

Axion Dark Matter and Gravitational Wave Detection in an SRF Cavity

Abstract:

I will present a recently proposed approach to detect photon-coupled dark matter axions in an RF cavity. The approach relies on axion-mediated transitions between nearly-degenerate resonant modes, leading to parametrically enhanced signal power for light axions. We will discuss how a resonant signal is generated, and how it compares with traditional haloscope searches. The approach requires understanding of a number of noise sources beyond the typical ones for cavity haloscopes, which we will discuss in detail. The approach can also be used to search for gravitational waves, and we will discuss ongoing work to quantify the potential sensitivity of the apparatus.