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Core-collapse Supernova Constraint on the Origin of Sterile Neutrino Dark Matter via Neutrino Self-interactions

Sunday, 19 February 2023 10:45 (15 minutes)

I will present a constraint on the sterile-neutrino dark matter through neutrino self-interaction inside a core-collapse supernova. The environment inside a core-collapse supernova has similar features as the early universe era where the sterile-neutrino dark matter is dominantly produced. I will start by showing how a massive scalar mediated neutrino self-interaction can affect the cooling rate of a core-collapse supernova. Then I will present the effect on the cooling luminosity, including the contributions to the thermal potential in the presence of non-zero chemical potentials from the plasma species. We will see that the supernova cooling argument can set a useful constraint on the neutrino self-interaction parameter space.

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