

**Corso di dottorato in Fisica / PhD in Physics**  
**Ciclo 37 / Cycle 37**  
A.Y. 2021-2022

**Borse a tematica vincolata / Reserved scholarships**

(for detailed information visit: <https://www.unitn.it/drphys/en/12/doctoral-programme-physics>)

<b>PhD Scholarship Title</b>	<b>SOCCEr (Superconducting Circuits for the Casimir Effect)</b>
<b>Research group link</b>	<a href="https://sd.fbk.eu/en/">https://sd.fbk.eu/en/</a> <a href="http://www.tn.ifn.cnr.it/">http://www.tn.ifn.cnr.it/</a> <a href="https://bec.science.unitn.it/BEC/0_Home.html">https://bec.science.unitn.it/BEC/0_Home.html</a>
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<b>Synthetic description of the activity and expected research outcome</b>	<p>The main objectives of the research activity are to fabricate coplanar superconducting waveguides and/or resonators closed on one end by a SQUID (Superconducting QUantum Interference Device) that acts as a tunable mirror and to use them in quantum optics experiments to observe the Dynamical Casimir Effect and related zero-point quantum fluctuation effects in the microwave spectral domain.</p> <p>The project will be carried out in a continuous regular interaction between three teams: theoretical team (INO-CNR BEC Center), fabrication team (FBK with photolithography and e-beam lithography), and testing team (IFN-CNR and FBK with 20 mK dilution refrigerator). The PhD student will be given the opportunity to participate in all the activity, theoretical and experimental, with the support of the three teams. During the PhD, she/he will be trained on the physics of devices such as SQUIDs, Josephson junctions and microwave resonators that are the building blocks of circuit-QED, one of the most promising approaches to quantum technologies.</p>
<b>Ideal candidate (skills and competencies):</b>	<ul style="list-style-type: none"> <li>● She/he should have a solid knowledge of electromagnetism and a master-level competence in the general concepts of solid-state physics. She/he should be keen on learning experimental techniques in the following fields: low temperature physics, superconducting microwave technologies, microfabrication technologies and material science. She/he should have a good capacity to work in team with experimentalists combined with a good understanding of theoretical concepts and a manifest ability to work in team with theorists.</li> <li>● She/he should have a proven ability to communicate in scientific English (written and oral)</li> </ul>