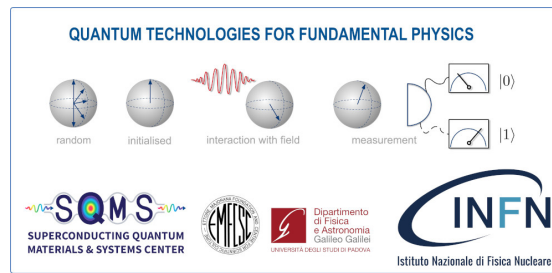


Quantum Technologies for Fundamental Physics



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Opportunities for SRF Cavities in the ADMX-EFR Project

Sunday, 3 September 2023 09:10 (20 minutes)

The axion is a hypothetical particle that may solve two problems in particle physics & cosmology, the Strong-CP problem and the nature of dark matter. The Axion Dark Matter Experiment (ADMX), which started at LLNL in the mid-1990s, is the DOE Flagship search for these particles. The experiment uses tunable resonant cavities in a large static magnetic field to enhance the conversion of axions to detectable microwaves. Quantum-limited amplifiers based on superconducting Josephson Junction circuits are critical to allow the search to be sensitive enough to rapidly scan the frequencies where the axion may exist. Here I will describe the detection strategy of ADMX along with outlining the next phase of the experiment dubbed ADMX-Extended Frequency Range (ADMX-EFR) which aims to cover 2-4 GHz in frequency range at below DFSZ sensitivity. I will discuss the opportunities that strong B-field tolerant high Q SRF cavities will allow for ADMX-EFR anticipated sensitivity.

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Session Classification: Superconducting cavities, materials, and quantum technology for detection of weakly-coupled particles