Abstract Submitted
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Development of a Tunable Axion Plasma Haloscopes AL KENANY, University of California - Berkeley — Long-established theories suggest that dark matter, in the form of axions, could account for the missing mass in the universe, however; the detection of dark matter has long eluded physics. As proposed by Lawson et al. [1], we are studying a new method of detecting axions by using a tunable plasma. The plasma haloscope is designed such that if the plasma frequency matches the axion mass, a weak microwave signal is generated. At high frequencies (>10 GHz), this concept should permit the use of larger resonator volumes than can be practically achieved with traditional cavities. We are pursuing a series of engineering/proof-of-concept studies beginning with the development of a benchtop experiment of a three-dimensional array of planar wire frames. The combined structures lead to metamaterial behavior, which will enable the measuring of the plasmon-axion interaction. [1] Matthew Lawson, Alexander J. Millar, Matteo Pancaldi, Edoardo Vitagliano, and Frank Wilczek, "Tunable Axion Plasma Haloscopes", 29 August 2019. Physical Review Letters (Accepted).

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