



Marina Putti

Full professor

✉ putti@fisica.unige.it

☎ +39 010 3536383

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

2003 - ONGOING

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. More recently, I have been involved in the Bachelor degrees in Chemistry, Informatics and Engineering, teaching Laboratory and General Physics courses. I have been also involved as teacher in the course of Superconductivity for the Master degree in Physics.

Postgraduate research and teaching activity

Supervision of PhD students, residents and post-doctoral fellows

Supervisor of 27 degree thesis (18 Master and 10 Bachelor degrees) and 12 PhD thesis.

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.

PhD committees membership

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.

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 characteristic of MgB₂ which strongly affects 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 T_c 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 - ONGOING

**High performing superconducting materialsconductors
for CERN-FCC**

CERN - CH

400.000 - Pricipal investigator

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