

# Experimental study of $YN$ interaction in the neutron rich environment produced via the ${}^6\text{Li}(\pi^-, K^+)X$ reaction

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For the  $YN$  interaction in the  $S = -1$  sector in the nuclear matter, the coupling between  $\Lambda$  and  $\Sigma$  particles is essential to explain the nature of the strangeness involved phenomena such as the excess of binding energy of the ground state of  ${}^4_\Lambda\text{He}$  [1] and the mechanism of the  $(\pi^-, K^+)$  double-charge exchange reaction [2]. It is theoretically expected that such the extra attraction coming from the  $\Lambda$ - $\Sigma$  coupling effect is enhanced in the neutron rich environment. In addition, the candidate events of  ${}^6_\Lambda\text{H}$ , which is the system expected to be bound owing to  $\Lambda$ , were reported from the FINUDA experiment [3]. Thus, the experimental study (J-PARC E10) using the  ${}^6\text{Li}(\pi^-, K^+)X$  reaction was triggered in J-PARC in 2012.

As the result of the experiment, almost no event were observed below the  ${}^4_\Lambda\text{H}+2n$  threshold [4]. Although this result was theoretically analyzed, it is still under discussion. Then, the more experiment information is awaited in order to conclude this situation. Recently, we improved the missing-mass resolution, the analysis efficiencies, and the background reduction method. The production cross section of the  ${}^6\text{Li}(\pi^-, K^+)X$  in every 2 degree of the reaction angle between 2-14 degree were also obtained. In this talk, we would like to report the latest analysis result of the J-PARC E10 experiment.

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