PARITY-TRANSFER REACTION FOR STUDY OF SPIN-DIPOLE 0^- MODE

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The spin-dipole (SD) 0^- excitation characterized by $\Delta L=1$, $\Delta S=1$, and $\Delta J^\pi=0^-$, attracts recent theoretical attention due to its strong relevances to the tensor correlations in nuclei. For example, self-consistent HF+RPA calculations in Ref. [1] 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 SD 0^- distribution enable us to quantitatively examine the tensor correlation effects. Despite this importance, experimental information on 0^- states is limited because of the lack of the experimental tools that are suitable for the 0^- studies.

We propose a new probe, the parity-transfer (^{16}O,^{16}F(0^-,g.s.)) reaction, for the 0^- studies [2]. The parity-transfer reaction selectively excites unnatural-parity states for a 0^+ target nucleus, which is an advantage over the other reactions used so far. In order to establish the parity-transfer reaction as a new tool for the 0^- studies, we performed the measurement of the ^{12}C(^{16}O,^{16}F(0^-,g.s.))^{12}B reaction. We demonstrate the effectiveness of this reaction by identifying the known 0^- state at E_x=9.3 MeV in ^{12}B.

The experiment was performed at the RIKEN RI Beam Factory (RIBF) by using the SHARAQ spectrometer and the high-resolution beam line [3]. A primary ^{16}O beam at 250MeV/nucleon was used. The outgoing ^{15}O + p produced by the decay of ^{16}F were measured in coincidence.

We obtained the relative energy E_{rel} between the ^{15}O and the proton, and the 0^- g.s. of ^{16}F was clearly separated from other excited states owing to the high resolution. In order to identify ^{12}B(0^-, 9.3 MeV) state, the data analysis for obtaining the ^{12}C(^{16}O,^{16}F(0^-, g.s.)) spectrum and its angular distributions is in progress. In this presentation, we will report the details of the experiment and the results.

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