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Hunting for axions in the solar basin

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A large flux of axion-like particles can be produced in the solar core. While the majority of these particles will have high velocities and escape the Sun's gravitational pull, a small fraction of low-velocity particles will become trapped on bound orbits. Over time, an appreciable density of slow-moving axions can accumulate in this "solar basin." Their subsequent decay to two photons provides a distinct observational signature. I will present a recent analysis using data taken by the NuSTAR X-ray telescope to search for the decay products of keV-scale axions trapped in the solar basin. Our results ultimately set limits on the axion-photon and axion-electron couplings well over an order of magnitude beyond current constraints and motivate the further exploration of stellar basins in other astrophysical systems.

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