

## Study of $^{12}_{\Lambda}\text{Be}$ neutron-rich hypernucleus production via the $^{12}\text{C}(K^-, \pi^+)X$ reaction at 1.8 GeV/c at J-PARC

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In fall 2015, the E05 Collaboration carried out the first phase of the experiment for search at the J-PARC K1.8 beam line using the Superconducting Kaon Spectrometer. The experiment is dedicated to the search for  $\Xi^-$  hypernuclei via the  $(K^-, K^+)$  reaction. A 9.36 g/cm<sup>2</sup> thick Carbon target was irradiated with a total of  $56.6 \times 10^9$   $K^-$  at 1.8 GeV/c. In addition, a polyethylene target of 9.54 g/cm<sup>2</sup> was used in order to study the elementary production cross section of  $\Xi^-$  at beam momenta of 1.5, 1.6, 1.7, 1.8, and 1.9 GeV/c.

In this measurement, the  $(K^-, \pi^+)X$  events were simultaneously taken with a pre-scale factor of 3 with both targets. The  $\Sigma^-$  and  $\Sigma^*(1385)$  structure were clearly seen in the spectra from polyethylene data while the in-flight  $^{12}\text{C}(K^-, \pi^+)X$  spectrum up to the  $Y^*$  region was firstly observed at the beam momentum of 1.8 GeV/c. Such the inclusive spectra enable us to investigate the  $\Sigma/\Sigma^*$ -nucleus potential through theoretical analysis.

Furthermore, the production of the neutron-rich hypernucleus,  $^{12}_{\Lambda}\text{Be}$ , was an important topic investigated through the  $^{12}\text{C}(K^-, \pi^+)^{12}_{\Lambda}\text{Be}$  reaction. In the Carbon spectra, we were able to obtain a hint of the  $^{12}_{\Lambda}\text{Be}$  hypernucleus production. In this conference, we would like to report the production cross section of  $^{12}_{\Lambda}\text{Be}$  via the  $(K^-, \pi^+)$  reaction.