Strange multibaryons studied in the ^{4}He($K^-_{stopped}$, ΛN) reaction

Takatoshi Suzuki[(a)] for KEK-PS E549 collaboration

[(a)] Department of Physics, The University of Tokyo, Tokyo, Japan

In order to confirm the strange tribaryon signals in the KEK-PS E471 experiment [1], we have performed the E549 experiment at the KEK 12 GeV Proton Synchrotron, with upgraded experimental devices and with by one order improved statistics. As result, narrow tribaryonic states were not observed in the ^{4}He(stopped K^-,N) missing mass spectra, and very strict upper limits for the both p [2] and n [3] emission channels were obtained for narrow states, although unresolved non-mesonic intensities were still observed around 3140 MeV/c^2 [3]. Meanwhile, FINUDA reported on possible K^-pp and K^-ppn bound state candidates in the Λp [4] and Λd [5] invariant mass spectra, respectively, from the stopped K^- reaction on several light nuclear targets. However, their interpretations suffered from the uncertainty of the contribution of non-mesonic multinucleon absorption processes [6,7].

We have investigated correlations of coincident ΛN [8] and Λd [9] pairs to establish the multinucleon processes and found out possible multibaryonic signals, and clearly observed Λ branches of non-mesonic two- and three-nucleon absorptions in the ΛN and Λd invariant mass spectra, respectively, as well-separable processes. Their existence and properties were definitely established. Furthermore, mysterious non-mesonic reaction strengths, which indicate possible signals of the formation and non-mesonic decay of strange multibaryon states with large widths, have been separately identified. In the contribution, we will develop the various aspects of normalized ΛN spectra, and discuss quantitatively possible interpretations of the mysterious components as $\bar{K}NN$ and/or $\bar{K}NNN$ bound states [10].

[1] T. Suzuki *et al.*, Phys. Lett. B **597**, 263 (2004) ; M. Iwasaki *et al.*, arXiv:nucl-ex/0310018.

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

[3] H. Yim *et al.*, Phys. Lett. B, in press (2010).

[4] M. Agnello *et al.*, Phys. Rev. Lett. **94**, 212303 (2005).

[5] M. Agnello *et al.*, Phys. Lett. B **654**, 80 (2007).

[6] V.K. Magas, E. Oset, A. Ramos, and H. Toki, Phys. Rev. C **74** 025206 (2006).

[7] V.K. Magas, E. Oset, and A. Ramos, Phys. Rev. C **77** 065210 (2008).

[8] T. Suzuki *et al.*, Mod. Phys. Lett. A **23**, 2520 (2008).

[9] T. Suzuki *et al.*, Phys. Rev. C **76**, 068202 (2007).

[10] Y. Akaishi and T. Yamazaki, Phys. Rev. C **60**, 044005 (2002) ; T. Yamazaki and Y. Akaishi, Phys. Lett. B **535**, 70 (2002).

E-mail: tsuzuki@phys.s.u-tokyo.ac.jp