Contribution ID: **954** Type: **Parallel session talk**

Full Results from HAYSTAC's Phase II Operation with a Squeezed-State Receiver

Thursday 18 July 2024 09:04 (17 minutes)

The Haloscope At Yale Sensitive To Axion CDM (HAYSTAC) experiment is a microwave cavity used to search for cold dark matter (CDM) axions with masses above 10 μeV. HAYSTAC searches for axion conversion into a resonant photon signal in an 8 T magnetic field, due to the Primakoff effect. In typical cavity experiments, the output signal power is exceedingly small, and thus quantum amplifiers are required. As a result, quantum uncertainty manifests as a fundamental noise source, limiting the measurement of the quadrature observables. Data taking for HAYSTAC was divided into two parts: Phase I achieved a near quantum-limited sensitivity using a single Josephson parametric amplifier (JPA), and covered a range between $23.15 < m_a < 24.0$ μeV, while Phase II used vacuum squeezing to circumvent the quantum limit, making HAYSTAC the first axion experiment to surpass it. In this talk, we will present an overview of the HAYSTAC experiment, and discuss the latest results from Phase II.

Alternate track

1. Astro-particle Physics and Cosmology

I read the instructions above

Yes

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Session Classification: Dark Matter

Track Classification: 09. Dark Matter Detection