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## Axion-Photon Sensitivity with NuSTAR Observations of M82 and M87

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Ultra-light axions with weak couplings to photons are motivated extensions of the Standard Model. We perform one of the most sensitive searches to-date for the existence of these particles with the NuSTAR telescope by searching for axion production in stars in the M82 starburst galaxy and the M87 central galaxy of the Virgo cluster. This involves a sum over the full stellar populations in these galaxies when computing the axion luminosity, as well as accounting for the conversion of axions to hard X-rays via magnetic field profiles from simulated IllustrisTNG analogue galaxies. We find no evidence for axions, and instead set robust constraints on the axion-photon coupling at the level of  $|g_{a\gamma\gamma}|$   
*lessim*  $6.4 \times 10^{-13} \text{ GeV}^{-1}$  for  $m_a$   
*lessim*  $10^{-10} \text{ eV}$  at 95% confidence.

**Presenter:** NING, Orion (University of California, Berkeley)

**Session Classification:** Flash Talks by Students