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Searching for Axion Dark Matter with the ADMX experiment¹

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The axion is a hypothetical particle arising from Peccei-Quinn solution to the strong CP problem in quantum chromodynamics. Axions with μeV masses are a prominent cold dark matter (CDM) candidate. The Axion Dark Matter eXperiment (ADMX) is searching for CDM axions in the halo of our galaxy with an axion haloscope: a high- Q resonator immersed in a strong magnetic field. Over the years, ADMX has achieved a significant improvement of measurement sensitivity by implementing a dilution refrigerator and a low noise microwave receiver. As a result, ADMX has successfully completed axion searches with unprecedented sensitivity, covering the two most established axion models (KSVZ and DFSZ). We will present an overview of the ADMX experiment including the development of the detector and search results over an axion mass range of 2.66–3.31 μeV . We will also discuss the further search plans of ADMX in the near term and beyond.

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