Contribution ID: **718** Type: **Parallel session talk**

Mechanical tuning in metamaterial-inspired resonators

Friday 19 July 2024 18:10 (17 minutes)

Axions in the mass range of tens to hundreds of micro-electron volts represent a promising dark matter candidate. Traditional cavity haloscopes represent a sensitive experimental configuration for probing low axion mass ranges, corresponding to frequencies up to a few GHz. However, the scaling of these cavity detectors to higher frequencies proves impractical due to limitations imposed by the axion Compton wavelength. Recently, a plasma haloscope concept inspired by metamaterials was proposed, offering a solution where the artificial plasma frequency can be tuned independently of the physical size of the detector. Building on this idea, the ALPHA Collaboration is developing resonator prototypes for axion searches in the frequency range of 10-45 GHz. In this presentation, we will describe various optimization strategies and parametric studies employed for the development of these resonator designs.

Alternate track

I read the instructions above

Yes

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Session Classification: Detectors for Future Facilities, R&D, Novel Techniques

Track Classification: 13. Detectors for Future Facilities, R&D, Novel Techniques