

Prospects of kaonic nuclei and kaonic atoms at J-PARC (invited talk)

Friday, April 4, 2025 9:50 AM (30 minutes)

Anti-kaon is one of the promising candidates for forming mesic nuclear-bound states. After many experimental efforts, we have finally found the simplest state, the so-called “K-pp”, via the K- induced nucleon knockout reaction on helium-3. The validity of this reaction is also verified by the Lambda(1405) study using a deuterium target. Now, we are developing a new detector system to further extend the successful method to other kaonic nuclei and other decay modes to investigate the nature of kaonic nuclei.

In addition, X-ray spectroscopy of kaonic atoms is of complementary importance. We already explored a precision frontier by introducing a novel superconducting X-ray detector, TES. We also challenge a sensitivity frontier for kaonic deuterium, which is necessary to determine the isospin-dependent $K\bar{N}$ amplitude but is still missing except for the recent data in SIDDHARTA-2.

In this contribution, after a short review of the achievements in the last decade, we would like to discuss the forthcoming experiments with an upgraded solenoid spectrometer and an upgraded K- beamline at J-PARC.

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