

Evidence the 3.5 keV line is not from dark matter decay

Tuesday, 3 December 2019 14:50 (20 minutes)

X-ray observations of nearby clusters and galaxies have reported an unexpected X-ray line around 3.5 keV. This line has received significant attention due to its possible explanation through decaying dark matter; in particular, decaying sterile neutrino models, with a sterile neutrino mass around 7 keV, provide a good fit to the available data. We use over 30 Ms of XMM-Newton blank-sky observations to search for evidence of the 3.5 keV line consistent with arising from decaying dark matter within the ambient halo of the Milky Way. We find the strongest limits to-date on the lifetime of dark matter in this mass range, strongly disfavoring the possibility that the 3.5 keV line originates from dark matter decay.

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Session Classification: Parallel

Track Classification: Dark matter