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Optimizing the HAYSTAC Livetime MICHAEL JEWELL, Yale University, HAYSTAC COLLABORATION — The HAYSTAC Collaboration is currently searching for axion cold dark matter with the use of resonant microwave cavities. 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 two scan rate enhancement [1]. In addition to noise, another major source of scan rate degradation currently comes from dead/lost time accrued while acquiring each average power spectrum. This talk will outline improvements made to the data acquisition routine which have allowed the livetime to be nearly doubled from 50% to 90%. These livetime improvements, in addition to an improved detector design, will allow for further increase in experimental sensitivity. [1] K. M. Backes et al. A quantum-enhanced search for dark matter axions. arxiv:2008.01853 (2020).

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