$\Xi(1690)$ as a $\bar{K}\Sigma$ molecular state

Takayasu Sekihara[1]

[1]Research Center for Nuclear Physics (RCNP), Osaka University, Ibaraki, Osaka, Japan

Investigating the internal structure of hadrons is one of the most important subjects in hadron physics. The motivation for the investigation is that we expect the existence of exotic hadrons, which are not able to be classified as qqq for baryons nor $q\bar{q}$ for mesons. Actually, the fundamental theory of strong interaction, QCD, does not prohibit such exotic systems as long as they are color singlet, and there are indeed several exotic hadron candidates which cannot fit into the classifications by the constituent quark models [1].

In this contribution we focus on the $\Xi(1690)$ resonance and theoretically investigate its structure in terms of the $\bar{K}\Sigma$ component. We show that the $\Xi(1690)$ pole with $J^P = 1/2^-$ can be dynamically generated near the $\bar{K}\Sigma$ threshold as an s-wave $\bar{K}\Sigma$ molecular state in a coupled-channels chiral unitary approach with the Weinberg-Tomozawa interaction. In the chiral unitary model we qualitatively reproduce the experimental $\bar{K}^0\Lambda$ and $K^-\Sigma^+$ mass spectra with the $\Xi(1690)$ pole, as seen in Fig. 1. Moreover we theoretically investigate properties of the dynamically generated $\Xi(1690)$ state.

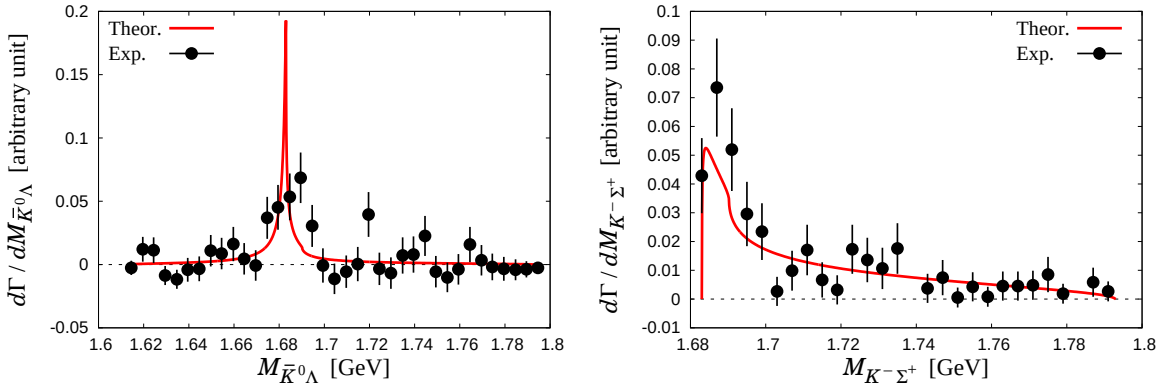

Figure 1: Mass spectra of the $\bar{K}^0\Lambda$ (left) and $K^-\Sigma^+$ (right) states [2]. Experimental data are taken from Ref. [3].

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[2] T. Sekihara, arXiv:1505.02849 [hep-ph].

[3] K. Abe *et al.* [Belle Collab.], Phys. Lett. B **524**, 33 (2002).