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Science reach and electromagnetic modeling of DMRadio- m^3

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The experiments in the DMRadio program are designed to search for low mass sub- μeV axion dark matter using the coupling of axions to photons. Specifically, DMRadio- m^3 is designed to have sensitivity to KSVZ and DFSZ QCD axions in the 40-830 neV (10-200 MHz) range. A dc solenoidal magnetic field sources an axion current inside a coaxial pickup structure whose resonance frequency is tuned using lumped tuning elements. In this talk, we present the sensitivity of DMRadio- m^3 . The primary science goal of sensitivity to DFSZ axions across 30–200 MHz can be achieved with a 3σ live scan time of 3.7 years. This is informed by extensive finite element electromagnetic modeling of the pickup structure of the system, which will also be presented.

Submitted on behalf of a Collaboration?

Yes

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