Beamline and Magnet

Documentation:

HPS Beamline Commission Document v1 October 20, 2014 HPS beamline commissioning document v1.0.docx

Beamline Alignment with magnets at 95in. separation:beamline_Mar032014.pptx

Beam trajectory through pair spectrometer magnet , from simulation.

Engineering drawings of beamline and components: https://userweb.jlab.org/~zarecky/Dark%20Matter%20file%20directory.htm

7/26/2011 slides from Stepan including plan and survey positions of vacuum chamber: BeamLine_updates.pptx

Beamline photos are available: Beamline.pptx

See Calorimeter for ECal-specific docs.

Presentation of Beamline update at Wednesday morning, 27 March 2013, meeting Beamline 27 March 2013.ppt

ECal vacuum flange: beam gap vacuum chamber, honeycomb

Fieldmaps:

The magnetic field maps used for simulation and reconstruction are derived from TOSCA simulations combined with PRIMEX measurements of the fringe fields. That procedure is described here. This results in the following files:

BmapCorrected3D_3k.txt

BmapCorrected3D_4k.txt

BmapCorrected3D_5k.txt

BmapCorrected3D_6k.txt

BmapCorrected3D_7k.txt

BmapCorrected3D_8k.txt

BmapCorrected3D_9k.txt

BmapCorrected3D_10k.txt

BmapCorrected3D_11k.txt

BmapCorrected3D_12k.txt

BmapCorrected3D_13k.txt

These maps represent one eighth of the field volume, assuming symmetry for the other seven octants.

The file format is:

X Y Z BX BY BZ

with units of cm and Oersteds.

These files are then converted into a format appropriate for the slic simulation program and the hps-java reconstruction code using the following prescription:

First, determine the field setting required for the energy of the beam.

Find the closest fieldmap calculation in the above list and determine the scaling factor to bring the central value of the fieldmap into accord with the desired setting.

Scale, unfold and convert units of the txt file into a file which can be used by slic and hps-java using the following command:

java -cp ~/.m2/repository/org/hps/hps-distribution/3.11-SNAPSHOT/hps-distribution-3.11-SNAPSHOT-bin.jar org.hps.util.UnfoldFieldmap < fieldmap > < scaling factor >

The resulting file, out.dat, should be renamed to preserve the provenance, e.g.

125acm2_3kg_corrected_unfolded_scaled_0.7992.dat (1.056 GeV running)

209acm2_5kg_corrected_unfolded_scaled_1.04545.dat (2.3 GeV running)

The fieldmaps are archived at http://www.lcsim.org/resources/hps/fieldmap/

For HPS fieldmaps are on GitHub: https://github.com/JeffersonLab/hps-fieldmaps.git

Chicane Current Settings:

Document:

Chicane current setting M. Ehrhart, G. Kalicy, S. Stepanyan February 1, 2016: https://wiki.jlab.org/hps-run/images/c/c6/Chicane_settings.pdf

HPS chicane current setting M. Ehrhart, G. Kalicy, Holly Szumila-Vance, and S. Stepanyan, August 3, 2015: https://misportal.jlab.org/mis/physics/hps_notes/viewFile.cfm/2015-007.pdf?documentId=10

For 2019 run

> Beam energy reported by MCC: 4.556651 GeV
> Beam energy to field setting conversion from above documents: B = Eb * 0.22727 Tesla/GeV = 1.03559 T = 10355.9 Gauss.
>
> Analyzing magnet current: was set to 1592.37 A, the current readback was 1609.576±0.058 A, Magnetic Field read back: -9668.1±21.3 G
> Calculated field from current: (1592.37 - 0.6657)/0.1537 =10355.9 Gauss.
> The field map used for 2019 is 418acm2_10kg_corrected_unfolded_scaled_1.0319, so uses 10319 Gauss field (0.36% low).
>
> (Method for average field and current read back: take the MYA current and field probe read back for the Analyzing Magnet (PSPECIRBCK, HPS: LS450_2:FIELD) for the period 2019-07-26 19:08 until 2019-09-08 21:26. For each run, search for a value before the run_start time. Compute average and std for those values that are > 1599 (current) or < -9000 (field).)

Papers:

Talks:

Subtopics: