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Towards precise predictions of the diffuse supernova neutrino background

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The isotropic signal of neutrinos from all past core-collapse supernovae, known as the diffuse supernova neutrino background (DSNB), is close to being detected in Super-Kamiokande. The most optimistic models are already disfavored with current upper limits so improving our theoretical understanding of the DSNB is crucial in the next few years, especially with upcoming detectors. We discuss the importance of understanding the late phase neutrino emission during core collapse. We also discuss strategies for estimating this phase, given the prohibitive computational cost for long term simulations. Finally, we show how recent measurements of the star formation rate up to redshift 2 have improved and can result in precise DSNB flux predictions, in time for next generation experiments.

Author: EKANGER, Nick (Virginia Tech)

Presenter: EKANGER, Nick (Virginia Tech)

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