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Newly completed JLab experiment: Determine the unknown Λ_n interaction by investigating the possible Λ_{nn} resonance

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The newly completed JLab experiment E12-17-003 aimed to search for a possible Λ_{nn} resonance using the $3\text{H}(e, e' K^+)(\Lambda_{nn})$ reaction. If such a state does exist, the experiment will measure its binding (or excitation) energy and natural width. These measurements will provide extremely important and experimentally determined information, for the first time, that can be used to investigate the unknown Λ_n interaction.

Direct ΛN scattering data is extremely important and needed based on the newly confirmed Charge-Symmetry-Breaking (CSB) at a level of 270keV from the binding energy difference observed between ground states of $4\Lambda\text{He}$ and $4\Lambda\text{H}$. Especially, the Λ_n data does not exist at all, thus the properties of Λ_n interaction has been assumed to be identical to that of Λp interaction. The resonance of Λ_{nn} system can provide a unique and only experimental data that can be used to determine the unknown properties of Λ_n interaction.

The presentation will give an overview of the physics motivation of the JLab experiment, the experimental technique, and the most updated analysis results which although may still be preliminary.

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