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## Neutrinos from dense environments, non-radiative neutrino decay and the diffuse supernova neutrino background

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“Neutrinos from dense environments, non-radiative neutrino decay and the diffuse supernova neutrino background”

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In this talk I will first describe the frontiers of our knowledge on neutrino flavor evolution in dense media - core-collapse supernovae, binary neutron star mergers, early universe - and mention connections to other domains, in particular quantum information theory and computing [1,2]. How neutrino change flavor, in astrophysical and cosmological environments, is tightly linked to known and unknown neutrino properties. I will focus on the case of non-radiative neutrino decay and its importance for future observations, in particular the upcoming discovery of the diffuse supernova neutrino background and its interpretation [3,4].

[1] M. Cristina Volpe, “Neutrinos from dense: flavor mechanisms, theoretical approaches, observations, new directions”, *Review of Modern Physics*, arXiv: 2301.11814.

[2] J. Froustey, C. Pitrou, M. Cristina Volpe, “Neutrino decoupling including flavour oscillations and primordial nucleosynthesis”, *JCAP* 12 (2020) 015, arXiv: 2008.01074.

[3] P. Ivanez-Ballesteros, M. Cristina Volpe, Neutrino nonradiative decay and the diffuse supernova neutrino background, *PRD D* 107 (2023) 2, 023017, arXiv: 2209.12465.

[4] P. Ivanez-Ballesteros, M. Cristina Volpe, in preparation.

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