STUDY OF SPIN-DIPOLE 0^- STATES VIA PARITY-TRANSFER (^{16}O, $^{16}F(0^-)$) REACTION

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The spin-dipole (SD) 0^- excitation has recently attracted theoretical attention owing to its strong relevance in the tensor correlations in nuclei. For example, recent self-consistent HF+RPA calculations predict that the tensor correlations produce a strong hardening (shifting toward higher excitation energy) effect on the 0^- resonance. It is also predicted that the effect is sensitive to the magnitude of the tensor strength. Thus experimental data of the 0^- distribution enable us to examine the tensor correlation effects quantitatively. Despite this importance, experimental information on 0^- states is limited because of the lack of the experimental tools suitable for 0^- studies.

We propose the parity-transfer (^{16}O, $^{16}F(0^-)$) reaction as a powerful tool to study 0^- states in nuclei. This reaction has a unique selectivity to unnatural-parity states, which is an advantage over the other reactions used thus far. As the first (^{16}O, $^{16}F(0^-)$) measurement, the experiment for a ^{12}C target was performed by using a 247 MeV/u primary ^{16}O beam at the RIKEN RI Beam Factory (RIBF). The outgoing $^{15}O + p$ particles produced in the decay of ^{16}F were measured in coincidence by using the SHARAQ spectrometer.

The obtained ^{12}B excitation energy spectrum shows high selectivity of the present reaction to 0^- states. We also find that the oscillatory pattern of the angular distribution allows a clear spin-parity determination of each excited state. These unique features will be discussed in detail, as well as the results for the 0^- distribution in ^{12}B.