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Searching for Axion Dark Matter with the ADMX experiment[1]
G. CAROSI, S.J. ASZTALOS, R. BRADLEY, C. HAGMANN, J. HOSKINS, M. HOTZ, J. HWANG, D. KINION, L. ROSENBERG, G. RYBKA, P. SIKIVIE, D.B. TANNER, K. VAN BIBBER, ADMX Collaboration — Axions are hypothetical pseudoscalar particles that exist as a consequence of the Peccei-Quinn solution to the strong-CP problem. Light axions (μeV-meV) are also a natural cold dark matter candidate and may be detected by their resonant conversion to microwave photons in a high-Q cavity immersed in a strong magnetic field. This detection strategy provides the basis for the Axion Dark Matter eXperiment (ADMX) which has been taking data at Lawrence Livermore National Laboratory (LLNL) for over a decade. In this experiment, the signal from the cavity is amplified by an ultralow noise amplifier, and mixed down to the audio frequency range in a double-heterodyne receiver. The signal is digitized and a Fourier transform produces a power spectrum, in which the axion would appear as a narrow line at $f = m_a c^2/h$. This talk will present an overview of ADMX, with particular attention to the successful implementation of new ultralow-noise first stage cryogenic SQUID amplifiers, and the first results from this new configuration.

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