



## Flavio Gatti

Associate professor

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### *Education and training*

2002

#### **Physics PhD**

Rivelatori criogenici per spettroscopia nucleare  
MIUR - Genova - IT

1988

#### **Physics Degree**

Università di Genova - Genova - IT

### *Academic experience*

2001 - ONGOING

#### **Professore Associato SSD FIS-01 SC 02-A1.**

Università di Genova - Genova - IT

1993 - 2001

#### **Ricercatore SSD FIS-01 SC 02-A1.**

Università di Genova - Genova - IT

### *Work experience*

2002 - 2003

#### **Infrared bolometer specialist**

ERG - Genova - IT

Development of devices for sensitive Infrared detection

### *Language skills*

#### **English**

Independent

#### **French**

Independent

### *Teaching activity*

He has carried out teaching activities in several basic physics courses mainly with laboratory works both in the degree course in Physics, and in Environmental Sciences, Materials Science, Civil Engineering and Chemistry and Chemical Technologies.

In the courses outside the Physics one he devoted himself to the assistance

(General Physics exercises) until 2001. Subsequently he conducted the entire courses as lecturer and in laboratory, if included.

In the Physics courses he carried out the general courses of laboratory of the first (Mechanics), second (Analogic and Digital Electronics) and third year (Analysis of signals, Sampling and Control) of the three-year degree, as well as the specialized courses of Nuclear Physics Laboratory and Particles (Laboratory works of nuclear and particle physics with demonstrative experiment at the Accelerator in Frascati), Laboratory of Advanced Thermodynamics (Vacuum, Cryogenic, Superfluidity, Superconductivity, Cryogenic devices with quantum effects), Superior Physics (VO), Astroparticle Physics (NO). Recently he has introduced and coordinated a course in Physics and Space Technology with contributions from Space Industry experts and astrophysicists of the INAF.

## ***Postgraduate research and teaching activity***

### **Supervision of PhD students, residents and post-doctoral fellows**

He has been a supervisor of 13 doctoral theses with themes in the field of ongoing projects. Among these ones, 7 are employed as researchers/faculty at: MANA (Jp)-PSI (CH), Heidelberg (D), IIT, INFN-LNGS, SRON (NL), Berkely-Princeton (USA), INFN-Ge. Five others are employed in the Industry and one is an AdR.

He has been the supervisor of about 10 AdR, some of whom for several years

### **PhD committees membership**

Member of the scientific panel of the Ph.D. in Physics from 2005 to 2009 (cycles XXI-XXV)

Member of the scientific panel of the Ph.D. in Nanotechnology from 2009 to 2013 (cycles XXV-XXVIII)

## ***Research interests***

The researches are focused on the experimental investigation of fundamental properties and interactions of some particles, carried out both with traditional methods, at particle accelerators and with nuclear decays in laboratories, and with astrophysics and cosmology methodologies. In particular, most of the researches focused on the mass properties of neutrinos, the violation of the leptonic flavor in the so-called 'neutrino oscillations', and their impact in astrophysics and cosmology: the universe large-scale structure, dark matter, background of cosmological neutrinos and the intense sources of such particles. For some of these researches he has developed, among other instruments, new superconducting cryogenic detectors customized to high precision measurements. The main projects implemented and/or in progress are hereby listed.

Neutrino physics: beta decay and neutrino mass (MANU and MARE projects of INFN, ERCC's HOLMES) and solar neutrinos (BOREXino project at Gran

Sasso).

Leptonic flavor physics: Lepton Flavor Violating Decay of the Muon (MEG project at PSI-CH).

X-ray astrophysics: interstellar and intergalactic medium and dark matter (ATHENA ESA-ASI project).

Cosmology: LSPE project for the microwave background polarization (ASI-INFN).

Detectors: Micro-calorimeters and Cryogen TES bolometers, THz detector for internal security, SIS junctions and SQUIDS electronics, single-photon superconducting detectors. Micro-manufacturing: all thin-film and micro-processed devices. Low temperature physics and technology: refrigerators and sub-K measurements, superconducting materials at low and ultra low temperature (Ir, W, Re, MgB<sub>2</sub> ...).

Electronic SQUID, electronic front-end analogue with very low noise, Electronics for data acquisition (VME / PXI) for high energy resolution (4eV FWHM @ 6KeV) and high resolution resolutions (30 ps rms), processing of digital signals from detectors.

## **Grants**

**2016 - ONGOING**

### **Progetto Premiale ASI-INFN Future TES detector for balloon born CMB polarization experiment**

MIUR - IT

1 M E. - Principal investigator

**2015 - ONGOING**

### **Optimization of a European Transition Edge Sensor Array**

ESA - NL

0.1 M E. - Participant

WP Leader on TES cryogenic anti-coincidence for space missions.

**2015 - ONGOING**

### **AHEAD Advanced High Energy Astrophysics Detectors**

EU H2020 - BE

0.16 M E. - Participant

WP Leader for Detector Design and Fabrication of a TES cryogenic Anticoincidence detector for a space X-ray space observatory

**2014 - 2017**

### **Progetto Premiale 2012 - ASI-INAFF**

MIUR - IT

0.3 M E. - Participant

Project Leader of Detector Design and Fabrication TES detector for ATHENA X-ray space observatory.

**2014 - ONGOING**

## **LSPE**

INFN - IT

0.3 M E. - Pricipal investigator

Bolometric Instruments for stratospheric ballon borne telescope for CMB.

## **2014 - ONGOING**

### **HOLMES**

ERC - BE

1.2 M E. - Participant

Project Leader of Ho-163 production, purification-implanting and detector fabrication

## **2007 - 2014**

### **MARE**

INFN - IT

0.4 M E. - Pricipal investigator

Neutrino mass measurement with cryogenic microcalorimeter with isotope 187-Re.

## **2010 - 2013**

### **Sviluppi nel millimetrico**

ASI - IT

0.3 M E. - Participant

Project leader for Design and Fabrication of the cryogenic Large Area TES Spider Bolometer.

## **2007 - 2011**

### **TERAEYE**

EU-FP6 - BE

0.7 M E. - Pricipal investigator

Development of cryogenic camera with Quantum-dot at 1K for passive and spectroscopic detection of THz for Homeland Security

## **2005 - 2006**

### **PRIN - Thermal Detectors for application to fundamental physics and material science**

MIUR - IT

0.3 M E. - Pricipal investigator

## ***Editorial activity***

F. GATTI: Elsevier Editor of the Procceing of the Low Temperature Detector Conferenze with peer review selection of papers; NIMA vol. 520, p. 1-685, ELSEVIER, doi: 10.1016/j.nima2003.11.203

Contributions in Books:

A. ANSALDO, D. RICCI, F. GATTI, E. DI ZITTI, S. CINCOTTI (2005). Investigating Schottky Barrier Effects in Carbon nanotube Field Effect Transistors. In: H. KUZMANY; J. FINK; M. MEHRING; S. ROTH EDS.. ELECTRONIC PROPERTIES OF

NOVEL NANOSTRUCTURES. vol. 786, p. 570-573, NEW YORK:American Institute of Physics, ISBN: 9780735402751, doi: 10.1063/1.2103933

DI PASQUALE M., REPETTO P., GATTI F., RICCI D., DI ZITTI E. (2004). Fabrication of Field Effect Transistors based on carbon nanotubes made by LASER ablation. In: H. KUZMANY; J. FINK; M. MEHRING; S. ROTH EDS.. XIX Euroconference on Electronic Properties of Novel Materials. vol. 723 (1), p. 570-573, New York:AIP , doi: 10.1063/1.2103933

R.CRISTIANO, PAGANO, F.GATTI, Applied Superconductivity : Handbook on Devices and Applications- Superconducting Radiation and Particle Detectors (pages 843–948)2015 | book-chapter