



Contribution ID: 97

Type: Oral presentation

## Study of two nucleons correlation via (p,dN) in ${}^6\text{He}$

*Friday, 28 June 2024 09:40 (20 minutes)*

The isospin character of the p-n pair and n-n pair at medium relative momentum has been observed in comparison with A=6 nuclei,  ${}^6\text{Li}$ , and  ${}^6\text{He}$ . We have measured the  ${}^6\text{Li}(p,dp)$  and  ${}^6\text{He}(p,dn)$  cross sections for the neutron pick-up domain with 70A MeV incident heavy ion on the solid hydrogen target[1] via inverse kinematics at RIPS facility in RIKEN. All the reaction products at forward angles, including recoiled nucleons N [p or n], were measured by plastic scintillator telescopes and identified unambiguously. The momentum transfer covers up to 1.0 fm<sup>-1</sup> through a wide angular coverage, thus picking up the high-momentum neutrons correlated with protons in nuclei. In the (p,dp) reaction, we observed a strong population of deuteron-like states d+ ${}^4\text{He}$  in  ${}^6\text{Li}$  but a weak population of neutron pairs 'n-n'+ ${}^4\text{He}$  in  ${}^6\text{He}$ .

The data were compared with plane-wave and distorted-wave impulse approximation (DWIA) calculations with realistic elastic d(p,p)d and charge exchange reaction 'n-n'(p,n)d cross sections with the common procedure, which was successfully applied to the  ${}^{16}\text{O}(p,dp)$ [2]. The calculations with assumed spectroscopic amplitudes from theoretical estimation based on a three-body model[3] fairly reproduce the observed ratio of cross sections between  ${}^6\text{Li}$  and  ${}^6\text{He}$ . It indicates that the present DWIA framework works well at medium relative momenta. The observed strong isospin dependence in the NN pair indicates the presence of NN correlation in A=6 nuclei. In this talk, we will present new results of the experiment with  ${}^6\text{Li}(p,dp){}^4\text{He}$  and  ${}^6\text{He}(p,dn){}^4\text{He}$  and discuss the applied detailed reaction analysis.

[1] Y. Matsuda et al. Nuclear Instruments and Methods A643 (2011) 6-10

[2] S. Terashima et al. Phys. Rev. Lett. 121(2018) 242501

[3] W. Horiuchi and Y. Suzuki. Phys. Rev. C76(2007)024311

### Collaboration

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**Session Classification:** Friday morning 1