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Next generation hypernuclear spectroscopy with the (e,e'K+) reaction at Jefferson Lab

Λ hypernuclear spectroscopy is useful for investigating the Λ-nucleon (ΛN) interaction. High resolution missing-mass spectroscopy for Λ hypernuclei was established at Jefferson Lab by means of the $(e, e'K^+)$ reaction. We are preparing a next-generation experiment in which Λ hypernuclei with a wide mass range, A = 6-208, will be measured at JLab's Experimental Hall C. The beam time is planned to start in 2027. High-momentum resolution spectrometers HES and HKS are expected to allow us to achieve an energy resolution of 0.6 MeV (FWHM) and a total energy accuracy of 0.07 MeV. Such a high accuracy measurement would give us new insights for ΛN charge symmetry breaking and isospin dependent ΛNN three body interaction. In addition, we aim to study deformation and cluster structures of core nuclei by using the Λ in hypernuclei as a probe. For example, tri-axially deformation states in 26 Mg will be investigated through high resolution spectroscopy of $^{27}_{\Lambda}$ Mg.

I will review the hypernuclear physics program at Jefferson Lab.

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