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Search for the Cosmic Axion Background with ADMX

Wednesday, 5 July 2023 15:30 (20 minutes)

The Cosmic axion Background (CaB), a relativistic background of axions that is not dark matter, could be produced in the late Universe from the decay of another dark matter candidate.
In this talk, we show the first result of the direct search for CaB performed with the axion haloscope, the Axion Dark Matter eXperiment.
Conventional haloscope analyses search for a signal with a narrow bandwidth, as predicted for dark matter, whereas the CaB will be broad. We introduce a novel analysis strategy, which searches for a CaB-induced daily modulation in the power measured by the haloscope. Using this, we repurpose data collected to search for dark matter to set a limit on the axion photon coupling of the CaB originating from dark matter decay in the 800-995 MHz frequency range. We also show the extensibility of this analysis combined with possible single photon counters like the superconducting qubit.

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