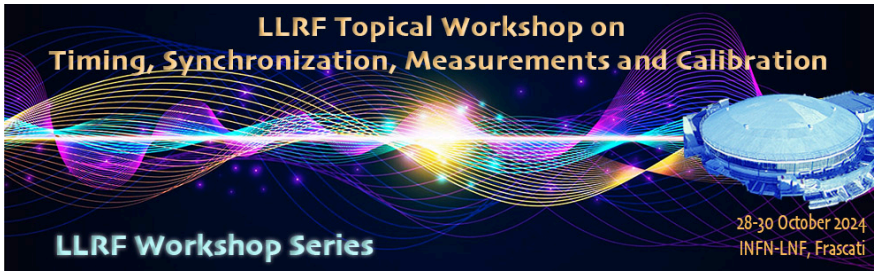

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Recent results and future perspective in the search for Axion dark matter at LNF

Tuesday, 29 October 2024 15:45 (25 minutes)

In recent years, we witnessed an increasing interest in the search of light Dark Matter (DM), addressing in particular axions. Axion existence would untie the long-standing DM problem. Its cosmological evolution and astrophysical constraints indicate a favorable mass range between 1 μeV < ma < 10 meV.
The axion observation technique is based upon its inverse Primakoff conversion into one photon, stimulated by a static magnetic field. The elements required to run a haloscope are a strong magnetic field, a microwave resonant cavity, an ultra-low noise receiver, a tuning mechanism to control the frequency of the cavity and dilution cryostat.
We report on the first operation of the new QUAX haloscope located at LNF. The experiment is conducted using a resonant cavity equipped with a tuning rod mechanism allowing to exclude the existence of dark matter axions with coupling g_a down to 0.861×10^{-13} GeV^{-1} in the mass window (36.5241 – 36.5510) μeV [1]. We also report on future development in the haunt for axions showcasing the features of FLASH, a future experiment that will be host at LNF [2].

[1] A. Rettaroli et al. PRD 2024
[2] D. Alesini et al. Physics of the Dark Universe 2023.

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