

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

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The behavior of kaons and anti-kaons in dense matter is an important topic in nuclear and particle physics, as their properties are closely related to the mechanism of symmetry breaking in low-energy QCD.  $\bar{K}NN$  has attracted significant attention as the simplest kaonic nucleus.

In this presentation, I will report on our study of the  $\bar{K}NN$  bound state in photoproduction. Our experiment utilizes high-energy (1.5–2.4 GeV), high-intensity  $\gamma$  beams, and a solenoid spectrometer capable of covering large angular ranges. An important feature of this study is the simultaneous measurement of proton and hyperon emitted at large angles over a wide kinematic coverage. As a result, this study provides valuable insight into the production process of the “ $K^-pp$ ” bound state. The concentration of events shows up below the  $K^-pp$  threshold in the  $\gamma d \rightarrow K^0\Lambda p$  reaction. I will discuss its origin.

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