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AXIS can Access Dark Matter Decays

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As one of NASA's proposed future Astrophysics Probe missions, the Advanced X-ray Imaging Satellite (AXIS) is designed to improve the sensitivity and spatial resolution of the Chandra X-ray Observatory. AXIS aims to deliver low-background, arcsecond imaging over a broad 0.3–10 keV energy range, featuring an effective area of 3600 cm^2 at 1 keV and 830 cm^2 at 6 keV across a 450 $arcmin^2$ field of view. These capabilities open a new parameter space for exploring decaying dark matter candidates such as axion-like particles (ALPs) and sterile neutrinos through X-ray line searches. We present an initial study of AXIS's prospects for detecting dark matter decay signals, finding potential lifetime sensitivities of order $\approx 10^{30}$ seconds, surpassing current X-ray limits.

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