Contribution ID: **100** Type: **not specified**

Supernova Bounds on Neutrinophilic Dark Matter

Thursday 10 July 2025 14:50 (20 minutes)

Supernova cooling has long been used to constrain physics beyond the Standard Model, typically including new mediators or dark matter particles that couple to protons or electrons. The large density of neutrinos inside supernovae also makes supernovae powerful laboratories to study non-standard neutrino interactions. In this work, we consider supernova production of dark matter that couples dominantly to neutrinos. We show that, for a wide range of unconstrained parameter space, neutrino annihilation within a supernova could copiously produce dark matter, at a large enough rate to cause noticeable anomalous cooling. We thus set novel constraints on dark matter-neutrino interactions based on the non-observation of such anomalously high cooling.

Authors: PATWARDHAN, Amol (SLAC); DEV, Bhupal (Washington University in St. Louis); CAPPIELLO, Christopher

Presenter: CAPPIELLO, Christopher

Session Classification: Parallel 1