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## High-frequency Cavity Haloscopes for the ADMX-VERA Program

Post-inflationary axions are predicted to have  $m_a$ 

 $gtrsim16.5~\mu eV$  (4 GHz), a regime where unfavorable volume scaling drastically reduces the sensitivity of conventional cavity-based haloscopes. In this talk, I present on the design and characterization of high-volume (10's of  $\lambda^3$ ), high-frequency cavity geometries for the volume-enhanced resonating axion (VERA) program, an R&D effort of the ADMX collaboration. The single-wedge design is currently employed in a tabletop dark photon search projected to produce leading limits in its frequency range. A larger single-wedge cavity is currently being lapped to a tight flatness tolerance for optimal form factor, and will be used in a cryogenic search. The triple-wedge design, which fits efficiently in a solenoid bore but requires custom flexure stages for the relative alignment of the three wedges, is currently undergoing metrology prior to RF characterization. Finally, the beehive resonator will soon be studied using a specially designed metrology rig. I will also discuss the potential advantages of single photon counters over continuous-wave amplification at high frequency. To achieve greater coupling with the novel resonators, an array of slot antennas combined via passive summing tree is under development.

Author: DYSON, Taj (Stanford University)

**Co-authors:** YI, Andrew (SLAC National Accelerator Laboratory); KUO, Chaolin; BARTRAM, Chelsea (SLAC); SALATINO, Maria (Stanford University); WITHERS, Matthew O'Neal (Stanford University); RUPPERT, Sephora (Stanford University)

**Presenter:** DYSON, Taj (Stanford University)