



Federica Mantegazzini

Curriculum Vitae

General Information

Name Federica Mantegazzini
Address Fondazione Bruno Kessler (FBK), Via Sommarive 18, 38123 Trento, Italy
E-mail fmantegazzini@fbk.eu
Nationality Italian

Education

- 2016–2021 **PhD in Physics, Heidelberg University (Germany)**
Dissertation: "Development and characterisation of cryogenic high-resolution microcalorimeters for the ECHo neutrino mass experiment"
Final grade: *Summa cum laude* (with highest distinction)
- 2009–2015 **Bachelor's & Master's degrees in Physics, University of Milano-Bicocca (Italy) and CERN (Switzerland)**
Master's Degree Program in Physics at the University of Milano-Bicocca with a curriculum in the field of particle physics.
Final grade: 110/110 *cum laude* (with distinction)
- 2004–2009 **High School, Liceo Classico S. Quasimodo (Italy)**
Final grade: 100/100

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Research Activity

- Mar 2022 – **Research Scientist**, *FBK-SD-MST Bruno Kessler Foundation, Sensors & Devices Center, MST Unit*
now
◇ Development and microfabrication of superconducting quantum sensors and devices, including Josephson junctions, Superconducting Quantum Interference Devices (SQUIDs), traveling wave parametric amplifiers (TWPAs), Josephson parametric amplifiers (JPAs), microbolometers, superconducting qubits
◇ Room temperature and cryogenic characterisation of superconducting quantum sensors devices
◇ Integration of quantum sensors and read-out
- Jul 2021– **Postdoctoral Researcher**, *Kirchhoff-Institute for Physics, Heidelberg University*
Mar 2022
◇ Development, optimisation and fabrication of cryogenic microcalorimeters and superconducting quantum devices
◇ Cryogenic measurements with dilution refrigerators for the characterisation and operation of superconducting quantum devices
- Oct 2016 – **Doctoral Researcher**, *Kirchhoff-Institute for Physics, Heidelberg University*
Jul 2021
Development, optimisation and characterisation of high-resolution magnetic microcalorimeters (MMCs) with embedded ^{163}Ho , operated at cryogenic temperatures and read out by dc SQUIDs for the ECHo experiment, for the determination of the effective electron neutrino mass.
- Apr 2016 – **Research Internship**, *Kirchhoff-Institute for Physics, Heidelberg University*
Oct 2016
Test measurements, characterisation and operation of Superconducting Quantum Interference Devices (SQUIDs).
- 2015 – 2016 **Member of the CMS collaboration**, *CERN - Geneva*
Calibration of the electromagnetic calorimeter ECAL, in preparation for the restart of the accelerator LHC.

Projects and Collaborations

- 2022 – now **PNRR - National Quantum Science and Technology Institute (NQSTI)**,
Role: Development and prototyping of integrated superconducting quantum devices, e.g. integrated superconducting qubits with TWPA multiplexed dispersive readout
- 2022 – now **JUVENTUS (Josephson jUncTions with VERTical process for TUnable reSonators)**, Role: Development of new fabrication technologies for Josephson junctions; fabrication and characterisation of flux-pumped Josephson Parametric Amplifiers (JPAs)
- 2022 – now **DARTWARS (Detector Array Readout with Traveling Wave AmplifierS)**,
Role: Fabrication and characterisation of Traveling Wave Parametric Amplifiers (TWPAs) for quantum-limited read-out of superconducting detectors and qubit
- 2022 – now **Qub-IT (Quantum Sensing With Superconducting Qubits For Fundamental Physics)**, Role: Development of single superconducting circuit components (Josephson Junctions, resonators, etc.), Josephson Parametric Amplifiers (JPAs) and superconducting qubits

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2016 – 2022 **ECHo (Electron Capture in Ho-163)**, Role: Development and characterisation of high-resolution magnetic microcalorimeters with embedded ^{163}Ho for the determination of the neutrino mass; Integration of detectors and dc-SQUID-based read-out systems for the measurement campaigns

Conferences (selection)

- 2021, July **LTD-19**, *International Workshop on Low Temperature Detectors*, Contribution: talk
- 2020, June **Neutrino 2020**, *International Conference on Neutrino Physics and Astrophysics*, Contribution: poster
- 2020, Feb **Workshop: Determination of the absolute electron (anti-)neutrino mass**, Contribution: talk
- 2019, July **LTD-18**, *International Workshop on Low Temperature Detectors*, Contributions: talk and poster
- 2018, June **Neutrino 2018**, *International Conference on Neutrino Physics and Astrophysics*, Contribution: poster
- 2018, March **Workshop: Determination of the absolute electron (anti-)neutrino mass**, Contribution: poster

Schools

- 2019 **Cryocourse**, *Košice (Slovakia)*
- 2017-2018 **Heidelberg Physics Graduate Days**, *Heidelberg (Germany)*
- 2017 **Pontecorvo Neutrino Physics School**, *Prague (Czech Republic)*
- 2015 **CMS Data Analysis School**, *Bari (Italy)*
- 2008 **Summer School of Politecnico di Milano**, *Milano (Italy)*

Publications (selection)

- A. Giachero, F. Mantegazzini et al., *High kinetic inductance NbTiN film for quantum limited traveling wave parametric amplifiers*, (in preparation, invited publication on *Materials for Quantum Technology*)
- F. Mantegazzini, N. Kovac et al., *Development and characterisation of high-resolution microcalorimeter detectors for the ECHo-100k experiment*, submitted to *NIM A*
- C. Guarcello et al. (The DARTWARS Collaboration), *Modeling of Josephson Traveling Wave Parametric Amplifiers*, *IEEE Transactions on Applied Superconductivity* (2022)

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- V. Granata et al. (The DARTWARS Collaboration), *Characterization of Traveling-Wave Josephson Parametric Amplifiers at $T=0.3$ K*, IEEE Transactions on Applied Superconductivity (2022)
- M. Borghesi et al. (The DARTWARS Collaboration), *Progress in the development of a KITWPA for the DARTWARS project*, NIM A 167745 (2022)
- F. Mantegazzini et al., *Metallic magnetic calorimeter arrays for the first phase of the ECHo experiment*, NIM A 1030, 166406 (2022)
- F. Mantegazzini, *Development and characterisation of high-resolution metallic magnetic calorimeter arrays for the ECHo neutrino mass experiment*, PhD diss., Heidelberg University (2021)
- F. Mantegazzini et al., *Multichannel read-out for arrays of metallic magnetic calorimeters*, JINST 16, 08, P08003 (2021)
- C. Velte et al., *High-resolution and low background ^{163}Ho spectrum: interpretation of the resonance tails*, Eur. Phys. J. C, 79:1026 (2019)
- L. Gastaldo et al., *The Electron Capture in Ho-163 Experiment - ECHo*, EPJ ST 226 (2017)

Expertise

- Development of superconducting quantum devices: microbolometers, Josephson Junctions, Superconducting Quantum Interference Devices (SQUIDs),
- Design and simulation of superconducting circuit components,
- Optical microlithography and deposition techniques for microfabrication of superconducting quantum devices,
- Integration of superconducting quantum sensors and read-out (e.g. multiplexing read-out for microcalorimeters),
- Design and optimisation of cryogenic set-ups for the operation of superconducting quantum devices,
- Operation and customisation of dilution refrigerators for device characterisation at millikelvin temperature.

Languages

Italian Native
English Fluent
German Basic

Digital skills

Programming: Python, C, C++
 Data analysis: Root CERN, Python
 Design tools: Virtuoso Cadence, EAGLE, Tanner Tools
 Simulations: Sonnet

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PERSONAL INFORMATION

Gloria Gottardi



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☎ +39 0461314475

✉ ggottard@fbk.eu

🌐 State personal website(s)

Sex Female | Date of birth 03/03/1975 | Nationality Italian

Enterprise***	University	EPR
<input type="checkbox"/> Management Level	<input type="checkbox"/> Full professor	<input type="checkbox"/> Research Director and 1st level Technologist / First Researcher and 2nd level Technologist
<input checked="" type="checkbox"/> Mid-Management Level	<input type="checkbox"/> Associate Professor	<input type="checkbox"/> Level III Researcher and Technologist
<input type="checkbox"/> Employee / worker level	<input type="checkbox"/> Researcher and Technologist of IV, V, VI and VII level / Technical collaborator	<input type="checkbox"/> Researcher and Technologist of IV, V, VI and VII level / Technical collaborator

***in accordance with the call, the criteria for the admissibility of expenses are provided for by DPR No. 22/2018. With reference to personnel expenses, the DPR provides that, if the beneficiary is not included in the University category or in the EPR category, it is always included in the Business category, regardless of the legal nature and even if it is not a company.

WORK EXPERIENCE

June 2021 - present

Senior Researcher

Centre on Sustainable Energy, Fondazione Bruno Kessler – Trento, Italy

- Development of innovative nano-structured thin films materials and surface treatments by low pressure plasma processes (PVD, PECVD) and Atomic Layer Deposition (ALD)
- Chemical-physical characterization of materials by various analytical techniques (XPS, FTIR and UV-visible spectroscopy; electrical and mechanical testing)

Materials for energy related applications

January 2001 – June 2021

Researcher

Centre Materials and Microsystems, Fondazione Bruno Kessler – Trento, Italy

- Development of innovative nano-structured thin films materials and surface treatments by low pressure plasma processes (PVD, PECVD) and Atomic Layer Deposition (ALD)
- Chemical-physical characterization of materials by various analytical techniques (XPS, FTIR and UV-visible spectroscopy; electrical and mechanical testing)

TCOs, protective coatings, barrier and functional coatings, high-k oxides, carbon-based materials, graphene, polymeric biomaterials

June 2005 – December 2005

Postdoctoral researcher associate

Chemistry Department, Rutgers University – New Jersey, U.S.A.

- Development of oxide based thin films by Atomic Layer Deposition (ALD)
- Chemical-physical characterization of materials by various analytical techniques (XPS, MEIS, ...)

High-k oxides for electronic materials

EDUCATION AND TRAINING

1995-2000 **Master's Degree in Physics**
University of Trento, Italy
▪ Development and chemical-physical characterization of polymeric materials for biomedical applications

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s) English, proficiency level C2

Digital skills Microsoft Office Tools, Origin, Casa XPS

Job-related skills Laboratory management, experimental approach, project management

ADDITIONAL INFORMATION

Projects FET-Graphene Flagship - Core 1&2 projects (ID: 649953 and 785219, FBK partner, funding 362.591€) for the development of materials for hydrogen storage),

DIGESPO (micro Combined Heat and Power Innovative compact devices for residential and commercial buildings, ID: 241267, global funding 3.278.174 €)

EDEN (High energy density Mg-Based metal hydrides storage system, H2020-FCH JU1, ID 303472, FBK 260,900 €).

Publications Hybrid graphene-based materials and its catalytic activity toward hydrogen sorption
Ullah, Hafeez; Laidani, N.; Bartali, R.; Micheli, V.; Safeen, Kashif; Gottardi, G.; Rossi, F.; Liu, Wei;
Ullah, Saeed
Diamond and Related Materials, 2022, 121, 108766

Atomic layer deposition of palladium coated TiO₂/Si nanopillars: ToF-SIMS, AES and XPS
characterization study
Iatsunskyi, I.; Gottardi, G.; Micheli, V.; Canteri, R.; Coy, E.; Bechelany, M.
Applied Surface Science, 2021, 542, 148603

Defects and doping effects in TiO₂ and ZnO thin films of transparent and conductive oxides
Laidani, N.; Gottardi, G.; Bartali, R.; Micheli, V.; Brusa, R. S.; Mariazzi, S.; Raveli, L.; Luciu, I.;
Safeen, K.; Egger, W.
Handbook of Modern Coating Technologies: Applications and Development, 2021, 509-554

Porous Silicon-Zinc Oxide Nanocomposites Prepared by Atomic Layer Deposition for Biophotonic
Applications
Pavlenko, Mykola; Myndrul, Valerii; Gottardi, Gloria; Coy, Emerson; Jancelewicz, Mariusz;
Iatsunskyi, Igor
Materials, 2020, 13(8), 1987

Graphene oxide/reduced graphene oxide films as protective barriers on lead against differential
aeration corrosion induced by water drops

Bartali, Ruben; Gaixia, Zhang; Tong, Xin; Speranza, Giorgio; Micheli, Victor; Gottardi, Gloria; Fedrizzi, Michele; Pierini, Filippo; Sun, Shuhui; Bensaada Laidani, Nadhira; Tavares, Ana C
Nanoscale Advances, 2020, 2(11), pp. 5412–5420

Graphene films decorated with TiO₂ grown by atomic layer deposition: Characterization and photocatalytic activity study under UV–visible light
Marchetti, F., Laidani, N., Scarpa, M., Gottardi, G., Moser, E.
Applied Surface Science, 2019, 470, pp. 484–495

Synthesis of Nb-doped TiO₂ films on rigid and flexible substrates at low temperature
Safeen, Kashif; Micheli, V.; Bartali, R.; Gottardi, G.; Safeen, Akif; Ullah, Hafeez; Laidani, N.
Modern Physics Letters B, 2019, 33(26), 1950313

Decoration of graphite nanoplatelets with Nb₂O₅ deposited by radio frequency sputtering
Ullah, Hafeez; Laidani, N.; Micheli, V.; Safeen, Kashif; Gottardi, G.; Rossi, F.; Iacob, Erica; Bartali, R.
Diamond and Related Materials, 2018, 89, pp. 206–217

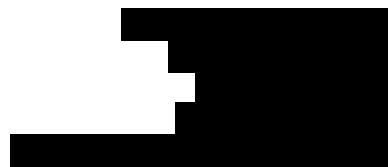
Efficient hydrogen generation from water using nanocomposite flakes based on graphene and magnesium
Bartali, R.; Speranza, G.; Aguey-Zinsou, K. F.; Testi, M.; Micheli, V.; Canteri, R.; Fedrizzi, M.; Gottardi, G.; Cosser, G.; Crema, L.; Pucker, G.; Setijadi, E.; Laidani, N.
Sustainable Energy and Fuels, 2018, 2(11), pp. 2516–2525

Influence of intrinsic defects on the electrical and optical properties of TiO₂:Nb films sputtered at room temperature
Safeen, Kashif; Micheli, Victor; Bartali, Ruben; Gottardi, Gloria; Safeen, Akif; Ullah, Hafeez; Bensaada Laidani, Nadhira
Thin Solid Films, 2018, 645, pp. 173–179

Trento, May 30th, 2023

Laura Parellada Monreal

Curriculum Vitae



Personal information

Birth



Nationality



Education

- Nov. 2015 - March 2019 **Ph.D. in Applied Engineering,**
University of Navarra, San Sebastián - Donostia, Spain,
Laser-nanostructured metal oxide semiconductors for conductometric gas sensors.
Distinction: International Cum Laude
Under the supervision of Dra. Gemma G^a. Mandayo and Dra. Irene Castro Hurtado
- Sept. 2014 - July 2015 **International MSc of Nanosciences & Nanotechnologies:**
MSc 2 Nanophysics and Nanostructures,
Joseph Fourier University, Grenoble, France.
- Sept. 2008 - June 2013 **BSc in Physics,**
University of Barcelona (UB), Barcelona, Spain.
- Sept. 2006 - June 2009 **Grade in Viola,**
Conservatori Municipal de música de Barcelona, Spain.

Professional experience

- Sept. 2020 - Present **Researcher,**
Fondazione Bruno Kessler, Trento, Italy.
Main tasks:
 - Fabrication process and technology development of Silicon Photomultipliers.
 - TCAD process simulation.
- Dec. - June 2020 **Postdoctoral researcher,**
Cirimat, Toulouse, France.
Main tasks:
 - RF magnetron sputtering of metal oxide thin films.
 - Electrical and microstructural material characterization.
 - Study the performance of silicon microsensors platforms for NO₂ detection.
 - Analysis, interpretation and presentation of results.
 - Ph.D. supervision.
- Nov. 2015 - March 2019 **Predoctoral researcher,**
Ceit-IK4, San Sebastián - Donostia, Spain.
Main tasks:
 - Cleanroom microfabrication of gas sensing devices using photolithography and sputtering of metal oxide thin films (mainly ZnO and WO₃).

- Nanostructuration of metal oxide thin films by nano- and femtosecond laser systems.
- Nanostructures characterization compared to thin film.
- Gas sensing experiments: acquisition of the sensor conductance as a function of target gas concentration in controlled atmospheres.
- 2D heat transfer equation simulation using Matlab.
- Implementation and validation of the sensor devices into a wireless electronic platform able to operate in a real environment.
- Communication of the results in international conferences and peer-review journals.

March - July 2015

MSc Thesis,

Alternative Energies and Atomic Energy Commission, Institute for Nanoscience and Cryogenics & European Synchrotron Radiation Facility CGR/IF BM32, Grenoble, France.

GISAXS analysis of platinum nanoparticles grown on graphene/Ir(111)

Under the supervision of Dr. Gilles Renaud

Main tasks:

- GISAXS data analysis and simulation.
- Interpretation of the results and development of a growth model.

January - June 2014

Internship,

European Synchrotron Radiation Facility - Surface Science Laboratory, Experiments Division, Scientific Infrastructure, Grenoble, France.

Main tasks:

- Provide AFM expertise to the European Photon & Neutron Science Campus scientists.
- Development of the Surface Science Laboratory website.

Skills

Microfabrication and nanostructuration techniques

Photolithography, DC and RF sputtering deposition, annealing treatments, RIE, direct laser interference patterning (DLIP), femtosecond laser subwavelength patterning.

Characterization techniques

AFM, SEM, GIXRD, Mechanical profilometer, Raman spectroscopy, TOF-SIMS, XPS, GDOES, TEM.

Computer skills

Good command of Origin, MATLAB, Victory Process, LabVIEW, Microsoft Office™ tools, LaTeX, SciDAVis (Scientific Data Analysis Visualization), IsGISAXS, PyRod (GISAXS Data treatment) and Jahia (website editor).

Basic command of Fortran 77, Python and AutoCAD.

Personal skills

Organized, self-motivated, analytical, proactive, hands-on problem-solving skills, team player

Ceit-IK4.

Teaching activities

Jan. - May 2017 and

Professor's assistant,

Jan. - May 2016

Nanotechnology and photonics course, Telecommunications MSc, Tecnun-University of Navarra