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Testing neutrinophilic dark sectors in core-collapse supernovae.

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In this talk, I explore how neutrinophilic dark sectors can impact core-collapse supernovae by extracting energy out of the proto-neutron star and show preliminary cooling bounds on two different models: a Dirac fermion with s-wave annihilation and a Majorana fermion with p-wave annihilation to neutrinos of all flavours. For each model I present the cooling bounds for two cases: a light mediator and a heavy mediator. We find that luminosity bounds lie in the overabundant region if the dark sector fermions are to be considered dark matter candidates. Finally, I briefly discuss limitations to the luminosity calculations like diffusive transport and important changes that can happen before core-collapse.

Abstract

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