Future plan on Investigation of ΛN Interactions by Electroproduction at JLab

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The (e, e′K^+) reaction spectroscopy of hypernuclei was well established at JLab since about 15 years ago and it is now widely recognized as a powerful tool to study Λ-hypernuclei like (K^-,π^-) and (π^+, K^+) reactions. It has advantages in energy resolution (0.5 $\sim$ 0.8 MeV) and complements those from hadronic productions in being a dominantly spin-flip reaction as opposed to a non-spin flip reaction. The greater strength observed for the low-lying excited states of $^{12}_{\Lambda}$B [1] relative to the ground state is an example. The (e, e′K^+) reaction enables the determination of binding energies with high precision because of the calibration provided by the elementary reaction on hydrogen.

The collaboration is proposing new experiments in the JLab 12 GeV era covering a coherent series of measurements on Λ hypernuclei in specifically selected mass range of targets to investigate the ΛN interactions and various forms of quantum-manybody systems. The proposed measurements can be done only at JLab and will provide essential information for theoretical investigations. The outcome may make significant contributions to hypernuclear physics research for the next decade(s) in the framework of the research either ongoing or planned in this field. The new experimental design not only widens and deepens the physics range but also dramatically improves the data quality and production efficiency. The proposal (C12-15-008) was conditionally approved for the part of spectroscopy of $^{40}_{\Lambda}$K and $^{48}_{\Lambda}$K. Theoretical input and suggestions are extremely welcome.

[1] L. Tang *et al*, Phys. Rev. **C 90**, 034320 (2014)