

Neutrino flavor oscillations in supernovae

Wednesday 11 December 2024 12:30 (30 minutes)

Neutrinos are known to play crucial roles in core-collapse supernova explosions. The anticipated large amount of supernova neutrinos events from the next galactic explosion as well as the upcoming unambiguous detection of the diffuse supernova neutrino background are also expected to be important messengers to probe various important issues in astrophysical, nuclear, and particle physics. However, accurate theory modeling for supernovae and their neutrino signals has been plagued by the poor understanding of the collective flavor oscillations of neutrinos that can happen inside the deep interior of a supernova. In this talk, I will review this challenging issue and the associated difficulties. I will then discuss recent progresses toward solving this long-standing problem.

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Session Classification: Plenary