

Updated Results from HAYSTAC's Quantum-Enhanced Search for Dark Matter Axions - REMOTE

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The HAYSTAC Collaboration is currently searching for axion cold dark matter with the use of a resonant microwave cavity. Because both the mass of the axion and its coupling strength are largely unknown, a key figure of merit for a haloscope is the rate at which it can scan this vast parameter space. Recent progress in developing squeezed state receivers have allowed HAYSTAC to reduce noise levels below the standard quantum limit, resulting in a factor of two scan rate enhancement as first demonstrated in the search over the combined axion mass window of $16.96\text{-}17.12\mu\text{eV}$ and $17.14\text{-}17.28\mu\text{eV}$. This quantum enhanced search was continued between July and September 2021, extending the scanned region to axions with masses between $18.45\text{-}18.69\mu\text{eV}$. In this update, I will discuss the status of HAYSTAC with emphasis on the most recent data taking phase that includes improvements to the data acquisition routine which have reduced dead time by a factor of two, further improving the scan rate of the experiment.

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