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First Results of BREAD: Broadband Reflector Experiment for Axion Detection

Tuesday, 4 July 2023 09:45 (30 minutes)

We report R&D progress, as well as first dark photon search results with BREAD - a novel dish antenna for broadband ~μeV-eV wave-dark matter detection, which allows to utilize state-of-the-art high-field solenoidal magnets. Axions are converted non-resonantly to photons on a cylindrical metallic wall parallel to an external magnetic field. These photons are then focused using a novel reflector geometry onto a state-of-the-art high-sensitive photon detector. We recently demonstrated [PRL 128 (2022) 131801] that this concept using a $\sim 10\,\mathrm{m}^2$ conversion area in a $\sim 10\,\mathrm{T}$ solenoidal magnet has the potential to discover QCD axions spanning multiple decades in mass range. In this talk we discuss progress of our first stage pilot experiments - GigaBREAD and InfraBREAD - covering different mass ranges. We show first results of a room-temperature GigaBREAD prototype and discuss upscaling to larger, cryogenic and magnetized versions.

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