

Abstract Submitted
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LC Resonators in the DMRadio-50L Experiment¹ JYOTIRMAI SINGH, Stanford University, DMRADIO COLLABORATION — DMRadio-50L is a next generation experiment designed to search for axions and dark photons in the kHz - MHz range using high Q ($\sim 10^6$) lumped element LC resonators. In this frequency range, resonant cavities used in conventional haloscope experiments are impractical. Lumped element circuits, however, experience the same resonant enhancement and achieve important science reach for axions and axion-like particles. In this talk we focus on the design of the DMRadio-50L LC resonator. We outline the challenges in achieving high Q values, such as accurately measuring loss tangents for capacitor dielectrics, and discuss progress on measurements to understand them. This will include data from the DMRadio Pathfinder, as well as LC oscillator tests in Liquid Helium probes and dilution fridges. We will also discuss the function of the resonator within the overall experiment, i.e. how the coupling between the resonator and the DMRadio-50L superconducting sheath impacts performance and the tuning mechanisms with which we adjust the resonant frequency of the experiment.

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