Progetto	Evading quantum noise with superconducting circuits in axion dark matter search
Esperimento / sigla proponente	QUAX
Laboratorio ospitante	LNL
Contact person presso il laboratorio	Antonello Ortolan
Periodo previsto:	01/06/23 - 30/09/23
Sezioni e tutor proponenti:	Padova / Caterina Braggio
Descrizione attività (max 1000 caratteri)	At the precision frontier of particle physics, experiments that test the validity of fundamental theories require detectors at the ultimate level of sensitivity allowed by quantum mechanics. In cavity-based searches of axion dark matter (DM), vacuum fluctuations of the cavity field fundamentally limit the sensitivity to an axion-induced field. With today's leading technology based on quantum-limited linear amplifiers, it may take centuries to probe the existence of this leading DM candidate through the most plausible parameter space. Such quantum limits can be overcome if microwave photon counting is adopted. Very recently practical single microwave photon detectors have been introduced in the field of quantum information science, following an impressive progress made in the fabrication of superconducting quantum circuits. In collaboration with Quantronics group (CEA, Saclay) we are testing a prototype detector (composed of a tunable RF cavity readout by a microwave photon counter) for axion dark matter searches. The candidate will work on central issues related to operation of the single microwave photon detector (SMPD), including the low dark count rate, tunability, long term stability and continuous operation. The research activity aims to demonstrate the effectiveness of quantum-enhanced search of axions for the QUAX experiment.
Altre indicazioni: (max 500 caratteri)	
Facility che il laboratorio ospitante mette a disposizione	Laboratorio QUAX; Foresteria; Mensa
Note:	