

Study of spin-isospin responses of light nuclei near and along the drip line with PANDORA

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The charge-exchange (p,n) reactions at intermediate beam energies and small angles, can selectively excite Gamow-Teller (GT) states up to high excitation energies in the final nucleus. Therefore, (p,n) reactions in inverse kinematics applying the missing mass reconstruction[1,2] provide the best and efficient tool to study the B(GT) strengths values of unstable isotopes in a wide excitation energy region, without Q-value limitation. An experimental program aiming to study the spin-isospin responses of light nuclei along the drip line was started at RIKEN RIBF. A measurement [3], SAMURAI-30, with 5 days of beam time was approved to investigate ^8He , ^{11}Li and ^{14}Be nuclei. In a pilot measurement of the mentioned experiment at HIMAC facility in Chiba, we studied the Gamow-Teller transitions of ^6He in inverse kinematical (p,n) reactions at 123 MeV/nucleon incident energy using polyethylene target. Our new neutron detector, PANDORA [4], with digital readout was also commissioned.

In this talk, details of experiment and the results of B(GT) strengths distribution of ^6He will be reported as well as a brief overview of the whole program will be presented.

[1] M. Sasano et al., Phys. Rev. Lett. 107, 202501 (2011).

[2] M. Sasano et al., Phys. Rev. C 86, 034324 (2012).

[3] L. Stuhl et al., RIKEN Accelerator Progress Report 48, 54 (2015).

[4] L. Stuhl et al., Nucl. Instr. Meth. A 866, 164 (2017).

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