Marina Putti

Full professor

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Education and training

1986
Degree in Physics
Transport properties of a two-dimensional electronic gas and effects due to the two-dimensional gas three-dimensional gas interface - 110/110 e lode
University of Florence - Firenze - IT

1990
PhD in Physics
Specific heat and thermal diffusivity in the new high temperature superconductors.
University of Genova - Genova - IT

Academic experience

2019 - ONGOING
Full Professor
University of Genova - Genova - IT

2003 - 2019
Associate Professor
University of Genova - Genova - IT

1992 - 2002
Reasearcher
University of Genova - Genova - IT

1990 - 1991
Post-doctoral fellow
National Institute of Matter Physics - Genova - IT

Teaching activity
The teaching activity has been carried out with continuity since 1993, at the beginning with the role of support of Laboratory and General Physics courses and since 1997 with the role of teacher.
In particular, I have been mainly involved in the Bachelor degrees in Material Science for which I taught the following courses: Physics Laboratory, Electromagnetisms in materials, Solid State Physics, Material Physics. I have been involved in the Bachelor degrees in Chemistry, Informatics and Engineering, teaching Laboratory and General Physics courses. Actually, I teach General Physics to Engineering, Electromagnetism to Materials Science and Superconductivity to the Physics Master's degree.

Postgraduate research and teaching activity

Supervision of students, residents and post-doctoral fellows

Supervisor of 30 degree thesis (20 Master and 10 Bachelor degrees)
Supervisor of 16 PhD thesis.
Responsible for 13 research fellowships

Committees membership

Since 2007, member of the evaluation board of the Bachelor degree
2003-2014, member of the Ph.D. School of Science and Technology of Materials at University of Genova.
Since 2014, member of Ph.D. School of Science and Technology of Chemistry of Materials.
Since 2016, responsible for the Curriculum of Science and Technology of Materials.
Since 2019 member of the PhD in Physics and Nanosciences and head of the Curriculum in Applied Superconductivity;
From 2020 Chairman of the Bachelor of Physics Degree Committee.
From 2020 Chairman of the Department Research Commission

Research interests

The beginning of my PhD coincided with the discovery of high-temperature superconductors (HTS). My group, that boasted long experience in the field of conventional superconductivity, was involved in their investigation since the beginning and I had the task of studying the thermal properties of the HTS. The experimental apparatus developed during my PhD thesis and the research started in those years, in the following earned me international collaborations and application-oriented contracts.
Since 1993 I directed my interest to the experimental study of thermoelectric properties such as Seebeck effect and Nernst effect. New experimental apparatuses were appositely developed which allowed a complete characterization of transport properties (resistivity, Hall effect, Seebeck effect and Nernst effect) as a function of temperature, magnetic field amplitude and orientation. The investigation of transport properties started in those years, continues still today and is recognized as excellent at international level.
Since 1996, I became responsible of the laboratory for the measurements of thermal and electrical transport properties and part of my activity was devoted to the characterization and study of new materials (Borocarbides, artificial multilayers). The most important results which I achieved were on the study of thermal fluctuations of HTS and in particular, the observation of the crossover between Aslamazov-Larkin and short wave length regime. I would also mention the study of charge transfer mechanisms in the HTS performed by the investigation of the Seebeck coefficient.

The discovery of superconductivity in magnesium diboride in 2001 marked a turning point in my career. I had the opportunity to coordinate several activities including the production of MgB2 samples pure and substituted (Prof. A.Palenzona and Prof. P. Manfrinetti of the Department of Chemistry and Industrial Chemistry), irradiation of such samples at international facilities (LENA-University of Pavia, PSI-Zurich), characterization and study of the physical properties of the samples (electrical, magnetic and thermal, critical fields, critical current). Since 2004, I was the Principal investigator (PI) of two successive PRIN projects. PRIN2004 was devoted to the investigation of two-gap superconductivity which is a peculiar of characteristic of MgB2 which strongly affect all the superconducting properties. We succeeded in tuning the two-gap behaviours by introducing disorder with irradiation and chemical substitution and we had the direct observation of the merging of the energy gaps in neutron irradiated MgB2 samples. PRIN2006 was still dedicated to the study of multi-band superconductivity in the MgB2 and we looked for similar characteristics in other kind of superconductors, such as A15 materials. The scientific importance of my research activity on MgB2 is reflected by the many publications in international journals (65 on this subject with more than 1300 citations) and the invited talks at international conferences (7) among which, the invitation at the March 2006 Meeting of the American Physical Society and, more recently, the plenary talk at EUCAS 2015.
Since 2007, I was called to manage the development of MgB2 wires. I have been the local leader of a FP6 European project (HIPERMAG) and scientific responsible for the contract with the company Columbus-Superconductors which manufactures MgB2 conductors.
The MgB2 activities have led to a number of international collaborations mainly in the US. I have been PI of an Italian-US bilateral project of particular significance funded by MAE (2008-2011). In order to further develop a common research on MgB2, I was invited to spend a year at the Applied Superconductivity Center in Tallahassee at the National High Magnetic Field Laboratory of the Florida State University (FSU) (August 2008-July 2009).
During my stay at FSU, iron based superconductors (IBS) were discovered (2008). Being in a hot spot in this field, gave me the opportunity of managing high quality samples and facilities and carrying on scientific exchanges: Once back in Italy I had the occasion of promoting research on IBS. Since 2008 I have been the national coordinator of two PRIN projects (PRIN2008 and PRIN2012) dedicated to fundamental studies on these compounds. Both projects have gathered the main Italian groups working in the field of superconductivity (Università di Parma, Pavia, Cagliari, l'Aquila, Roma la Sapienza, Politecnico di Torino). PRIN2008 was devoted to the investigation of proximity between magnetisms and superconductivity in IBS. It started soon after the discovery of IBS and acted as a seed to tighten the Italian network on IBS. PRIN2012 was devoted to the study of the role of disorder in tuning the superconducting/magnetic properties of IBS: it has worked to consolidate the Italian Superconductivity Network, which is today at the forefront in this field.
In 2010 I coordinated the European consortium of FP7 program coordinated

with Japan. The project SUPER-IRON devoted to explore the potential of IBS for application was ranked first in Europe. The project was characterized by the opening and strengthening of important collaborations with European partners and Japanese groups.
I am currently considered worldwide one of the leading experts on novel superconducting materials and their potential for application. As such, I have been invited to give talks, and plenary lectures at major international conferences in the field and to coordinate national and international projects. Recently, I have been involved by CERN for coordinating a collaboration project between CNR-SPIN and CERN devoted to Explore High Performing Superconducting Conductors for FCC, which includes research on MgB2, HTS (Bi-2212) and IBS. This project has started in June 2017.

Grants

2004 - 2006
Two-gap superconductivity in MgB2 role of disorder
MIUR - IT
330.000 - Pricipal investigator

2007 - 2009
Multi-band superconductivity MgB2 and beyond
MIUR - IT
232.800 - Pricipal investigator

2010 - 2012
High Tc superconductivity in Fe-based superconductors a new challenge for research
MIUR - IT
200.000 - Pricipal investigator

2008 - 2010
MgB2 from microscopic mechanisms to large scale applications
MAECI - IT
200.000 - Pricipal investigator

2011 - 2015
SUPER-IRON 'Exploring the potential of Iron-based Superconductors'
European Commission - BE
2.373.000 - Pricipal investigator

2014 - 2017
RIDEIRON Using controlled disorder to investigate the mechanisms of iron based superconductors
MIUR - IT
406.668 - Pricipal investigator

2017 - 2019

High performing superconducting materialsconductors for CERN-FCC

CERN - CH

400.000 - Pricipal investigator

2019 - 2023

HIBiSCUS “High performance-low cost Iron BaSed Coated condUctorS for high field magnets”

MUR - IT

949.866 - Pricipal investigator

2022 - 2025

IRIS - Innovative Research Infrastructure on applied Superconductivity

PNRR Infrastrutture di Ricerca - IT

1.900.000 – UniGe coordinator

Editorial activity

Member of the Advisory Board of Superconductor Science and Technology (2010-2014).
Since 2015 Member of the Executive Board of Superconductor Science and Technology.
Referee of international journals: Nature group: Nature, Scientific Reports; Physical Review: B, X, Letters; Superconducting Science and Technology; Applied Physics Letters.

Assigments abroad

2008-2009: Visiting Professor at the Florida State University
Since 2017 an elected member of the European Society for Applied Superconductivity (ESAS).

Publication

259 publications on international Juornals;
5,953 citations;
Hirsh-Index 38.