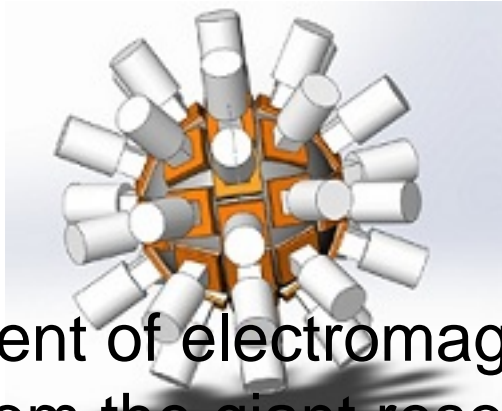


Frontiers in Gamma Ray Spectroscopy

FIG18



Contribution ID : 57

Measurement of electromagnetic direct decays from the giant resonances of ^{12}C and ^{16}O .

Content :

We carried out an experiment(E398) to measure the energy and emission probabilities of gamma-rays from the giant resonances ^{16}O and ^{12}C at Research Center for Nuclear Physics in Osaka University, using 392-MeV proton beam, high-resolution magnetic spectrometer "Grand Raiden" and an array of NaI(Tl) scintillators.

The nucleus excited to the giant resonances(GR) may decay via hadronic mode by emitting a particle or with electromagnetic mode by emission of high energy gamma rays. In this presentation, we stress on the electromagnetic decay mode and its measurements. Electromagnetic decay of GR is extremely sensitive to its multipolarity. As the strength of E1 transition is much larger than other multipole transitions, direct electromagnetic decays to the ground state of $^{12}\text{C}(0^+)$ are dominated by GDR(1^-) and contribution from the GR with higher multiplicities is suppressed.

The direct gamma ray branching ratio was measured as a function of excitation energy(Ex). For the region($16\text{MeV} < \text{Ex} < 22\text{MeV}$) populated by resonances with higher multiplicities($J^\pi = 2^-, 3^-, 4^-$), we measured branching ratio to be $0.14 \pm 0.06\%$, which is small and insignificant (2σ level). The significant branching ratio of $0.28 \pm 0.04\%$ has been observed for the region($22\text{MeV} < \text{Ex} < 26\text{ MeV}$) which is dominated by GDR.

We also measure the direct gamma cross section by combining E398 cross section for $^{12}\text{C}(p,p')$ reaction. The measured direct gamma cross section also clearly shows the dominance of GDR.

We present the measurement of direct decays and theoretical implications of the result.

Primary authors : Mr. REEN, Mandeep Singh (Okayama University)

Co-authors : Mr. SUDO, Takashi (Okayama University)

Presenter : Mr. REEN, Mandeep Singh (Okayama University)

Session classification : --not yet classified--

Track classification : --not yet classified--

Type : Poster