ELECTRON CAPTURE ON IRON-GROUP NUCLEI[1]

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We present Gamow-Teller strength distributions from shell-model Monte Carlo studies of fp-shell nuclei that may play an important role in the pre-collapse evolution of supernovae. We then use these strength distributions to calculate the electron-capture cross sections and rates in the zero-momentum transfer limit. We also discuss the thermal behavior of the cross sections. We find large differences in these cross sections and rates when compared to the naive single-particle estimates. These differences need to be taken into account for improved modeling of the early stages of type II supernova evolution.

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