

# NEUTRINO INTERACTIONS WITH NUCLEI FOR NEUTRINO PROCESS IN SUPERNOVA EXPLOSION

Myung-Ki Cheoun<sup>1</sup>, Eunja Ha<sup>1</sup>, Jaewon Shin<sup>1</sup>, Toshitaka Kajino<sup>2</sup>, T. Hayakawa<sup>3</sup>

<sup>1</sup>Department of Physics, Soongsil University, Seoul 156-743, Korea

<sup>2</sup>Division of Theoretical Astronomy, National Astronomical Observatory of Japan, Mitaka, Tokyo 181-8588, Japan and Department of Astronomy, Graduate School of Science, University of Tokyo, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan

<sup>3</sup>National Institutes for Quantum and Radiological Science and Technology, JAEA, Shirakara-Shirane 2-4, Tokai-mura, Ibaraki 319-1195, Japan

We present neutrino interactions with some nuclei, whose cosmological origins are thought to be strongly correlated with supernova neutrinos. For example, neutrino cross sections with  $^{19}\text{F}$ ,  $^{98,99}\text{Ru}$ ,  $^{99}\text{Tc}$   $^{100}\text{Ru}$  are calculated by Quasi-particle Random Phase Approximation (QRPA). Also possible physical meanings will be addressed because these reactions play important roles for the neutrino process nucleosynthesis.

In order to justify these predictions we estimate Gamow-Teller (GT) transition strengths of the nuclei and compare to available experimental data. In addition to GT transition, recent results of M1 spin transition strengths are also to be discussed with related topics because it is largely associated with the neutrino interactions via neutral current.