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Old neutron stars as a new probe of relic neutrinos and sterile neutrino dark matter

Tuesday 20 May 2025 15:00 (15 minutes)

We study the kinetic cooling (heating) of old neutron stars due to coherent scattering with relic neutrinos (keV sterile neutrino dark matter) via Standard Model neutral-current interactions by taking into account coherent enhancement, gravitational clustering, neutron degeneracy, Pauli blocking and weak potential. We find that the anomalous cooling of neutron stars due to relic neutrino scattering is difficult to observe. However, the anomalous heating of neutron stars due to coherent scattering with keV-scale sterile neutrino dark matter may be observed by current and future telescopes operating in the optical to near-infrared frequency band, such as the James Webb Space Telescope (JWST), which would probe hitherto unexplored parameter space in the sterile neutrino mass-mixing plane.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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