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Relic neutrinos from collapsars and neutron star mergers

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In highly dense matter scenarios, such as in Supernova, collapsars, and neutron star mergers, neutrinos decouple from matter much earlier and deeper than photons. Their detection in neutrino observatories would allow us to gain valuable insight into the interior, structure, and evolution of these astrophysical environments. While much can be learned from the neutrinos emitted by a single explosion, the rarity of these events combined with neutrinos' weakly interacting nature pose challenges for their detection. Relic neutrinos, emitted since the first Supernovae and mergers occurred in the universe, provide a continuous background flux that offers an additional avenue for the study of matter under strong gravity. In this talk, I shall discuss the diffuse neutrino background from collapsars and neutron star mergers, and the prospects of learning about the equation of state of nuclear matter from its possible detection.

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