Hall C Expert Howto

Experiment: HKS

Enge Magnet

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Abstract

This Howto outlines the purpose of the Enge magnet and its operation and monitor.

1 Purpose and Optics

The Enge Split-Pole magnet is used behind and combined with the Splitter magnet as the electron spectrometer which analyzes the electron's momentum and scattering angle. The momentum and angular reconstructions are done using the measured focal plane parameters, reconstruction matrices, and defined target point target X position.

The central momentum is 316 MeV/c with a bite of about $\pm 30\%$. The solid angle acceptance is about 9 msr in average. Due to the non-negligible momentum dispersion from the front Splitter magnet and extremely small scattering angle, the total virtual photon flux is obtained by more precise integrals over momentum bite and angle rather than simply using this average acceptance.

At a location between the Splitter and Enge Split-Pole, the Enge magnet is tilted by rotate about X-axis and followed by a shift along Y-axis. This arrangement effects as rotating at the virtual target position then shifting this point off the Splitter middle plane. By doing this, the spectrometer remains detecting small forward angle scattered electrons but just avoid the high rate bramstrahlung and Moller electrons. Such tilt does not effect the resolution but symmetry in acceptance.

2 Setting the magnet

Since this magnet is not directly effect the beam, thus it will be controlled and operated by Hall C experimentalists. However, due to fringe field does have slight effect to beam and other magnets nearby, such as Splitter and HKS Q1, it is preferred to turn off the beam during the process of setting up the magnet. Since this magnet is sharing the same power supply with Moller magnet, existing control will be used in setting up the magnet by referring to steps of "Getting started" and "Setting the magnets" in "How to set the SOS magnets" in Hall C online Howto document. Since no polarity change in operating this magnet for hypernuclear experiment, step of "Degaussing" is not Needed.

3 Monitor

The field is monitored directly by a hall probe. The stability should be controlled within an error of $\pm 10^{-4}$ or ± 1.5 gauss.