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Status of the Cosmic Axion Spin Precession Experiment (CASPEr)

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The Cosmic Axion Spin Precession Experiment (CASPEr) is a multi-faceted research program using nuclear magnetic resonance (NMR) techniques to search for dark-matter-driven spin-precession.
CASPEr is naturally divided into two main research directions, based on two possible couplings to the Standard Model.

- CASPEr-Wind searches for spin precession induced by the coupling between ultralight bosons and the axial nuclear current (the so-called "axion wind" coupling). The interaction that drives the spin precession may be treated as a pseudo-magnetic field where the nuclear spin couples to the relative momentum of the local dark matter field.
- The coupling of axions to the gluon field of quantum chromodynamics (QCD) is explored by CASPEr-Electric, which searches for the effect of an oscillating nuclear electric dipole moment. In the presence of an electric field, this electric dipole moment generates a toque that drives spin precession.

The combined experiment searches for dark matter composed of axions, axion-like particles, or dark/hidden photons with boson masses from $\sim 6 \times 10^{-17}$ to $\sim 6 \times 10^{-7}$ eV. We will report on the current status and describe recent progress in the construction of the assorted CASPEr apparatus.

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