

Neutrino and Heavy-element Nucleosynthesis in Supernovae

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Neutrinos can play an important role in the synthesis of nuclides in high energy astrophysical processes involving compact objects, such as core-collapse supernovae or binary neutron star mergers, where neutrinos can experience collective flavor oscillations driven by neutrino-neutrino interactions. Here, we seek to explore the possible influences of neutrino interactions on the heavy-element nucleosynthesis including vp-process and r-process in supernova environments with different astrophysical conditions and neutrino inputs. We find that the potential impact is particularly strong in high-entropy, proton-rich conditions, where neutrino interactions can nudge an initial vp process neutron rich, introducing a new neutrino-induced neutron capture process “vi process”.

Primary author: WANG, Xilu (Institute of High Energy Physics, Chinese Academy of Sciences)

Co-authors: BALANTEKIN, Baha (University of Wisconsin, Madison); CERVIA, Michael; PATWARDHAN, Amol; SURMAN, Rebecca (University of Notre Dame)

Presenter: WANG, Xilu (Institute of High Energy Physics, Chinese Academy of Sciences)

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