Title: MeV dark matter in the 3+1+1 model

Abstract:
The existence of light sterile neutrinos in the eV mass range with relatively large mixing angles with the active neutrinos has been proposed for a variety of reasons, including to improve the fit to the LSND and MiniBooNE neutrino oscillation experiments, and reactor disappearance experiments. It was shown that neutrino mixing with a heavier sterile neutrino, in the mass range between 33 eV and several GeV, could significantly affect and improve the agreement between neutrino oscillation models with light sterile neutrinos and short baseline experimental results, allowing for a new source of CP violation in appearance experiments and for different apparent mixing angles in appearance and disappearance experiments. However various collider experiment, supernovae, and cosmological constraints can eliminate most of the parameter region where such a heavy sterile neutrino can have a significant effect on neutrino oscillations. I will present a model allowing a new light scalar in the MeV mass region, which is a potential dark matter candidate, to interact with the sterile neutrinos. The model can satisfy all experimental constraints and is a consistent theory of neutrino oscillation anomalies and dark matter which can also potentially explain the INTEGRAL excess of 511 keV gamma rays in the central region of the galaxy.