

Recent Results and Status of HAYSTAC Phase III Upgrades

The Haloscope At Yale Sensitive To Axion Cold Dark Matter (HAYSTAC) Experiment is actively searching for QCD axions using a resonant microwave cavity enhanced by a squeezed state receiver, which allows us to circumvent the standard quantum limit in the measurement noise. We have recently completed Phase II operations, which provided new results in the range of 16.96-19.46 μeV with sensitivity to QCD axions with axion-photon coupling of ~ 3 times $|g_{\gamma}^{KSVZ}|$, demonstrating the robustness of the squeezed state receiver over a wide mass range. Currently, we are working on upgrades for the system to be used in Phase III operations. This poster will show the recent results, discuss our plan for phase 3 operation, and details of the status of upgrades, including a new cavity that operates above 25 μeV and vibration mitigation to improve the squeezing.

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