Hall B 12 GeV Upgrade Workshop

Feb 2-3 2007

Beamline Summary, part II

- Møller polarimeter
- Møller shield
- Raster
- Faraday cup
- Beam line instrumentation
- (Photon beam line. No new devices. No need to work on it for now.)
- Unpolarized targets
- Energy measurement

Møller polarimeter (B. Raue, FIU. Presented by S. Kuhn, ODU)

- May need to upgrade the magnetic optics. Need to investigate if the present power supplies/magnets are suited. Would be difficult to replace.

  To the suggestion that DVCS 6 GeV magnet could be used, it was replied that it would cost some money to brings the cryogenics in the tunnel.
- Can use the present Møller target system but we could try to improve the polarimetry precision from ~3% to <1% by adopting the Hall C system.
- Desirable to get the greatest lever arm possible between target and detectors One option to make best use of the tunnel room is to make the goniometer and Møller detector switchable.

- Status: No present design. No cost estimate available at the moment. No institution volunteered formally to take care of the Moller. No clear specification from experimental program.

  ⇒Some work to be done before June.

Møller shield (D. Kashy)

- Present design incompatible with use of polarized target.
  3 cm raster diameter > max cone diameter.
  Will need specialized shields for polarized target and for polarized target experiment using inner calorimeter.
  The shields may be made of several parts that can be used in various configurations.

- Status: Design under way for unpolarized case. No design for polarized cases.
  Manpower available (JLab+Alex Vlassof).

Raster

- The power supplies used up to now cannot raster a 11 GeV beam with a 3 cm diameter.

- These power supplies need to be changed for upcominc 6 GeV experiments. They should be chosen so they meet the 12 GeV specifications.

- Need to make sure beam pipes and magnets can accommodate a 3 cm diameter beam.

- Status: There should be little work needed to get a working raster for 12 GeV.

Faraday cup & beam line monitors (A. Freyberger)

- Fcup maybe used for some experiments (I<15 nA(?), and/or lower beam energies).

  For higher current, higher beam energy experiments:
  - Cool the fcup (possible but not trivial to do).
  - Use the fcup at low beam current to calibrate other beam line devices. Those devices needs to be identified. Possibilities:
    - BPM with split output signals (one to usual slow acquisition and one to faster system for beam charge asymmetry monitoring) Similar scheme used in EG4. No particular difficulty expected.
    - Secondary Emission Monitor (SEM). Should be a straightforward project to carry out (need an institution to volunteer)
    - (SLM not a good choice because of signal-beam position correlation)

- Status. Some study needed for absolute current measurement. need a volunteer to investigate SEM.

Faraday cup & beam line monitors (A. Freyberger)

- SLM and nanoA BPM will work for 12 GeV as well as for 6 GeV (or better for SLM). No work needed here.
- Possibility of implementing OTR (Optical Transition Radiation). Possible but extra material on the beam line. Was done in EG1b.

- Status: no work needed.

Unpolarized targets. D. Kashy

- Should work as they are.
- Fit the current design.

⇒No work needed.

Beam energy

- The usual way to know energy in Hall B may not be available anymore: Hall A energy measurements (eP and ARC) won't work and won't be upgraded. Hall D won't have an absolute energy measurement. Hall C ?

  Without absolute beam calibration, Knowledge of energy in Hall B will lose an order of magnitude (unless we can run at few 100 of nA).

- To avoid that we can have precise energies only when Hall C run, we need an absolute measurement in Hall B.

  One suggestion: use of tagging system ?

- Status: No work done on this topic. Need to identify our experimental requirements. Status for other halls ? Need manpower to study the topic.