institut Laue-Langevin (Grenoble, France) for the evaluation of the experiment proposals, 1999 - 2002.
- Member of the Comité Directeur of the Collaborating Research Group Project IN-13 – The Biological Spectrometer@ILL, 2001 – 2004.
- Evaluator for the European Commission under Framework Programme 6 – Marie Curie Actions.
- Member of the International expert group The Expert Working Group on Large Neutron Infrastructures of the European Strategy Forum on Research Infrastructures (ESFRI – Roadmap 2006), in charge of providing ESFRI with the landscape and a first analysis of the needs for neutron sources in Europe (new sources; upgrade of the existing ones), 2005.
- Member of the Scientific Council of the National Consortium of Italian Universities for Condensed Matter (CNISM), with the role of expert of large scale facilities, 2005 - 2008.
- Member of the Scientific Review Committee “Disordered systems and Liquids” for the evaluation of the experiment proposals at the European Synchrotron Radiation Facility - ESRF (Grenoble, FR), 2006 - 2009.
- Member of the Scientific Advisory Committee of the European Synchrotron Radiation Facility – ESRF (Grenoble), 2006 – 2011.
- Evaluator for the LAB-EX (Laboratories of Excellence – CNRS, FR) call for projects, 2011
- Panelist and rapporteur for the 2012 funding call for research projects of the National Research Council of Romania, 2012.
- Member of the selection panel for Projects of Industrial Relevance of the Region Umbria in the Energy and Materials fields, set up by the regional innovation authority, 2011 – 2012.
- Reviewer of the outreach and science communication projects (CTS) funded by the Italian Ministry of Education, University and Research, 2012.
- Member of the national Selection Panel (Comitato di Selezione) of PRIN (Projects of National Relevance) projects set up by the Italian Ministry of Education, University and Research, 2013.
- Member of the ESFRI Neutron Landscape Group, 2014 — 2016.
- Member of the International expert group PSE-WG (Physical Science and Engineering Working Group) of ESFRI, in charge of providing ESFRI with the landscape and an updated analysis of the priorities in the provision of PSE European facilities, 2014 —.
- Member of the *Review panel for the scientific evaluation of R&D activities in the research field Matter at the Forschungszentrum Jülich* – DE, 2017.
- Member of the *Review panel for the scientific evaluation of R&D activities in the research field Matter at DESY* – DE, 2018.
- Member of the *W&T3 (Condensed Matter and Physical Chemistry) Expert Panel at the Research Foundation Flanders* (BE), 2019-2021

#### Advisory and Management Panels

- Scientific Secretary of the Board of the Italian Society of Neutron Spectroscopy (Società Italiana di Spettroscopia Neutronica), 1994-1997.
- Italian representative to the Steering Committee of the Institut Laue Langevin (Grenoble), 2002 - 2009.
- Italian Delegate to the FP7 Programme Committee Capacities-Infrastructures of the European Commission, nominated by the Italian Ministry of Education, University and Research, 2007 – 2013.
- Delegate of the Italian Ministry of Education, University and Research at the International Working Group Round Tables ESS-Lund, 2007 – 2009.
- Member of the Executive Board of the Project The European Spallation Neutron Source (ESS) financed by the European Commission under the FP7 Call - Capacities Infrastructures Preparatory Phase, 2008 – 2010.
- Representative of the Scientific Partner Countries of the Institut Laue Langevin (Grenoble) to the Associate Board, 2008 - 2009.
- Member of the ESFRI advisory Working Group on Neutron Sources in Europe, 2008.
- Member of the International group The Expert Group on Analytical Research Infrastructures (EGARI), in charge of advising ESFRI on needs and priorities for large-scale facilities for material analysis in Europe, 2009.
- Member of the Expert Advisory Group supporting the Directorate for International Research of the Italian Ministry of Education, University and Research for the development of research policies, since 2009.
- Italian Delegate to the Steering Committee of the European Spallation Source (ESS), nominated by the Italian Ministry of Education, University and Research, 2009.
- Member of the Working Group for the Italian Roadmap of Research Infrastructures of pan-European Level, set up by the Italian Ministry of Education, University and Research (MIUR), 2009 - 2010.

- Member of the International expert group ILL Associates' Working Group on Neutrons in Europe for 2025 with the task of proposing a 15-years strategy for neutron production in Europe, 2010 - 2011.
- Member of the 11-Member Committee for the writing of the University Statute (Commissione Statuto) of the University of Perugia, 2011.
- Italian Delegate to the Council of the European Spallation Source (ESS), 2015.
- Vice-Chair (elected) of the Council of the ESS-ERIC, 2015 – 2017.
- Member of the Horizon 2020 Advisory Group for European Research Infrastructures (including e-Infrastructures), 2016-2018
- MIUR Representative in the Board of Directors of the INFN, 2018 – 2019
- Member of the Italian Delegation to the European Strategy Forum on Research Infrastructures, nominated by the Italian Ministry of Education, University and Research, 2018 – .

## Coordination of Research Projects & Programmes

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Since 1993 she has been acting as **scientific responsible and coordinator** of projects mostly funded by the European Commission for the development of detectors and instrumentation for neutrons (FP3) up to the most recent projects on research communication (H2020).

Some specific activities have been supported by national projects funded by CNR, INFN, Elettra and MIUR.

### Responsibilities in major international projects

- Scientific Responsible of the Research Programme *Development of solid state detectors for neutrons and electronics for PSD detectors* – European Project **ENNI - European Network for Neutron Instrumentation** - (Framework Programme 3) - 1993/1996.
- National Coordinator and scientific responsible of the Research Programme *Demonstration of new Si based solid-state neutron PSDs* – European Project **XENNI - The 10-Member European Network for Neutron Instrumentation** (Framework Programme 4) – 1996/2000.
- Responsible for the bilateral research collaboration *Proposal to Demonstrate the Performance Characteristics of a Silicon/Gadolinium Detector on the LANSCE Reflectometer SPEAR* between the Italian National Institute INFN and Los Alamos National Laboratory, funded by the Department of Energy (US) under the Project **SNS (Spallation Neutron Source)** - 1999/2000.
- Technical Responsible of the Project **BRISP** – *Design and construction of the spectrometer for Brillouin scattering of thermal neutrons*, a neutron spectrometer to be installed at the High Flux Reactor of the Institut Laue-Langevin (Grenoble, FR) under the international collaboration CRG (Collaborating Research Group) between INFN (IT), Chemnitz University (DE) and ILL (FR) – 1999/2002.
- National Coordinator and scientific responsible for the Research Programme *Si Detectors and Neutron Zone Plates* - European Project **TECHNI - Technology for Neutron Instrumentation** (Framework Programme 5) – 2000/2004.
- National Coordinator and scientific responsible for the Research Programme *Si/Gd Microstrip Detectors* of **DETNI - Detectors for Neutron Instrumentation**, funded as a “*Joint Research Activities*” within the European Project NMI3 – Neutron and Muon Integrated Infrastructure Initiative (Framework Programme 6) - 2004/2007.
- Scientific Responsible and delegate of the Italian Ministry of Education, University and Research (MIUR) for the Italian participation in the *Preparatory Phase* of the European Project **The European Spallation Neutron Source (ESS)** (Framework Programme 7) – 2008/2010.
- Responsible for the characterization program of fuel cell materials @ the MCLab (*Material Characterization Laboratory*) of the Physics Department of the University of Perugia – European Project **H2FC - Integrating European Infrastructure to support science and development of Hydrogen and Fuel Cell Technologies towards European Strategy for Sustainable, Competitive and Secure Energy** (Framework Programme 7) – 2011/2013.
- Person in charge of the proposal **SHARPER** - SHAring Researchers' Passion for Excellence and Results. European Researchers' Night in the Centre of Italy 2014 – 2015. Call H2020-MSCA-NIGHT-2014 Topic: MSCA-NIGHT-2014 - Proposal number SEP-210142337 (H2020)
- Person in charge of the proposal **SHARPER** - SHAring Researchers' Passion for Engagement and Responsibility. Call H2020-MSCA-NIGHT-2016 Topic: MSCA-NIGHT-2016 Proposal number 722981 (H2020)

### Participation in major international projects as a contributing member of Working Groups

- Strategic Project *Neutron Spectrometer PRISMA*, funded by the Italian National Research Council (CNR), for the design and construction of the neutron instrument PRISMA to be installed at the Spallation Neutron Source ISIS (Rutherford Appleton Laboratory, UK) – Responsible Prof. Francesco Sacchetti, 1985-1986.

- International Project Group for the *Development of the Spallation Neutron Source ISIS*, 1986-1987.
- *The Focusing Monochromator Project for IN4C*, funded by the Italian National Research Council (CNR), for the design and construction of a focusing crystal monochromator for the spectrometer IN4C installed at the High Flux Reactor of the Institut Laue-Langevin (Grenoble, FR) – Responsible Prof. Francesco Sacchetti, 1990-1992.
- Bilateral Project MURST/British Council: *Design of an Improved PRISMA Spectrometer*, 1991-1993.
- *Neutron Spectrometer Project TOSCA*, funded by the Italian National Research Council (CNR), for the design and construction of the neutron spectrometer TOSCA to be installed at the pulsed neutron source ISIS (UK) – Responsible Dr. Marco Zoppi, 1996-1999.
- EU Project *Optimisation of Cold Neutron Beams for Single Crystal Spectroscopy*, 1998-2001.
- EU Project *NMI3-Integrated Infrastructure Initiative for Neutron Scattering and Muon Spectroscopy (NMI3)*, working group on Neutron Optics, development of zone plates for cold neutrons, 2008-2011.

#### Responsibility and participation in major nationally funded projects

- “Studio di fattibilità e progettazione di una linea di test per esperienze con fascio continuo di neutroni termici presso il linac del progetto SPES dell’INFN”, (*Feasibility study and preliminary design of a neutron test beamline at the linac accelerator of the SPES project*), INFN-Laboratori Nazionali di Legnaro, 1999-2001.
- *UMBRA - Understanding MgB2: Research and Applications*, Progetto di Ricerca Avanzato INFN – Advanced Research Project funded by INFN, the Italian National Institute for the Physics of Matter, 2002-2003.
- *“Perovskiti Funzionali: Sintesi, Proprietà Magnetiche e di Trasporto Elettronico e Ionico”*, (Functional Perovskites: synthesis, magnetic properties, electronic and ionic transport) COFIN 2004, funded by the Italian Ministry of Education, University and Research, 2005-2006.
- *Dynamics and Relaxation in Liquid Metals and in Proton-Exchange Membranes (PEM): Neutron Scattering Investigation*, COFIN 2005, funded by the Italian Ministry of Education, University and Research, 2006-2007.
- *Scientific data & computing for the European Spallation Source ESS and the Free Electron Laser FERMI (CarESS)*, Elettra-INFN-Università di Perugia (2017-2020).