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Parity-transfer (^{16}O,^{16}F(0^-)) 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$(0^-, \mathrm{g.s.})$) reaction,
for the 0^- studies [2].
The parity-transfer reaction uses $0^+ \rightarrow 0^-$ transition
in the projectile to probe 0^- states in a target nucleus.
This reaction has a unique selectivity to
unnatural-parity states,
which is an advantage over the other reactions used so far.
The first experiment for a ^{12}C target
was performed at the RIKEN RI Beam Factory
by using the SHARAQ spectrometer [3].
In this presentation,
we will report the details of the experiment and the results.

[1] H. Sagawa, G. Coló, Prog. Part. Nucl. Phys., 76 (2014) 76

[2] M. Dozono et al., RIKEN Accel. Prog. Rep., 45 (2012) 10

[3] T. Uesaka et al., Prog. Theor. Exp. Phys., 2012 (2012) 03C007

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