FEDERICA MANTEGAZZINI

Research scientist

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RESEARCH AREAS

- Superconducting quantum devices
- Cryogenic detectors
- Low temperature physics

EXPERTISE

Technical skills: Microfabrication, Cryogenic measurements, Data analysis

Coordination: Team leader, PI & Coordinator of scientific projects

EDUCATION

7/2021 - 10/2016 **PhD in Physics** — **Heidelberg University, Germany**
Doctoral dissertation: *Development and characterisation of high-resolution metallic magnetic calorimeter arrays for the ECHo neutrino mass experiment*.
Final grade: Summa cum laude, with highest distinction

10/2009 - 11/2015 **Bachelor and Master Degree in Physics** — **University of Milano-Bicocca, Italy**
Final grade: 110/110 cum laude

FELLOWSHIPS

4/2016 – 7/2021 **PhD Scholarship** — **Heidelberg University, Germany**
HighRR Research Training Group - High Resolution and High Rate Detectors in Nuclear and Particle Physics

RESEARCH POSITIONS

3/2022 – now **Research scientist** — **Fondazione Bruno Kessler, Trento, Italy**
- Coordinator of research team:
  Development of superconducting devices (parametric amplifiers, qubits, superconducting detectors)
- Responsible of cryogenic laboratory (under construction)
- Management and coordination of research projects

3/2022 – now **Associated Researcher** — **INFN TIFPA, Trento, Italy**
- Member of INFN experiments (DARTWARS, Qub-IT)
- Responsible for microfabrication of superconducting devices in Trento

7/2021 – 3/2022 **Postdoctoral researcher** — **Heidelberg University, Germany**
- Coordination of cryogenic measurements for the ECHo experiment
- Supervision of PhD and Master students

10/2016 – 7/2021 **Doctoral researcher** — **Heidelberg University, Germany**
- Design and microfabrication of microcalorimeter arrays for neutrino mass measurements (ECHo experiment)
- Cryogenic measurements, characterisation and data analysis

4/2016 – 10/2016 **Research internship** — **Heidelberg University, Germany**
- Cryogenic testing of SQUID devices

COORDINATION & MANAGEMENT RESPONSIBILITIES

2023 – now **PI & Coordinator of the MiSS project (Horizon Europe)** — **FBK, Trento**
MiSS - *Microwave Squeezing with Superconducting (meta)materials*, Horizon-RIA project.
Consortium: 7 partners (4 countries).
Total budget: 2.6 M€, managing a budget of 600 k€

2023 – now **Local responsible for the DARTWARS experiment** — **FBK, Trento**
DARTWARS - *Detector Array Readout with Traveling Wave AmplifieRS* (INFN CSN5 experiment).
Collaboration: 7 national partners.
Total budget: 1 M€, managing a budget of 50 k€

2022 – now **Task leader & Local responsible for Qu-Pilot project (Horizon Europe)** **FBK, Trento**
Qu-Pilot - Superconducting platform.
Consortium: 21 partners (9 countries).
Total budget: 19 M€, managing a budget of 370 k€

2022 – now **Contact person for PNRR NQSTI (National Quantum Science and Technology Institute)** **FBK, Trento**
Italian National Initiative on Quantum Technologies.
Consortium: 20 national partners.
Total budget: 117 M€, managing a budget of 800 k€

REVIEWING ACTIVITIES

2023 – now **Reviewer for scientific journals**
Journals: Superconducting Science and Technology (IOP), European Physical Journal C (Springer).
IOP Certified Trusted Reviewer

2022 – now **Scientific Referee for INFN**
Reviewer and referee of national scientific project within INFN Commission V

2021 **Scientific Reviewer for Q@Tn - Quantum Science and Technology in Trento**
Selection and review of projects

ORGANISATION OF SCIENTIFIC MEETINGS

2023 – now **Recurring scientific meetings "Theory+Experiments"** **Trento, Italy**
Role: Organiser

9/2023 **Workshop: Quantum Technologies for Fundamental Physics** **Erice, Italy**
Role: Chairman

6/2023 **Workshop: Quantum Technologies** **Torino, Italy**
Role: Member of Scientific Committe

10/2022 **Workshop: cQED@Tn** **Trento, Italy**
Circuit QED: From Quantum Devices to Analogues on Superconducting Circuits,
Role: Member of Scientific Committe

TEACHING ACTIVITIES

currently planned **Master course on Superconducting Quantum Devices** **University of Trento, Italy**

2023 **Course at the Doctoral School PQIP2023** **Trento, Italy**

2016-2019 **Laboratory course for cryogenic measurements** **Heidelberg University, Germany**

SUPERVISION OF STUDENTS

2022 – now **Supervision of 2 PhD students** **Heidelberg University, Germany & University of Milano-Bicocca, Italy**

2022 – now **Supervision of 5 Master students and 4 Bachelor students** **Heidelberg University, Germany & University of Milano-Bicocca, Italy**

PUBLICATIONS (SELECTION)

- F. Mantegazzini et al, *High kinetic inductance NbTiN films for quantum limited travelling wave parametric amplifiers*, Phys. Scr. 98 125921, 2023, doi.org/ 10.1088/1402-4896/ad070d
- M. Borghesi et al, *Progress in the development of a KITWPA for the DARTWARS project*, NIM A 1047, 2023, 167745, doi:10.1016/j.nima.2022.167745
- F. Mantegazzini et al, *Development and characterisation of high-resolution microcalorimeter detectors for the ECHo-100k experiment*, NIM A 1055, 2023, 168564, doi:10.1016/j.nima.2023.168564
- F. Mantegazzini et al, *Metallic magnetic calorimeter arrays for the first phase of the ECHo experiment*, NIM A 1030, 2022, 166406, doi:0.1016/j.nima.2022.166406
- M. Griedel, F. Mantegazzini (corresponding authors) et al, From ECHo-1k to ECHo-100k: *Optimization of High-Resolution Metallic Magnetic Calorimeters with Embedded 163Ho for Neutrino Mass Determination*, J Low Temp Phys 209, 779–787, 2022, doi.org/10.1007/s10909-022-02732-w

- F. Mantegazzini, *Development and characterisation of high-resolution metallic magnetic calorimeter arrays for the ECHo neutrino mass experiment*, 2021, doi:10.11588/heidok.00030250
- F. Mantegazzini et al, *Multichannel read-out for arrays of metallic magnetic calorimeters*, 2021 JINST 16 P08003, doi:10.1088/1748-0221/16/08/P08003

INVITED PRESENTATIONS (SELECTION)

24/11/2023 **Invited seminar** — **CNR-SPIN, Naples, Italy**
Development and microfabrication of superconducting quantum devices at FBK

6/7/2023 **Invited talk** — **ECT*, Trento, Italy**
International workshop COLMO (Quantum Collapse Models investigated with Particle, Nuclear, Atomic and Macro systems), Invited talk: *Superconducting devices for quantum sensing*

8/6/2022 **Invited talk** — **University of Milano-Bicocca, Italy**
International workshop NuMass - Determination of the absolute electron (anti)-neutrino mass, Invited talk: *Optimisation of the high-resolution metallic magnetic calorimeters with embedded Ho-163 for the ECHo-100k experiment*

1/10/2019 **Invited talk** — **Heidelberg University, Germany**
International workshop Vistas on Detector Physics, Heidelberg, 2019, Invited talk: *The ECHo experiment*

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2023 – now **DRD5 Protocollaboration** — **CERN, Switzerland**
Quantum Technologies for Future Colliders

2022 – now **Q@Tn (Quantum Science and Technology in Trento)** — **Trento, Italy**
Joint quantum laboratory in Trento

2022 – now **INFN Associate Researcher** — **Trento, Italy**
INFN Commission V, TIFPA

2016 – 2021 **DPG Associated Researcher** — **Heidelberg, Germany**
Deutsche Physikalische Gesellschaft - German Physical Society

MAIN CURRENT COLLABORATIONS

Italy: University of Milano Bicocca (Milan), INFN Frascati National Laboratories (Rome), INRiM (Turin), CNR-SPIN (Naples)
Europe: Heidelberg University (Germany), Neel Institute (France), Aalto University (Finland)
Worldwide: NIST (Colorado, U.S.), A*STAR (Singapore)

LANGUAGES

English - Professional proficiency, **Italian** - native, **German** - basic