

Searching for axion dark matter from dwarf spheroidal galaxies and the Sun

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The coupling of axion and axion-like particles (ALPs) to two photons leads to radiative decays of axion dark matter and axion-photon conversion in an external magnetic field. We discuss two methods to search for these signals exploiting astrophysical data. The first is based on MUSE spectroscopic optical observations of a sample of five classical and ultra-faint dwarf spheroidal galaxies.

We present world-leading limits on ALPs radiative decays for ALPs masses in the range of 2.7-5.3 eV. The second strategy relies on the radio emission produced from the conversion of ALPs in the Sun's magnetic field, including conversion in sunspots. We demonstrate that near-future low-frequency radio telescopes, such as the SKA Low, may access regions of unexplored parameter space for masses below the micro-eV range.

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