

Exploring Dark Matter Interactions by (Not) Forming Black Holes in Neutron Stars

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Room 415 Nieuwland Science Hall

A plethora of possible direct and indirect dark matter signals have spurred an expanding array of dark matter models. In this talk I will winnow these models by showing that if we assume 1. dark matter scatters off neutrons and 2. the dark matter is a boson, the existence of old neutron stars implies that dark matter must annihilate for a wide range of dark matter masses. Without an annihilation channel, enough bosonic dark matter would have collected in old neutron stars to form a black hole and destroy the host star.

I will also show a recently calculated annihilation channel implied for dark matter which is fermionic and has an attractive Yukawa coupling. This constrains parameter space for self-interacting dark matter models designed to explain the galactic halo core vs. cusp observation.