

Neutrino-nucleus reactions and e-capture rates based on new shell-model Hamiltonians

Neutrino-nucleus reaction cross sections relevant to supernova neutrino detection and nucleosynthesis are evaluated for ^{12}C , ^{13}C , ^{16}O , ^{40}Ar and ^{56}Ni with new shell-model Hamiltonians. Cross sections for various gamma and particle emission channels as well as for coherent scattering are obtained for ^{12}C , ^{13}C and ^{16}O . The updated cross sections are compared with available experimental data as well as previous calculations. Advantage of using light targets for coherent scattering is discussed.

Charged-current cross sections folded over neutrino spectra with and without the neutrino oscillations are compared to each other to see how they are sensitive to the MSW and/or collective neutrino oscillation effects. We also discuss electron-capture rates for supernova explosions and evolution of stars updated with new shell-model Hamiltonians for *sd*- and *pf*-shells. Evaluations of the rates for two-major shells such as *sd-pf* and *pf-g* shells are also in progress.

Primary author: Prof. SUZUKI, Toshio (Nihon University)

Co-authors: Prof. BALANTEKIN, Baha (University of Wisconsin); Prof. HONMA, Michio (University of Aizu); Prof. CHIBA, Satoshi (Tokyo Institute of Technology); Prof. KAJINO, Toshitaka (National Astronomical Observatory of Japan)

Presenters: Prof. BALANTEKIN, Baha (University of Wisconsin); Prof. SUZUKI, Toshio (Nihon University); Prof. KAJINO, Toshitaka (National Astronomical Observatory of Japan)