

Review of Geometry

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Validation of Geometry

Items under consideration

- ▶ Validation of detectors
 - ▶ Position of constituents
 - ▶ Results of reconstruction
- ▶ Magnet currents
 - ▶ tracking beams through beam line
 - ▶ matching beam to cooling channel

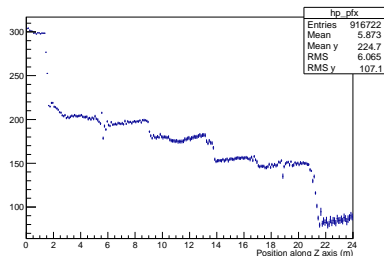
Figures of Merit

- ▶ Energy loss on axis
- ▶ Energy loss off axis
- ▶ Tracking through channel
- ▶ Emittance/beta function from MC truth
- ▶ Emittance/beta function from reconstruction.

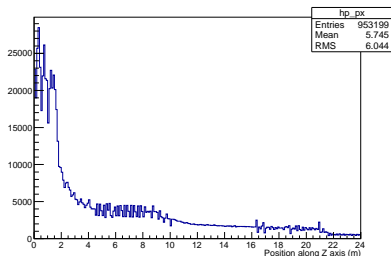
Status of Beam line currents

- ▶ Used Step I 6π , 200 MeV beam as defaults.
- ▶ Currents in CDB geometry and G4Beamline runs chosen to match M0 settings.

Mean momentum along beam line axis



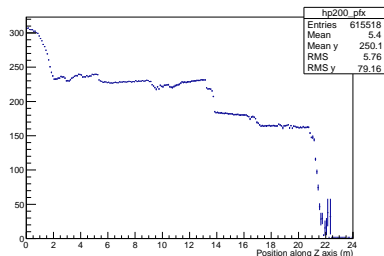
Muon count as a function of position



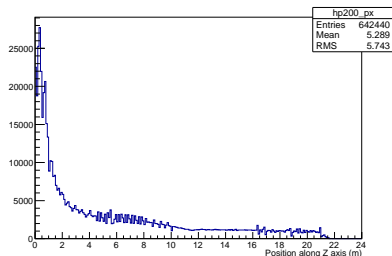
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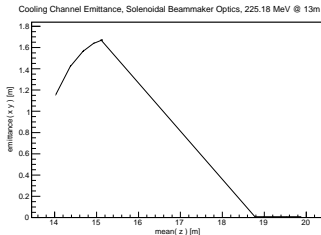
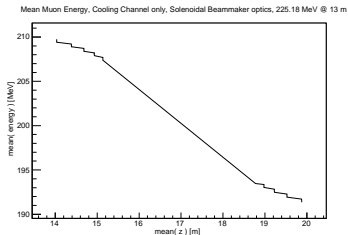
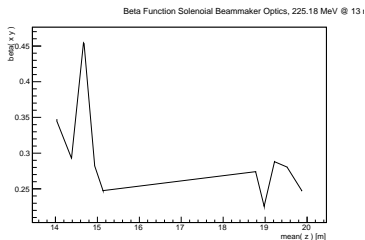
- ▶ Considered a cut at 200 mm from beam line axis

Matching Cooling Channel to Beam line

- ▶ Matched MAUS settings to G4Beamline interface.
 - ▶ Successfully tracked muons through D2 into channel.
 - ▶ Mean muon energy at absorber is 225.166 MeV.
 - ▶ Produces horrible emittance change results.
 - ▶ G4Beamline files do not work with the virtual planes emittance calculation for an unknown reason.
- ▶ Able to produce a large amount of cooling using a beam with energy of 225.18 MeV at 13000 mm ($\Delta\epsilon \approx 1.6m$).
- ▶ Momentum settings of beam line are wrong.
 - ▶ Using existing Step I 6π , 200 MeV settings means very few events at the appropriate momentum will reach the absorber.
 - ▶ Need to retune beam line — Jaroslav has been engaged with this.

Emittance and Energy in Cooling Channel

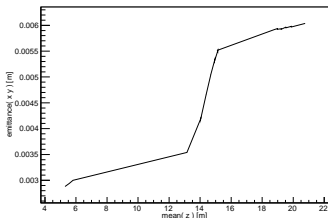
- ▶ Consider only the cooling channel.
- ▶ Needed several trials to arrive at maximum emittance change.
- ▶ Beta function looks asymmetric. Why?



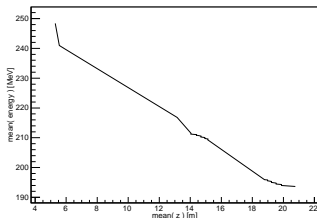
Emittance after Tracking Through Beamline

- ▶ Beam line not matched to optimal energy in cooling channel.
- ▶ Altered beam energy to match to the cooling channel without correcting currents.
- ▶ M0 beam line optics insufficient;
- ▶ Will need to re-evaluate G4Beamline simulations and beam line currents.

Emittance, Solenoidal BeamMaker Optics, 244.98 MeV from Geneva 1



Mean Muon Energy, Solenoidal BeamMaker Optics, 244.98 MeV from Geneva 1



Update to CDB interface

- ▶ Need to assert control over diffuser and solenoid fields.
- ▶ Always intended to be controlled with beam line interface.
- ▶ Added functionality to parent file translation to interpret diffuser thickness and magnetic field tables
 - ▶ Diffuser control assumes a bit mask written to 'diffuserThickness'.
 - ▶ May need to correct this when the diffuser is fully integrated in CDB.
 - ▶ Magnetic field tables assumed to include a flat set of currents for solenoids.
 - ▶ Assume that the current will alter the scaling of the field maps.
 - ▶ Will need to double check against field map information when available.
- ▶ Will be able to alter settings directly by altering a file (Beamline.gdml) and reprocessing the geometry.

Update to Ckov Geometry

- ▶ Lucien released a new geometry for Ckov.
 - ▶ Now in legacy area of MAUS.
 - ▶ Now copied into CDB geometry using GDML.
- ▶ Need to double check and validate model.

