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Laboratory enhanced searches for decaying axion dark matter

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The axion is particularly well motivated candidate for the dark matter comprising most of the mass of our visible Universe, leading to worldwide experimental and observational efforts towards its discovery. A primary technique in this search is the cavity haloscope, which is used to enhance the rate that dark matter axions convert to photons in a background electromagnetic field. As we discuss, the same haloscope technique can also be used to enhance the rate at which axions decay to two photons, as a manifestation of the Purcell effect. We explore this possibility, and show that it offers a novel method to explore the axion parameter space that is competitive and complimentary to other approaches

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