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The Axion Dark Matter Experiment (ADMX)

QCD axions are the resulting bosons from the Peccei-Quinn mechanism which solves the strong CP problem, and are also a convincing candidate for wavelike dark matter. The Axion Dark Matter Experiment (ADMX) is an axion haloscope located at the University of Washington which directly detects axions through axion-photon coupling. Since the axion mass and corresponding conversion photon frequency is unknown, an axion haloscope will need to scan across a wide range of frequencies at relevant sensitivities such as the benchmark models Kim-Shifman-Vainshtein-Zakharov (KSVZ) and Dine-Fischler-Srednicki-Zhitnitskii (DFSZ). In order to achieve this, ADMX uses a superconducting solenoid magnet to convert axions into photons inside a resonant microwave cavity which is read out through a receiver chain with low noise, nearly-quantum-limited-amplifiers as the first amplifier. ADMX has so far excluded KSVZ axions for 1.93 - 4.2 μeV and DFSZ axions for 2.66 - 3.3 μeV and 3.9 - 4.1 μeV at a 90% confidence level. In this talk, I will present the current status and future plans of ADMX as well as additional R&D efforts to expand our reach into the wider axion parameter space.

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