

Abstract Submitted  
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**X-Ray Searches for Decaying Dark Matter in Blank Sky Observations** JOSHUA FOSTER, University of Michigan — Sterile neutrinos with keV-scale masses represent well-motivated extensions to the Standard Model that could explain the observed neutrino masses while also accounting for the cosmological dark matter (DM) abundance. DM sterile neutrinos may slowly decay into active neutrinos and photons, producing nearly monochromatic *X*-ray emission that could be detected in astrophysical datasets. In this work, we use 547 Ms of data collected across the full sky by the MOS and PN instruments onboard the *XMM-Newton* observatory to search for sterile neutrino DM across the 5 keV to 16 keV mass range. We analyze background-subtracted data using parametric modeling of instrumental and known astrophysical lines alongside nonparametric modeling of continuum background contributions using Gaussian Processes. We find no evidence for unassociated X-ray lines, leading us to produce the strongest constraints on this DM scenario to-date.

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