

Single Microwave Photon Detectors for High Frequency Axion Detection

Monday 20 June 2016 12:35 (25 minutes)

High quantum efficiency, qubit-based single microwave photon detectors are being developed for the Axion Dark Matter eXperiment (ADMX). This cross-disciplinary research aims to transfer the already mature qubit readout technology used in quantum computing and bring it to bear on particle physics applications. Because dark noise from thermal photons is exponentially suppressed in low temperature operation, the effective noise power of these photon counting detectors can be orders of magnitude below that of the quantum-limited linear amplifiers presently used in axion searches. The resulting improvement in the signal-to-noise ratio will enable future searches for dark matter axions at higher mass.

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