Contribution ID: **36** Type: **not specified**

Dark Matter Thermalization in Neutron Stars

Monday, 5 May 2014 17:45 (15 minutes)

There have been many experimental efforts to constrain the dark matter - nucleon cross section as a function of dark matter mass. By considering black hole formation in neutron stars due to dark matter accretion, one can constrain dark matter parameter space that is inaccessible to current direct detection experiments. We have studied how Pauli blocking, kinematic constraints, and superfluidity and superconductivity in the neutron star affect dark matter interactions inside the star. Our results show that previously calculated dark matter thermalization times need to be altered.

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Session Classification: Cosmology II