

Abstract Submitted
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Modeling and optimizing DMRadio using an effective circuit formalism¹ NICHOLAS RAPIDIS, Stanford Univ, DMRADIO COLLABORATION — The DMRadio experiment uses lumped LC oscillators in a magnetic field to resonantly search for axions in the kHz-MHz range. This search relies on the axion-photon coupling which adds an effective current term in Maxwells equations. As the frequencies scanned by the experiment will be lower than those of the LC oscillators cavity modes, it is instructive to analyze the system through effective circuits governed by the modified Maxwells equations. In this talk we will present the methods used to combine all components of the experiment into one effective circuit. By doing so, we can extract analytic formulas for the energy coupled by the axion and an understanding of the noise sources. In particular, this formalism provides a detailed framework for analysis and optimization of the systems losses and of its two primary noise components, namely backaction and imprecision noise, as well as their correlations.

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