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Supernova keV Sterile Neutrinos

We consider the production of keV sterile neutrinos in the cooling phase of the Supernova. A matter enhanced conversion from active to sterile neutrino is analyzed, leading to a strong bound on the sterile neutrino $\sin^2 2\theta - m_{\text{sterile}}$ parameter space from Supernova energy loss. In addition, we analyzed the impact of the standard production mechanism via interactions which is small compered to the aforementioned MSW.
We also consider $\nu_s \to \nu_a \gamma$ loop process, with respect to a possible observable photon signal, and obtain a limit using data from satellites which are sensitive in the MeV photon energy range.

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