

Theory of few-body kaon-nuclear systems

Thursday, 30 June 2022 08:30 (25 minutes)

The strong interaction between an antikaon and a nucleon is at the origin of various interesting phenomena in kaon-nuclear systems. In particular, the interaction in the isospin $I = 0$ channel is sufficiently attractive to generate a quasi-bound state, the $\Lambda(1405)$ resonance, below the $\bar{K}N$ threshold. Based on this picture, it may be expected that the $\bar{K}N$ interaction also generates quasi-bound states in kaon-nuclear systems, sometimes called kaonic nuclei. At the same time, the $\bar{K}N$ quasi-bound picture of the $\Lambda(1405)$ is also related to the discussion of hadronic molecules in hadron spectroscopy. In this talk, an overview is presented of the theoretical studies developed for kaon-nucleon and kaon-nuclear systems [1]. We start from the modern understanding of the $\Lambda(1405)$ resonance [2]. We then discuss the $\bar{K}N$ interaction [3] and various aspects of few-body kaonic nuclei [4]. Related topics, such as the K^-p momentum correlation functions in high-energy collisions and the studies of kaonic atoms, are also discussed.

[1] T. Hyodo and W. Weise, arXiv:2202.06181 [nucl-th].

[2] Y. Ikeda, T. Hyodo and W. Weise, Phys. Lett. B 706, 63 (2011); Nucl. Phys. A 881, 98 (2012)

[3] K. Miyahara and T. Hyodo, Phys. Rev. C 93, 015201 (2016); K. Miyahara, T. Hyodo and W. Weise, Phys. Rev. C 98, 025201 (2018)

[4] S. Ohnishi, W. Horiuchi, T. Hoshino, K. Miyahara and T. Hyodo, Phys. Rev. C 95, 065202 (2017)

Primary author: Prof. HYODO, Tetsuo (Tokyo Metropolitan University)

Presenter: Prof. HYODO, Tetsuo (Tokyo Metropolitan University)

Session Classification: 4; Thu-I