

# Study of neutron-neutron correlation in Borromean nucleus $^{11}\text{Li}$ via the $(p,pn)$ reaction

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Dineutron correlation is one of the symbolic phenomena expected to appear in neutron drip-line nuclei. It has been studied using different approaches, such as the transfer reaction and the break up reaction. However, currently available data seem to be insufficient to study the neutron-neutron correlation in terms of

- (i) the decomposition of high-angular-momentum components,
- (ii) the extraction of a core excitation,
- (iii) and the effect of final state interactions (FSIs) [1].

In the present study,

- (i) the MINOS [2] was used for higher luminosity,
- (ii)  $\gamma$  rays were detected to tag the core excitation,
- (iii) and the quasi-free  $(p, pn)$  reaction was employed to minimize the FSI.

In order to determine the momentum distribution of two valence neutrons, the kinematically complete measurement was performed. The opening angle between the two neutrons was reconstructed from the measured momentum vectors of all the particles.

The experiment was carried out by using the SAMURAI spectrometer [3] combined with the liquid hydrogen target system MINOS.

Momentum vectors of a knocked-out neutron and a recoil proton were respectively determined by the neutron detector WINDS [4] and a recoil proton detector setup, developed for this project.

Decay neutrons and heavy fragments were momentum analyzed by the neutron detector NEBULA and the SAMURAI spectrometer, respectively.

The details of experimental setup and results will be presented in this talk.

[1] Y. Kikuchi et al., Phys. Rev. C 87, 034606 (2013).

[2] A. Obertelli et al., Eur. Phys. Jour. A 50, 8 (2014).

[3] T. Kobayashi et al., Nucl. Instr. Meth. B 317, 294(2013).

[4] K. Yako et al., RIKEN Accel. Prog. Rep 45, 137 (2012).

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