

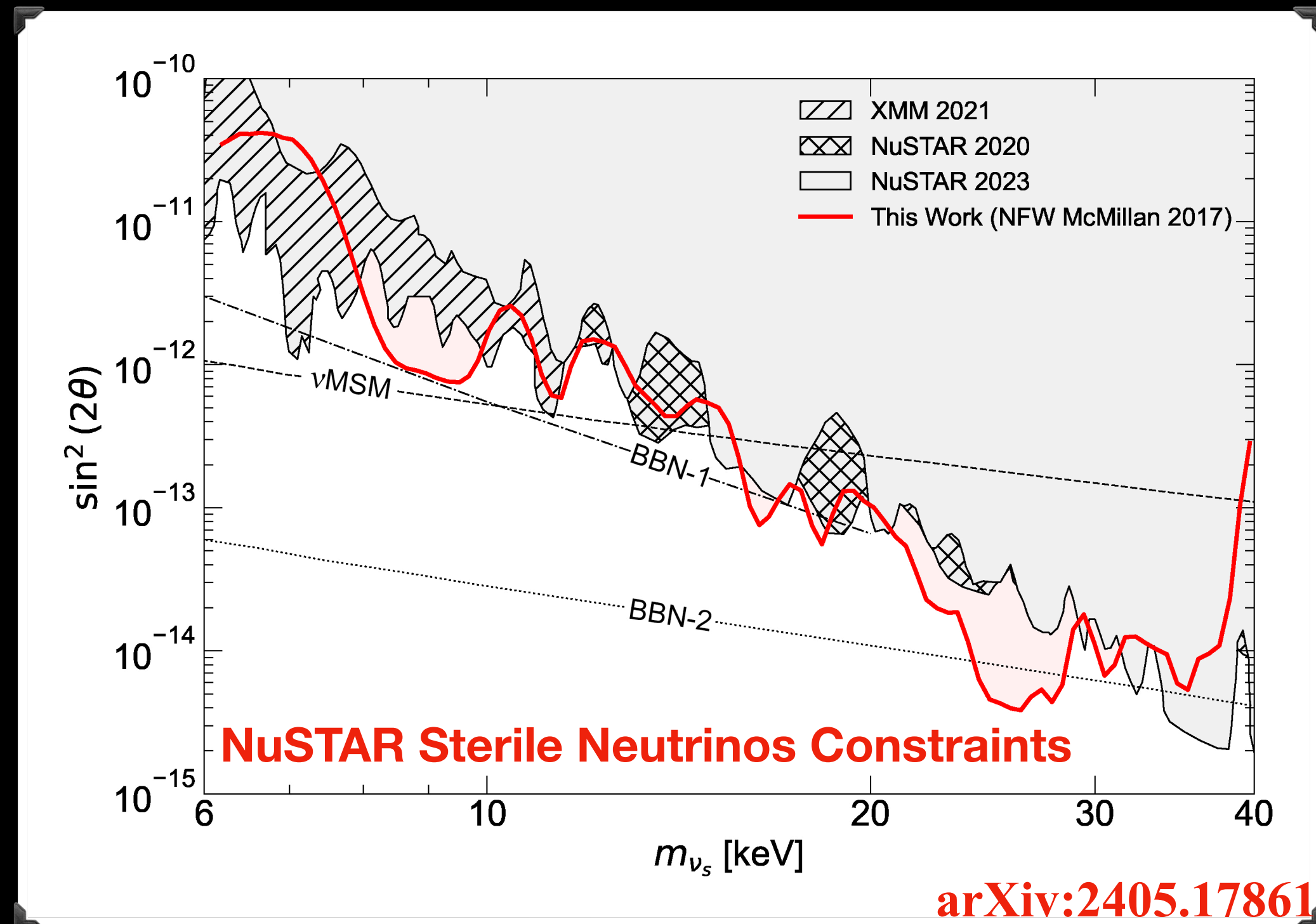
New Constraints on Decaying and Annihilating Dark Matter

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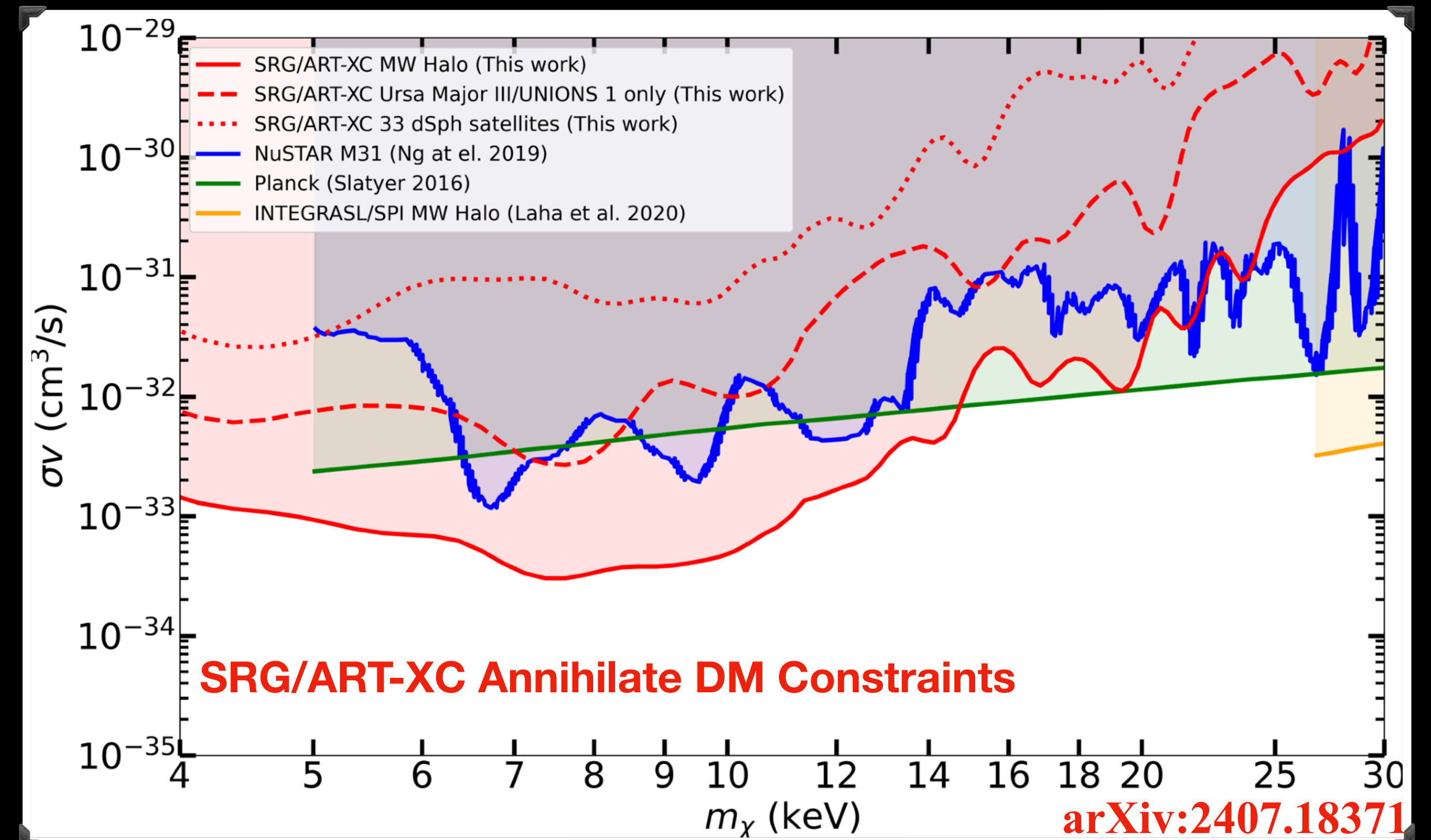
If the sterile neutrino exists, it can decay into one active neutrino and **x-ray** photon $\nu_s \rightarrow \nu_e + \gamma$

Also DM particles can annihilate into photons $X + X \rightarrow \gamma + \gamma$ (for example: in x-ray energy range)

So, We can **constraint parameters of the dark matter particles** using **X-Ray observations of Milky Way** and other galaxies



We find no solid evidence for a monochromatic line to be associated with sterile neutrino decay and place new upper limits on the active-sterile mixing angle θ for sterile neutrino masses $m_s = 6 - 40$ keV for the NuSTAR data



We find that the SRG/ART-XC data collected in the survey mode over 4 full-sky surveys naturally makes MW the most promising source of the DM annihilation to be searched for. The limit obtained from MW is strongest among all we found in literature, for the DM mass range $m_\chi = 4 - 15$ keV, and is competitive to those from NuSTAR observation of M31 galaxy and from analysis of the Planck data for $m_\chi = 15 - 25$ keV

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★ Given the upcoming new data from the ART - XC telescope, the constraints obtained from the ART-XC data may well be competitive with the annihilation constraints from the NuSTAR data
(Taking into account model/measurement uncertainties)

★ It is extremely important to have even more high-resolution observational data to either finally rule out simple decay or annihilation scenarios or to find strong evidence for unknown components in the spectra...

★ High quality data is key for further dark matter research!

Strong limits on keV-scale galactic sterile neutrino dark matter with stray light from NuSTAR after 11 years of operation, R. A. Krivonos, V. V. Barinov, A. A. Mukhin, D. S. Gorbunov, [arXiv:2405.17861](https://arxiv.org/abs/2405.17861)

Constraints on the parameters of keV-scale mass annihilating Dark Matter obtained with SRG/ART-XC observations, E. I. Zakharov, V. V. Barinov, R. A. Burenin, D. S. Gorbunov, R. A. Krivonos, [arXiv:2407.18371](https://arxiv.org/abs/2407.18371)

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