

MAS20-2020-000018

Abstract for an Invited Paper  
for the MAS20 Meeting of  
the American Physical Society

**Seeking the unseen: The Axion Dark Matter eXperiment (ADMX)<sup>1</sup>**

DAVID TANNER, University of Florida

The nature of the dark matter in the Universe is one of the most compelling questions in all of science. Dark matter makes up roughly 85% of the mass in the universe and we don't know what it is. It interacts extremely weakly with ordinary matter and energy making detection very challenging. The axion, a very well-motivated candidate for the dark matter, can be detected by conversion to microwave photons in a strong magnetic field; this process is the basis of many searches for axions and axion-like particles. The Axion Dark Matter eXperiment (ADMX) is conducting a search for axions within the dark-matter halo of our Galaxy. The ADMX experiment employs a large-volume superconducting magnet, a high- $Q$  tunable microwave cavity, an ultrasensitive SQUID microwave amplifier, and a high-performance dilution refrigerator to enable noise backgrounds in the mK temperature range. This "Generation 2" ADMX detector has reached the sensitivity to detect axions even for the most-weakly-coupled theories. The ADMX detector has completed two science runs at this design sensitivity. There were no detections and the search continues with a third science run. The resulting limits on axion mass and coupling, the prospects for the ongoing search, and the outlook for the future will be discussed.

<sup>1</sup>Supported by the DOE through DE-SC0250859.