**PhD Scholarship Title** | Quantum many-body physics  
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**Research group link** | https://bec.science.unitn.it/BEC/0_Home.html  
**Contacts:** | Giacomo Lamporesi  
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**Synthetic description of the activity and expected research outcome** | The candidate will be involved in one of the cutting-edge research directions that are active at the Pitaevskii BEC Center. Ultracold atomic gases offer a flexible platform to address open problems in fundamental physics such as many-body properties in quantum gases, transport phenomena, quantum simulation of fundamental interactions and gauge fields. In particular, the PhD student will be involved in the study and characterization of magnetic and topological phenomena emerging in superfluid mixtures. Depending on the candidate interests, the research could focus on experimental or theoretical aspects of the problem, anyway in strong synergy with all the researchers facing it.  
Other systems where many-body physics is theoretically explored at the BEC Center include photonic systems, quantum fluids of light, solid-state quantum devices as superconducting circuits, quantum nanoconductors, optomechanical systems and hybrid nanostructures.  
Another possible topic is the theoretical study of the solid-state quantum devices as superconducting circuits, quantum nanoconductors, optomechanical systems and hybrid nanostructures.  
**Ideal candidate (skills and competencies):** | Interest and motivation in studying fundamental properties of matter at ultracold temperatures.  
Knowledge of python language would be welcome.