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The Impact of Reaction Rate Uncertainties (and other nuclear physics inputs) on Nucleosynthesis in the Neutrino-p Process CARLA FROHLICH, EFI & Dept of Astronomy, Univ of Chicago, X. TANG, Dept of Physics, Univ of Notre Dame, J.W. TRURAN, Univ of Chicago & Argonne NL — The neutrino-p (νp) process has been shown to be an important nucleosynthesis process, occurring in core collapse supernovae, that contributes to the synthesis of nuclei in the mass region $64 \leq A \leq 120$. Such a nucleosynthesis process (in addition to the r- and s-processes) is needed to explain the observed abundance patterns in this mass region - particularly in very low metallicity stars. The νp-process consists of a sequence of (p,γ) and (n,p) or β^+ reactions, where the slowest reactions set the timescale. Nucleosynthesis studies of such events as the νp-process typically involve the use of reaction networks that include several thousand nuclei and associated reaction cross sections and lifetimes, most of which are only known theoretically. A majority of the nuclei involved are unstable and hence pose a challenge for experimental nuclear physicists. With improvements in existing facilities such as NSCL at MSU and ATLAS at ANL and with a future FRIB facility, experimental investigations of reaction rates and other nuclear quantities involving unstable nuclei will become feasible. In this talk, we will demonstrate how uncertainties in the reaction rates influence the resulting nucleosynthesis. In addition, we will identify important reactions and nuclei to be studied experimentally with upcoming techniques at the new facilities.

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