

Daniele Torsello

CONTACT INFORMATION	Corso duca degli Abruzzi, 24 Torino, Italia 10129	+39 3478668649 daniele.torsello@polito.it
AFFILIATIONS	1 - Politecnico di Torino, Department of Applied Science and Technology, Torino 10129, Italy 2 - Istituto Nazionale di Fisica Nucleare, Sezione di Torino, Torino 10125, Italy	
RESEARCH INTERESTS	Superconductivity, Radiation Damage, Materials, Modellization, Microwave measurements, Magnetism.	
PROFILE	<p>I am currently a Research Fellow in the Superconductivity and Magnetism - Material Engineering by Swift Heavy ions group at the Department of Applied Science and Technology of the Politecnico di Torino. My research is focused on the characterization of the electromagnetic properties of novel superconductors and their response to structural disorder. This is carried out with a combined experimental and theoretical approach based on microwave measurement techniques and on the Eliashberg equations. Structural disorder is introduced in the samples by ion irradiation performed at several facilities of the Istituto Nazionale di Fisica Nucleare to which I am associated.</p> <p>Currently I am working on the HiBISCUS PRIN project that aims at the optimization of coated conductor prototypes of Iron Based Superconductors for industrial applications that could set the basis for the full exploitation of these materials in strategic fields as clean energy production and high field magnets.</p>	
EDUCATION	<p>Politecnico di Torino, Torino, Italia</p> <p>Ph.D., Physics, March 2020</p> <ul style="list-style-type: none">• <i>Cum Laude</i>• Topic: <i>Study of the fundamental properties of iron based superconductors through the introduction of controlled disorder via ion irradiation.</i>• Advisor: Prof. Gianluca Ghigo <p>Università degli studi di Torino, Torino, Italia</p> <p>M.Sc., Physics, July 2016</p> <ul style="list-style-type: none">• <i>Cum Laude</i>• Topic: <i>Role of oxygen knock-out in the change of the electrical properties of Bi-2212 induced by synchrotron radiation nanoprobe</i>• Advisor: Prof. Marco Truccato <p>Università degli studi di Milano Bicocca, Milano, Italia</p> <p>B.Sc., Materials Science, July 2013</p> <ul style="list-style-type: none">• <i>Cum Laude</i>• Topic: <i>Semiconductor Nanomembranes</i>• Advisor: Prof. Emiliano Bonera	
RESEARCH EXPERIENCE	<p>Research fellow</p> <p>Superconductivity and Magnetism – Material Engineering by Swift Heavy ions group, Politecnico di Torino, Department of Applied Science and Technology, Torino, Italy</p> <p>Scientific advisor: Prof. Laura Gozzelino</p> <p>Topic: <i>Electromagnetic properties of Iron based superconductors and their modulation by ion irradiation: HiBiSCUS PRIN project</i></p>	<p>November 2019 - October 2021</p>

- Visiting Researcher** January - February 2019
 Superconductivity and Magnetism Low-Temperature Laboratory,
 Ames Laboratory, Iowa State University, Ames, U.S.A.
 Supervisors: Prof. Ruslan Prozorov
 Topic: *Analysis of the London penetration depth in Ni doped CaKFe₄As₄*
- Research Assistant** June - July 2014
 Research group of Theoretical Physics,
 University of Augsburg, Augsburg, Germany
 Supervisors: Prof. Dr. Ulrich Eckern
 Topic: *Thermoelectric properties of Lanthanum Cobaltate*
- Research Assistant** February 2014 to April 2014
 Research group of Computational Materials Science,
 Ludwig Maximilian University, Munich, Germany
 Supervisors: Prof. Dr. Rossitza Pentcheva
 Topic: *Tuning the thermoelectric properties of oxide materials by strain: a density functional theory study*

PAPERS

1. **D. Torsello**, and G. Ghigo “A Coplanar Waveguide Resonator Technique for the Characterization of Iron-Based Superconductors” Proceeding of the 2020 IEEE Ukrainian Microwave Week (UkrMW), 726 (2020)
2. V. Bonino, **D. Torsello**, C. Prestipino, L. Mino, and M. Truccato “Time and space resolved modelling of the heating induced by synchrotron X-ray nanobeams.” J. Synchrotron Rad. 27 1662 (2020)
3. **D. Torsello**, R. Gerbaldo, L. Gozzelino, F. Laviano, A. Takahashi, A. Park, S. Pyon, A. Ichinose, T. Tamegai, and G. Ghigo “Twofold role of columnar defects in iron based superconductors” Supercond. Sci. Technol. 33 094012 (2020)
4. G. Ghigo, **D. Torsello**, R. Gerbaldo, L. Gozzelino, S. Pyon, I. S. Veshchunov, T. Tamegai, and G-H. Cao “Effects of proton irradiation on the magnetic superconductor EuFe₂(As_{1-x}P_x)₂.” Supercond. Sci. Technol. 33 094011 (2020)
5. **D. Torsello**, G.A. Ummarino, J. Bekaert, L. Gozzelino, R. Gerbaldo, M.A. Tanatar, P.C. Canfield, R. Prozorov, and G. Ghigo “Tuning the Intrinsic Anisotropy with Disorder in the CaKFe₄As₄ Superconductor” Phys. Rev. Appl. 13, 064046 (2020)
6. A. Napolitano, S. Ferracin, R. Gerbaldo, G. Ghigo, L. Gozzelino, **D. Torsello**, and F. Laviano “Multiphysics simulation of a superconducting bolometer working in a portable cryostat.” J. Phys. Conf. Ser. 1559 012019 (2020)
7. A. Leo, G. Grimaldi, A. Nigro, G. Ghigo, L. Gozzelino, **D. Torsello**, V. Braccini, G. Sylva, C. Ferdeghini, and M. Putti “Critical current anisotropy in Fe(Se,Te) films irradiated by 3.5 MeV protons.” J. Phys. Conf. Ser. 1559 012042 (2020)
8. L. Gozzelino, R. Gerbaldo, G. Ghigo, **D. Torsello**, V. Bonino, M. Truccato, M. Grigoroscuta, M. Burdusel, G. Aldica, V. Sandu, I. Pasuk, and P. Badica “High magnetic shielding properties of an MgB₂ cup obtained by machining a spark-plasma-sintered bulk cylinder.” Supercond. Sci. Technol. 33 044018 (2020)
9. **D. Torsello**, G. A. Ummarino, R. Gerbaldo, L. Gozzelino, and G. Ghigo “Eliashberg Analysis of the electrodynamic response of Ba(Fe_{1-x}Rh_x)₂As₂ across the s_{\pm} to s_{++} order parameter transition.” J. Supercond. Nov. Magn. 1–6 (2019)

10. G. Ghigo, **D. Torsello**, L. Gozzelino, T. Tamegai, I. Veshchunov, S. Pyon, W. Jiao, G. Cao, S. Grebenchuk, I. Golovchanskiy, V. Stolyarov and D. Roditchev “Microwave analysis of the interplay between magnetism and superconductivity in $\text{EuFe}_2(\text{As}_{1-x}\text{P}_x)_2$ single crystals.” *Phys. Rev. Research* 1, 033110 (2019)
11. **D. Torsello**, K. Cho, K. R. Joshi, S. Ghimire, G. A. Ummarino, N. M. Nusran, M. A. Tanatar, W. R. Meier, M. Xu, S. L. Bud’ko, P. C. Canfield, G. Ghigo, and R. Prozorov “Analysis of the London penetration depth in Ni-doped $\text{CaKFe}_4\text{As}_4$.” *Phys. Rev. B* 100, 094513 (2019)
12. **D. Torsello**, G. A. Ummarino, L. Gozzelino, T. Tamegai, G. Ghigo “Comprehensive Eliashberg analysis of microwave conductivity and penetration depth of K-, Co-, and P-substituted BaFe_2As_2 .” *Phys. Rev. B* 99, 134518 (2019)
13. **D. Torsello**, R. Gerbaldo, L. Gozzelino, M. A. Tanatar, R. Prozorov, P. C. Canfield and G. Ghigo “Electrodynamical response of $\text{Ba}(\text{Fe}_{1-x}\text{Rh}_x)_2\text{As}_2$ across the s_{\pm} to s_{++} order parameter transition.” *Eur. Phys. J. Spec. Top.* 3, 228, 719 (2019)
14. A. Leo, G. Sylva, V. Braccini, E. Bellingeri, A. Martinelli, I. Pallecchi, C. Ferdeghini, L. Pellegrino, M. Putti, G. Ghigo, L. Gozzelino, **D. Torsello**, S. Pace, A. Nigro, G. Grimaldi “Anisotropic Effect of Proton Irradiation on Pinning Properties of Fe(Se,Te) Thin Films.” *IEEE Trans. Appl. Supercond.* 29, 8616884 (2019)
15. L. Gozzelino, R. Gerbaldo, G. Ghigo, F. Laviano, **D. Torsello**, V. Bonino, M. Truccato, D. Batalu, M. A. Grigoroscuta, M. Burdusel, G. V. Aldica and P. Badica “Passive magnetic shielding by machinable MgB_2 bulks: measurements and numerical simulations” *Supercond. Sci. Technol.* 32, 034004 (2019)
16. G. Ghigo, **D. Torsello**, G. A. Ummarino, L. Gozzelino, M. A. Tanatar, R. Prozorov, and P. C. Canfield “Disorder-Driven Transition from s_{\pm} to s_{++} Superconducting Order Parameter in Proton Irradiated $\text{Ba}(\text{Fe}_{1-x}\text{Rh}_x)_2\text{As}_2$ Single Crystals.” *Phys. Rev. Lett.* 121, 107001 (2018)
17. G. Ghigo, **D. Torsello**, R. Gerbaldo, L. Gozzelino, F. Laviano, T. Tamegai, “Effects of heavy-ion irradiation on the microwave surface impedance of $(\text{Ba}_{1-x}\text{K}_x)\text{Fe}_2\text{As}_2$ single crystals.” *Supercond. Sci. Technol.* 31, 034006 (2018)
18. G. Sylva, E. Bellingeri, C. Ferdeghini, A. Martinelli, I. Pallecchi, L. Pellegrino, M. Putti, G. Ghigo, L. Gozzelino, **D. Torsello**, G. Grimaldi, A. Leo, A. Nigro and V. Braccini “Effects of high-energy proton irradiation on the superconducting properties of Fe(Se,Te) thin films.” *Supercond. Sci. Technol.* 31 054001 (2018)
19. **D. Torsello**, L. Mino, V. Bonino, A. Agostino, L. Operti, E. Borfecchia, E. Vittone, C. Lamberti, and M. Truccato “Monte Carlo analysis of the oxygen knock-on effects induced by synchrotron x-ray radiation in the $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ superconductor.” *Phys. Rev. Materials* 2, 014801 (2018)
20. G. Ghigo, G. A. Ummarino, L. Gozzelino, R. Gerbaldo, F. Laviano, **D. Torsello** and T. Tamegai “Effects of disorder induced by heavy-ion irradiation on $(\text{Ba}_{1-x}\text{K}_x)\text{Fe}_2\text{As}_2$ single crystals, within the three-band Eliashberg s_{\pm} wave model.” *Sci. Rep.* 7, 13029 (2017)

TALKS AND
POSTERS

- **Invited oral presentation** at the 2020 IEEE Ukrainian Microwave Week, about “A Coplanar Waveguide Resonator Technique for the Characterization of Iron-Based Superconductors.”

- **Invited oral presentation** at the international Workshop IBS2App2020, about “London penetration depth anisotropy in $\text{CaK}(\text{Fe,Ni})_4\text{As}_4$.”
- **Poster** at the SuperFOx2020 conference, about “Analysis of the London penetration depth in $\text{CaK}(\text{Fe,Ni})_4\text{As}_4$.”
- **Oral presentation** and session chairman at the international conference Superstripes2019, about “Transition from s_{\pm} to s_{++} order parameter driven by disorder in $\text{Ba}(\text{Fe}_{1-x}\text{Rh}_x)_2\text{As}_2$ single crystals.”
- **Invited poster** at the Vortex2019 international conference about “Transition from s_{\pm} to s_{++} order parameter driven by disorder in IBSs”
- **Oral presentation** at the PhDPitch by IEEE in Torino, 2019, about “Combined microwave and Eliashberg analysis of the effects of disorder in Iron Based Superconductors”
- **Oral presentation** at the Workshop “Evaluation of radiation hardness of materials for nuclear fusion plants”, Torino, 2018, about “Evaluation of radiation damage via Monte Carlo simulations”
- **Poster** at the 2018 ICTP-IAEA Advanced School on Ion Beam Driven Materials Engineering, about “Effects of ion irradiation on the properties of doped BaFe_2As_2 systems.”
- **Poster** at the SuperFOx2018 conference, about “Passive magnetic shielding by machinable MgB_2 : measurements and numerical simulations.”
- **Oral presentation** at the SuperFOx2018 conference, about “Transition from s_{\pm} to s_{++} superconducting order parameter driven by disorder in $\text{Ba}(\text{Fe}_{1-x}\text{Rh}_x)_2\text{As}_2$ single crystals.”
- **Poster** at the Capri Spring School of Transport in Nanostructures 2018 about “The ASIDI project: a microbeam facility for proof-of-concept quantum devices development”
- **Oral presentation** at the FisMat2017 conference, about “A microwave resonator technique to study the effects of ion irradiation on the penetration depth of $(\text{Ba}_{1-x}\text{K}_x)\text{Fe}_2\text{As}_2$ in the framework of the three-band Eliashberg s_{\pm} wave model.”
- **Poster** at the 2017 ESAS Summer School on Superconductivity about “Effects of Au ion irradiation on K-doped $(\text{Ba}_{1-x}\text{K}_x)\text{Fe}_2\text{As}_2$ single crystals.”

AWARDS

- Award for the two **best PhD thesis** in Physics at Politecnico di Torino in the academic year 2019-2020
- Award for the **best poster presentation** at the SuperFOx2020 conference, sponsored by ENI
- Award for the **best poster presentation** at the 2018 ICTP-IAEA Advanced School on Ion Beam Driven Materials Engineering, sponsored by IAEA
- “Miriam Ferrari” prize for the two **best Bachelor Degree students** in Materials Science at the University of Milano-Bicocca in the academic year 2012-2013

SCIENTIFIC PROJECTS

- 2019-2022 PRIN project HIBiSCUS
- 2018-2019 INFN project ASIDI
- 2018-2019 INFN project TERA
- 2016-2018 INFN project DEMETRA

PRINCIPAL INVESTIGATOR

- 2020-2021: Spokesperson of the FUSIONI-project (FUnctionalization of Superconducting materials by means of proton and lightION Irradiations) at the Laboratori Nazionali di Legnaro of INFN.

ORGANIZATION OF WORKSHOPS AND CONFERENCES

- Treasurer and member of the Scientific and Organizing Committee of the international Workshop “**High-Temperature Superconductors in High Frequency and Fields**” (2021)
- Member of the Scientific and Organizing Committee of the international Workshop

“Iron Based Superconductors: advances towards application” (Santa Margherita Ligure, February 12 th - 14 th 2020)

- Organizer of the international Workshop titled **“Evaluation of radiation hardness of materials for nuclear fusion plants”** (Torino, December 4 th 2018) co-financed winning the “Cassini Junior 2018” call issued by the Institut Français and the Ambassade de France en Italie.

EDITOR

- Guest editor for the special issue “Synthesis, Design, Characterization of Unconventional Superconducting Materials” for the journal Materials.

PEER REVIEW

- Reviewer for Superconductor Science and Technology and Engineering Reports.

TEACHING AT
POLITECNICO DI
TORINO

- Co-tutor for 3 bachelor thesis in the course Ingegneria Aerospaziale
- Academic year 2020/2021, Fisica 2 - exercises, Ingegneria Informatica (15h)
- Academic year 2019/2020, Fisica 2 - exercises, Ingegneria Aerospaziale (15h)
- Academic year 2019/2020, Fisica 1 - exercises, Ingegneria Aerospaziale (18h)
- Academic year 2019/2020, Fisica 1 - laboratory, Ingegneria Aerospaziale (24h)
- Academic year 2018/2019, Fisica 2 - exercises, Ingegneria Aerospaziale (15h)
- Academic year 2018/2019, Fisica 1 - exercises, Ingegneria Aerospaziale (21h)
- Academic year 2018/2019, Fisica 1 - laboratory, Ingegneria Aerospaziale (24h)
- Academic year 2017/2018, Fisica 1 - laboratory, Ingegneria Aerospaziale (24h)