

HAW05-2005-000103

Abstract for an Invited Paper
for the HAW05 Meeting of
the American Physical Society

New shell model calculations of neutrino-nucleus scattering cross sections

TOSHIO SUZUKI, Department of Physics, College of Humanities and Sciences, Nihon University

Neutrino-nucleus reactions induced by charged and neutral currents are investigated by using new shell model Hamiltonians, where nucleon-nucleon interactions in the spin-isospin channel are improved to take into account properly the shell evolution properties. Quenching in the Gamow-Teller transition strength is somewhat weakened and agreement with experimental value is improved in several p-shell nuclei. Better agreement with observed values is systematically obtained for the magnetic moments in p-shell nuclei. Neutrino-nucleus cross sections are calculated for p-shell nuclei, for example, in ^{12}C and ^{11}B for supernovae and accelerator neutrinos by using the new shell model Hamiltonians. Change of the charged and neutral current cross sections are discussed by comparing with those obtained by conventional shell model Hamiltonians. Reactions on ^4He as well as heavy nuclei are also studied. Effects of the spreading in the strength on the cross sections are shown to be important.