Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Tightening NuSTAR Constraints on keV-Scale Sterile Neutrinos: Present and Future BRANDON ROACH, Massachusetts Institute of Technology, JOHN BEACOM, Center for Cosmology and AstroParticle Physics (CCAPP) of The Ohio State University, SHUNSAKU HORIUCHI, Virginia Tech, ROMAN KRIVONOS, Space Research Institute of the Russian Academy of Sciences (IKI), KENNY NG, Chinese University of Hong Kong, KERSTIN PEREZ, Massachusetts Institute of Technology, STEVE ROSSLAND, DANIEL WIK, University of Utah — Sterile neutrinos with masses at the keV scale are a popular dark matter candidate, with a clear decay signature including a mono-energetic x-ray photon that can be investigated using existing x-ray telescopes. In particular, the large solid angle of the NuSTAR observatory for unfocused x-rays has led to world-leading sensitivity to the decays of sterile neutrinos in the mass range 10-50 keV, across a variety of astrophysical targets. I will describe our group's analysis of archival NuSTAR observations of the M31 galaxy ($\sim$1.2 Ms) and dedicated high-latitude observations near the Galactic Center ($\sim$190 ks); together, these reduce the size of the remaining parameter space for resonantly-produced sterile neutrinos by nearly one-third. Finally, I will discuss the impact of recent improvements in modeling the NuSTAR instrument background, particularly in the x-ray energy range 3-5 keV (sterile neutrino masses 6-10 keV), and the implications for future sterile-neutrino dark matter searches using NuSTAR data.

Brandon Roach
Massachusetts Institute of Technology

Date submitted: 07 Jan 2021 Electronic form version 1.4