Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Operational and data analysis improvements for a quantum-enhanced search for dark matter axions HUAIJIN WANG, Yale University, HAYSTAC COLLABORATION[1] — HAYSTAC is the first axion dark matter haloscope to circumvent the quantum limit using vacuum squeezing technology. The experiment utilizes the resonant conversion of axions to microwave photons in a high Q cavity in the presence of a strong magnetic field, and implements a squeezed-state receiver system to enhance the search rate. The Phase 2 operation observes no signature of dark matter axions over the combined 16.96-17.12 and 17.14-17.28 $\mu eV/c^2$ mass range, and achieves 90% exclusion for axion-photon couplings above $g_\gamma = 1.38 \times g_\gamma^{KSVZ}$. In this talk, I will describe upgrades made to operational procedures and data analysis programs for the Phase 2 experiment, including characterizations of microwave cavity response and squeezed state receiver circuit properties, as well as updates and run-time improvements to the data analysis program.

[1]The Haloscope At Yale Sensitive To Axion CDM

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Date submitted: 30 Jul 2020 Electronic form version 1.4