K^-pp-$\bar{K}^0np$ coupled-channel DWIA calculation for (K^-, n) reaction spectrum

Takahisa Koike[1], Toru Harada[1], Akinobu Doté [2]

[1]Osaka Electro-Communication University

[2]KEK Theory Center, Institute of Particle and Nuclear Studies (IPNS), KEK

An experimental search of the "K^-pp" bound state by ^{3}He(K^-, n) reaction was recently performed at J-PARC [1], but no clear peak corresponding to the deeply-bound state was observed. The precise comparison of the whole spectrum shape with the theoretical calculation will be inevitable to deduce the binding energy and width of K^-pp from J-PARC data. To do this, our previous DWIA calculation of the ^{3}He(K^-, n) reaction spectrum [2] is improved as follows;

1. The K^-pp-$\bar{K}^0np$ coupled-channel Green's function method in the charge basis is employed, instead of the previous $\bar{K}NN_{I=1/2}$ single channel one in the isospin basis.
2. The phenomenological potential in the previous calculation is replaced to the microscopic G-matrix folding potential with the chiral SU(3) based $\bar{K}N$ interaction derived by Doté et.al [3]. Our folding potential gives $B.E.$ = 14 MeV and Γ = 92 MeV for [K^-pp-$\bar{K}^0np$] coupled state with spin $S = 0$.
3. The contribution of the $S = 1$ $\bar{K}^0d$ state is added, as well as the $S = 0$ state.

The preliminary results of the calculated spectrum shown in Fig. 1.

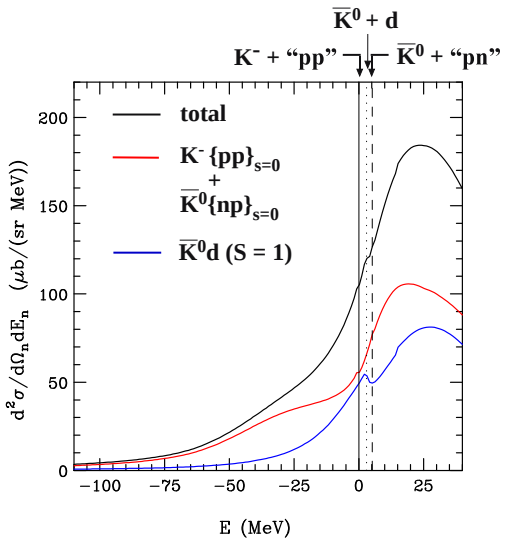

Figure 1: The calculated spectrum for ^{3}He(K^-, n) reaction with $p_{K^-} = 1$ Gev/c and $\theta_n = 0°$.

[1] T. Hashimoto et al. (J-PARC E15 collaboration), arXiv:1408.5637 [nucl-ex]

[2] T. Koike and T. Harada, Phys. Lett. **B652** (2007) 262; Phys. Rev. **C80** (2009) 055208.

[3] A. Doté, T. Inoue and T. Myo, Nucl. Phys. **A912** (2013) 66.