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Neutrino nuclear responses for double beta decays and astro neutrino interactions HIDETOSHI AKIMUNE, Konan University, HIROYASU EJIRI, RCNP, Osaka Unniversity — Neutrino nuclear matrix elements (NMEs), are crucial to extract neutrino properties from double beta decay (DBD) experiments, and to evaluate astro-neutrino nuclear interaction and nucleosynthesis rates. NMEs are very sensitive to nucleon nucleon spin-isospin($\sigma\tau$) and nuclear medium effects. Theoretical calculations for NMEs are very hard. Experimental inputs from charge exchange reactions such as (^{3}He,t) and ($\mu, \nu_\mu xn\gamma$) are very important for evaluating ν-weak NMEs for $\beta\beta$ and astro-ν processes. Gamow-Teller (GT) and spin dipole (SD) NMEs are studied. Note GT is major for $2\nu\beta\beta$, while SD is one of major components for $0\nu\beta\beta$. The observed NMEs for both GT and SD transitions are found to be reduced by $k_{\sigma\tau}$ $\approx$0.4-0.5 due to the nucleon $\sigma\tau$ correlation and to the one k_{NM} $\approx$0.5-0.6 due to the nuclear medium effects such as nucleon isobar (Δ) that are not explicitly included in the pnQRPA. The nuclear medium effects such as NΔ correlations are incorporated by using the effective coupling constant g_A^{eff}=(0.5-0.6)$\times g_A(free)$ for $\beta\beta$ and astro-ν NMEs.

Hidetoshi Akimune
Konan University

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