

Search for strange tribaryon states in the ${}^4\text{He}(\text{stopped } K^-, p)$ reaction

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In recent years there has been a considerable interest in an existence of deeply-bound $\overline{K}$ nuclear states which were stimulated by a prediction based on phenomenological $\overline{K}N$ interaction [1]. To observe such a state, experimental searches have been intensively performed at KEK, LNF, BNL and so on. In the KEK experiment (KEK-PS E471), an intense narrow peak was reported in a proton spectrum from the ${}^4\text{He}(\text{stopped } K^-, p)$ reaction [2]. The state was denoted as strange tribaryon, $S^0(3115)$. It can be interpreted as a signal by a formation of a deeply-bound K^-pnn state, and confirmations and further investigations were strongly required.

We performed a new experimental search at KEK in 2005 with much improved statistics and the energy resolution compared with those of E471. Furthermore, the momentum acceptance for protons was enlarged to search for other candidate of tribaryon states. Inclusive data were taken in the ${}^4\text{He}(\text{stopped } K^-, p)$ measurement, which enable us to determine a formation branching ratio of the state precisely.

In the obtained missing mass spectrum, no narrow peak structure was observed. The upper limit of the formation branching ratio was determined for the tribaryon states with strangeness -1 , charge 0 and isospin 1 [3].

In this contribution, the result of the missing mass analysis of the ${}^4\text{He}(\text{stopped } K^-, p)$ reaction will be presented.

[1] Y. Akaishi and T. Yamazaki, Phys. Rev. C 65 044005(2002).

[2] T. Suzuki et al., Phys. Lett. B 597(2004)263.

[3] M. Sato et al., Phys. Lett. B 659(2008)107.

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