

# Cosmic Axion Spin Precession Experiment (CASPEr)

*Thursday 29 August 2013 14:00 (24 minutes)*

We propose an experiment to search for QCD axion and axion-like-particle (ALP) dark matter. Nuclei that are interacting with the background axion dark matter acquire time-varying CP-odd nuclear moments such as an electric dipole moment. In analogy with nuclear magnetic resonance, these moments cause precession of nuclear spins in a material sample in the presence of a background electric field. This precession can be detected through high-precision magnetometry. With current techniques, this experiment has sensitivity to axion masses  $m_a < \sim 10^{-9}$  eV, corresponding to theoretically well-motivated axion decay constants  $f_a > \sim 10^{16}$  GeV. With improved magnetometry, this experiment could ultimately cover the entire range of masses  $m_a < \sim 10^{-6}$  eV, just beyond the region accessible to current axion searches.

**Presenter:** RAJENDRAN, Surjeet

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