

# ROCKSTAR: Towards a Roadmap of the Crucial measurements of Key observables in Strangeness reactions for neutron sTARs equation of state

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## Search for the $\bar{K}$ -NN state in photoproduction with LEPS2 spectrometer

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The behavior of kaon and anti-kaon in dense matter is an important topic, as their nature is closely related to symmetry breaking in low-energy QCD.

The interaction of kaons and anti-kaon with nucleon has been extensively studied with various experiments. These studies found that the  $\bar{K}$ -N interaction in the isospin  $I=0$  channel is sufficient to produce the quasi-bound state  $\Lambda(1405)$ .

This strong attractive interaction predicts the existence of a bound state known as a kaonic nucleus.

In particular,  $\bar{K}$ -NN is gaining attention as the simplest kaonic nucleus.

Recently, a clear peak has been observed in the E15 experiment. So there is growing interest in the properties of  $\bar{K}$ -NN.

In this presentation, I will discuss the studying of  $\bar{K}$ -NN in the ongoing hadron photoproduction experiment known as the LEPS2 solenoid Experiment and compare it with previous experiments. The LEPS2 solenoid experiment is a project aimed at investigating various hadron photoproduction reactions. It uses high-energy and high-intensity gamma beam and the solenoid spectrometer that covers large angles. The experiment is carried out at SPring-8, one of the large synchrotron radiation facilities in Japan.

Since 2022, the LEPS2 solenoid experiment has collected the physics data. In my talk, I would like to report on its current status and expected future results.

# Event display

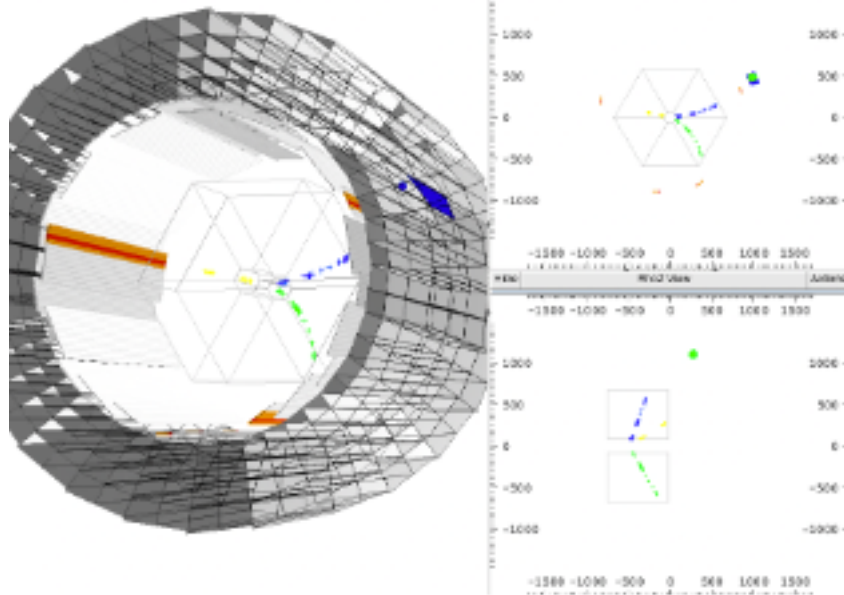


Figure 1: The Event Display of the LEPS2 Experiment

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