

Frontiers in Gamma Ray Spectroscopy

FIG18

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Measurement of gamma-rays from giant resonances of ^{12}C and ^{16}O and comparison with the hadronic decay model calculations

Content :

Experiment(E398) was carried out at RCNP(Osaka) to measure the energy spectrum and emission probabilities of gamma-rays from giant resonances of ^{12}C and ^{16}O using 392-MeV proton beam, high-resolution magnetic spectrometer "Grand Raiden" and array of NaI(Tl) scintillators.

Gamma-ray emission probability from the giant resonances of ^{12}C and ^{16}O has been measured as a function of excitation energy(E_x). The maximum gamma-ray emission probability was measured to be 70% for ^{12}C at $E_x=27\text{MeV}$ and 90% for ^{16}O at $E_x=23\text{MeV}$ until the energy threshold for two nucleons decay, then decrease gradually. We also present the hadronic decay model calculations for the transition probability from the giant resonance states to the excited states of daughter nuclei. We compare the calculations with our measured gamma-ray emission probability. Combining E398 gamma branching with $^{12}\text{C}(\nu, \nu')$ and $^{16}\text{O}(\nu, \nu')$ cross section, we also estimate supernova NC neutrino events expected at KamLAND and Super-Kamiokande.

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