

# NEUTRINO AND NUCLEAR PHYSICS IN THE ASTROPHYSICAL SYNTHESIS OF THE HEAVIEST ELEMENTS

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Wednesday, August 29 ❖ 4:00 P.M. ❖ 118 NSH

Refreshments at 3:30 P.M. in 202 NSH

While the basic picture of the astrophysical origin of the chemical elements has been largely worked out, key questions still remain. One of the biggest of these is the site of the formation of about half of the elements heavier than iron, in the r-process of nucleosynthesis. From the solar system abundance pattern of these nuclei, we can tell they were synthesized via neutron capture in conditions of high temperature and free neutron density. These conditions may be found in core-collapse supernovae or compact object mergers, though to date no self-consistent simulations of the r-process in these events exist that match the observational data. Here we will discuss aspects of a potential r-process in each of these sites, focusing on the neutrino interactions that can determine the neutron-richness of the environment and the nuclear physics of neutron-rich nuclei that shapes the final abundance pattern.