Optical Calibration For Jefferson Lab HKS Spectrometer

LULLIN YUAN, Hampton University — Jefferson Lab HKS experiment aims at obtaining high resolution hypernuclear spectroscopy by \((e,e'K)\) reaction. The calibration of the HKS spectrometer is crucial in order to obtain the proposed missing mass resolution. This calibration procedure is complicated due to the use of a zero degree on-target splitter magnet. We have developed a high precision optical calibration method, making use of the known masses of \(\Lambda, \Sigma^0\) hyperons produced from hydrogen in \(\text{CH}_2\) target and the narrow width of \(^{12}\Lambda\text{B}\) hypernuclear ground state from \(^{12}\text{C}\) target. To deal with the high accidental background, we have implemented the Expectation-Maximization parameter estimation method. In this talk, the procedure of the calibration will be described and the preliminary results of the calibration will be presented.

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