

Abstract Submitted
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Impact of electron-captures on nuclei near $N = 50$ on core-collapse supernovae¹ RACHEL TITUS, CHRIS SULLIVAN, REMCO G T ZEGERS, B ALEX BROWN, Michigan State University/NSCL, BINGSHUI GAO, NSCL — Sensitivity studies of the late stages of stellar core collapse with respect to electron-capture rates indicate the importance of a region of nuclei near the $N=50$ shell closure, just above doubly magic ^{78}Ni . In the present work, it has been demonstrated that uncertainties in key characteristics of the evolution, such as the lepton fraction, electron fraction, entropy, stellar density, and in-fall velocity are about 50% due to uncertainties in the electron-capture rates on nuclei in this region, although thousands of nuclei are included in the simulations. The present electron-capture rate estimates used for the nuclei in this region of interest are primarily based on a simple approximation, and it is shown that the estimated rates are likely overestimated by an order of magnitude or more. More accurate microscopic theoretical models are required to obtain Gamow-Teller strength distributions, upon which electron-capture rates are based. The development of these models and the benchmarking of such calculations rely on data from charge-exchange experiments at intermediate energies, and an experimental campaign to study $N=50$ nuclei with the $(t, ^3\text{He})$ reaction at NSCL will be presented.

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