GENERAL CHECKOUT — BEAM ENERGY = 5.784 GeV

Initial Checkout [0.5 hour]

Start at a spectrometer angle of 13.07 degrees and a central momentum of 3.6 GeV/c. Use a current of 0.2 μA, the Carbon target, and the raster on (radius of 1 cm). The rate should be about 80 Hz. Take a small run and verify that most detector channels are working.

Superharp Scan [0.5 hour]

Make sure the Carbon target is still installed. Take a superharp scan with raster off (0.2 μA current) with superharp 3H00 and 3H00A. Verify that the beam size is as expected ($\sigma_x \approx 80\mu m, \sigma_y \approx 150\mu m$).

Reestablish Standard HMS Tune [1 hour]

Use the HMS sieve slit in combination with the Carbon target. Use a current of 0.2 μA, and no raster. Measure a short Carbon spectrum ($\approx$ 10,000 triggers, or one hour). Produce an ntuple, and do the following: make a spectrum of x vs y at the nominal focal plane. What you should see is a "spider" with 5 legs. The non-straightness of the central leg indicates there is an offset in the Z or Y direction. If you don't see a "spider" or something resembling it one of the polarities of the HMS magnets is set wrong (or the magnet is off). If you see a "spider" next thing to figure out is what the X, Y, and Z offsets are of your present beam-target interaction point, but at least your tune is fine, so we start some more electronics/detector checkout.

Electronics Checkout [2 hours]

Turn the raster on with a radius of 1 cm. Remove the sieve slit and use the large (pion) collimator. Start with 0.2 μA, that should give you about 80 Hz rate. At the same kinematics, check that all electronics signals are well timed. Determine correct thresholds. Verify that all detector channels are counting. At this time checkoff the **Detector Checkout Plan** to make sure all detectors are operational. Check carefully that all wire chamber channels are cabled up correctly. Verify all scalers are incrementing. Check for double pulsing and time the wire chamber signals. Determine the scintillator plane efficiency for detecting electrons with the correct discriminator threshold, and make sure that the scintillator signals for detecting hadrons are on scale in the scintillator ADCs.

Calibration Spectrum: ^{12}C [1 hour]

Take a large run (250K) to check wire chamber time-to-distance maps, align the wire chamber positions in software and enable linked stub fitting, check the detector positions, check the timing and calibration constants (shower counter gains, pedestals, timing offsets, pulse height corrections, attenuation lengths, efficiencies, position dependencies). Your rate should be about 750 Hz. Optimize tracking properties. Make sure that θ and ϕ spectra are wide as expected. Construct x,y,θ, and ϕ spectra at the nominal focal plane. Does everything look reasonable? Check tracking with one wire chamber against tracking with two wire chamber sets. Reconstruct target quantities.

Checkout of HMS Dipole Setting [3 hours]

Use the sieve slit in HMS. Use the carbon target, no raster on, and less than 0.2 μA beam current. Set the spectrometer momentum to 5.0 GeV/c, using the quadrupole and dipole settings as given by FIELD/field00. Measure a sieve run of at least 10,000 counts. Now use the dipole setting as given by FIELD/field02, and repeat the sieve run.

Beam Position Checkout with SEM, WITH HOLDING FIELD [1 hour]

From now on we will have the target holding field on, and use the chicane. This will affect the correlation between SEM Y position (Y for MCC) and actual Y position on the target (again Y for MCC, i.e. vertical). We need to know beforehand the relation between these two positions beforehand. Have MCC steer the beam on the last BPM monitor, and each time verify the actual position with the SEM. Ask MCC to use a far upstream corrector magnet (3C20 area?) to accomplish this. We want to be able to steer the beam position in a 2×2 horizontal/vertical grid of ± 10 mm on the target! I.e. steer the beam on the BPM to positions that correspond to target positions like (-10 mm, 10 mm), (-10 mm, -10 mm), etc., calculated from the SEM values. Have MCC record the corrector magnet currents (both horizontal and vertical), and record the BPM and SEM positions.

X and Y Target Checkout with holding field [4 hours]

Use the sieve slit in HMS. Use the carbon target, no raster on, and less than 0.2 μA beam current. Set the spectrometer momentum to 3.6 GeV/c (doing it at 5 GeV/c would take a factor of three more time). Do a scan over the previously determined 2×2 horizontal/vertical grid, each time recording at least 10,000 events. This should take you ≈ 1 hour per run. Produce an ntuple, and verify that we model the optics dependence of horizontal and vertical beam positions correctly (I.e., is the reconstructed sieve spectrum independent of beam position?). For this you will need the reconstruction map for the HMS plus the tracking part through the target field.