Hypernuclear spectroscopy in Hall C at Jefferson Lab

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Meson electro-production has long been used in Hall C at Jefferson Lab as a powerful probe of nuclear structure. One long-standing program that makes use of this technique has been a series of three dedicated Hypernuclear spectroscopy measurements that have run over the last decade in our Hall. The basic mechanism involves electro-production of strangeness inside the nucleus, a proton is converted to a Λ hyperon and the interaction is tagged through detection of a time-correlated K^+ meson and the recoil electron $(e, e'K^+)$. Although technically very challenging, the technique allows a non-Pauli blocked hyperon to be injected deep into the interior of nucleus—a domain that is otherwise difficult to probe. Precision measurement of the induced hypernuclear excited states provides an excellent probe into the Y-N and Λ-N interactions as well as giving insight into how a nucleon is distorted by the nuclear mean field.

The first successful measurement was carried out in Hall C in 2000 (E89-009), and was expanded upon by a second generation run in 2005 (E01-011)[1]. A third generation experiment (E05-115) was completed in 2009[2]. A brief history and update of this project will presented along with ideas for the 12 GeV future.

[1] O. Hashimoto *et al.*, Nucl. Phys. A **804**, 125–138 (2008).

[2] O. Hashimoto *et al.*, Nucl. Phys. A **835**, 121–128 (2010).

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