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Spectroscopy of Λ hypernuclei using Electron Beams

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Precision spectroscopy of Λ hypernuclei is quite important tool to study the baryon-nucleon interaction. After a decade of efforts at JLab, hypernuclear spectroscopy with electron beams was established. Active discussion on the charge symmetry breaking (CSB) of the ΛN interaction was triggered by a recent measurement of the ground state of ${}^{7}_{\Lambda}$He at JLab as well as progresses of theoretical works. Latest results of the HKS-HES experiment (JLab E05-115) on ${}^{7}_{\Lambda}$He, ${}^{10}_{\Lambda}$Be and ${}^{12}_{\Lambda}$B will be reviewed from the view point of the ΛN CSB effects. Since the discussion on the ΛN CSB effects started from the differences of energy levels of A=4 hypernuclear iso-doublet (${}^{4}_{\Lambda}$H and ${}^{4}_{\Lambda}$He), the study of them with state-of-art experimental techniques is important to understand the ΛN CSB effect. At Mainz, a new research technique, the decay pion spectroscopy of electro-produced hypernuclei, has been developed to study absolute binding energies of light hypernuclei. Latest status of the ${}^{4}_{\Lambda}$H study at Mainz will be reported. As well as spectroscopy of light hypernuclei, precise measurements of single particle energies for heavier hypernuclei are quite important to study the baryon interaction. Future prospects on study of heavier hypernuclei at JLab will be discussed.

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