



Progress this week on the Plume

Adam Watts

AD, External Beamlines

3/25/2020

Progress this week

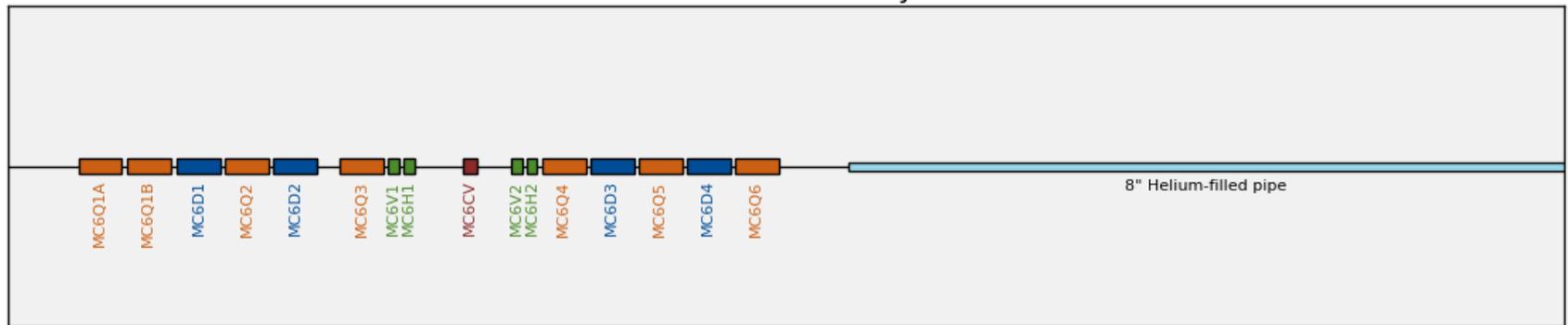
While working from home, focusing on two major tasks:

- Double-checking optics models (TRANSPORT, MADX, and G4Beamline), cross-comparing them.
- Looking at alignment data to determine errors and see if inspiration strikes from the data

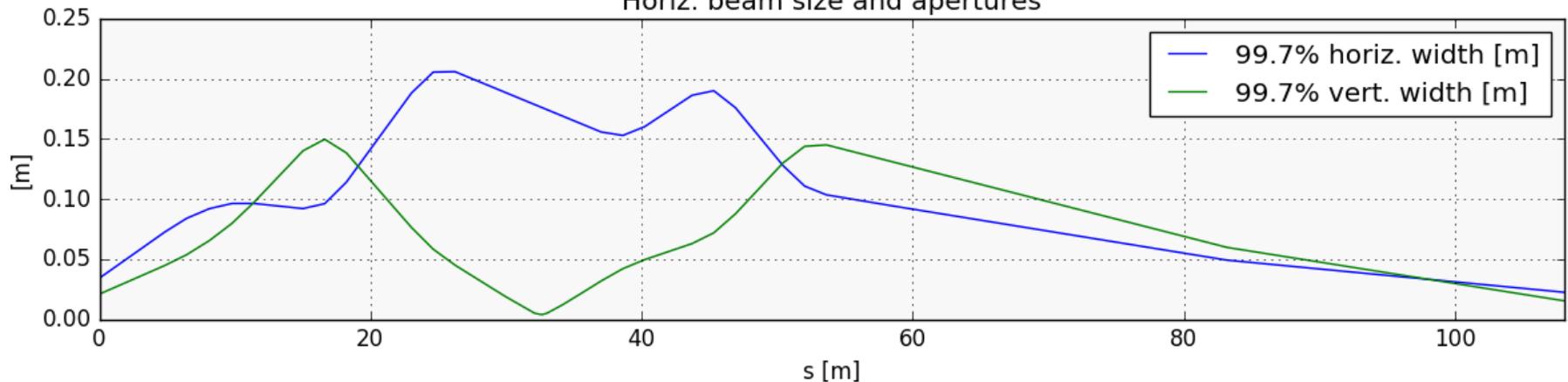
MADX model

Output from MADX optics model transporting 1% 64 GeV/c pions to final focus on NOvA target. This was used to set up initial tune for experiment. Initial conditions came from G4Beamline, 120 GeV/c protons on primary target.

NOvA Test Beam Secondary Beamline

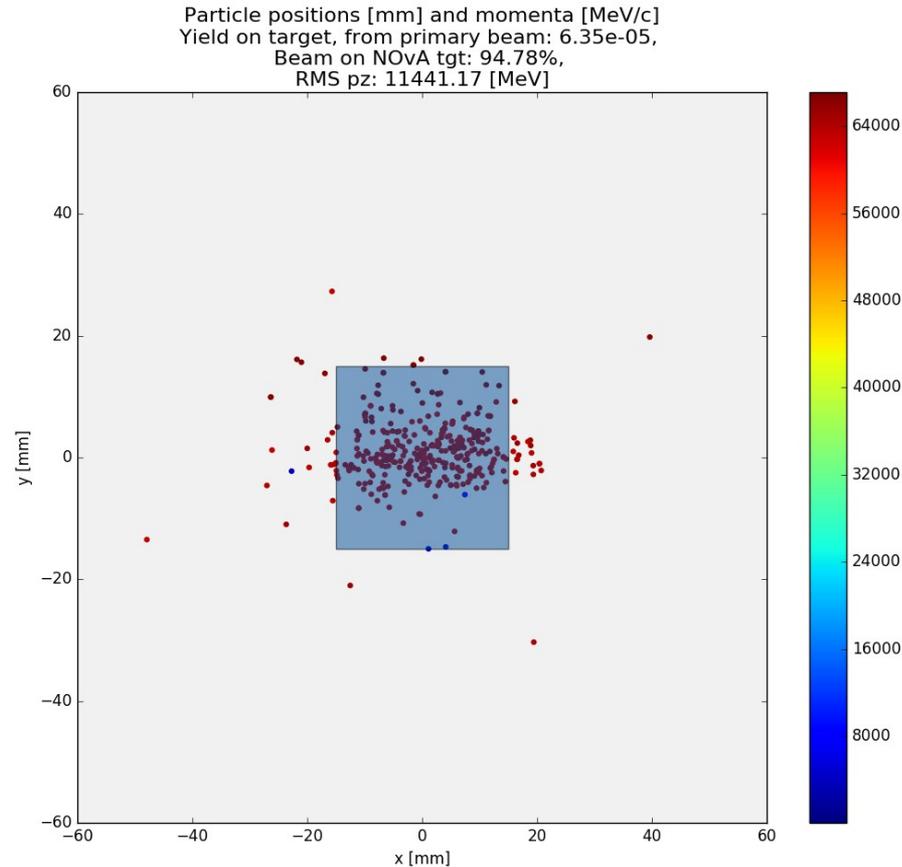


Horiz. beam size and apertures



G4BL model

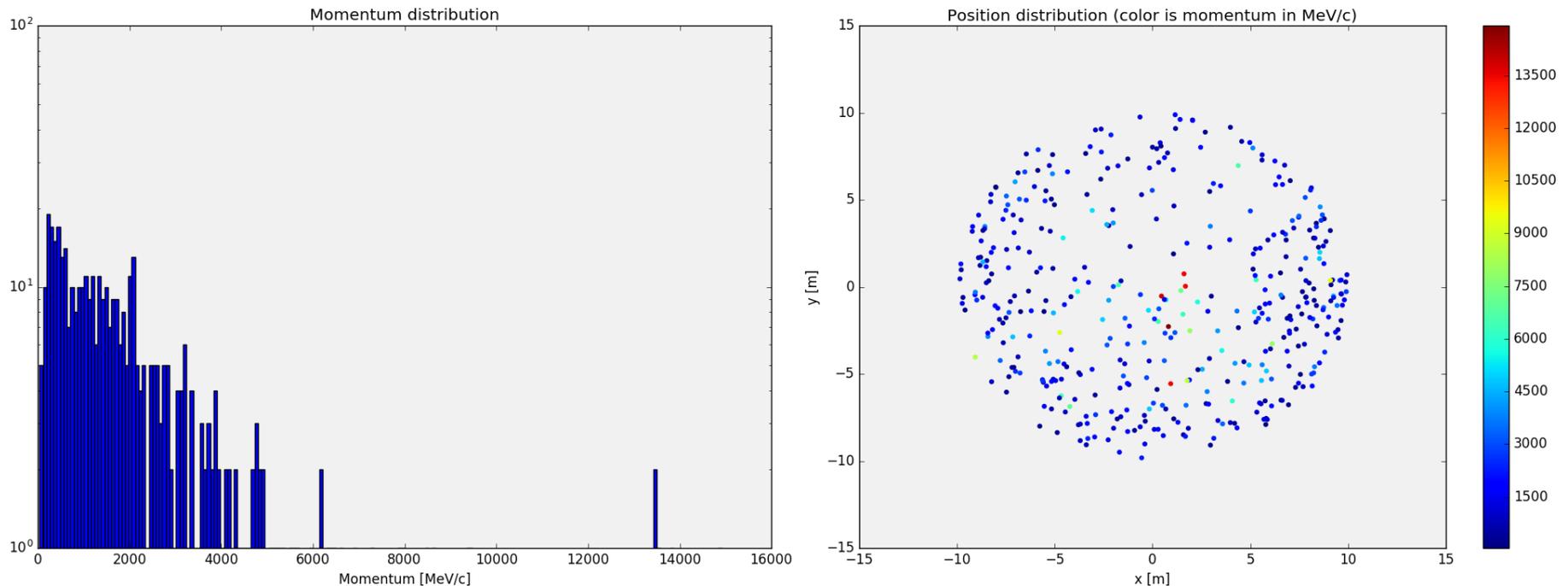
Tune from MADX was passed into G4Beamline, momentum cut removed so all particles off primary target propagated, kill on aperture, momentum collimator at 10mm.



G4BL model

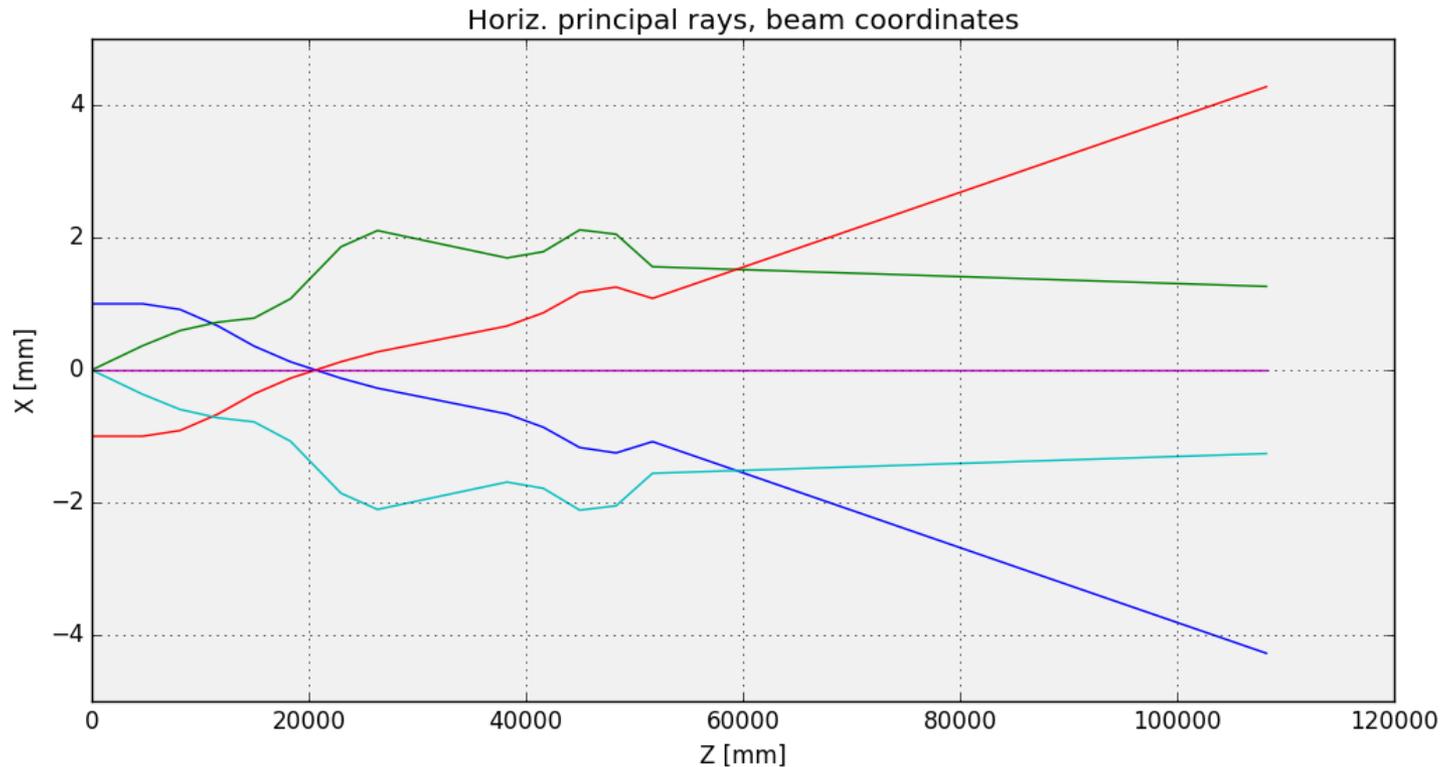
G4BL model does not appear to show concentrated muon pume, only diffuse.
Below data taken for keeping only muon tracks, no kill on aperture, detector at NOvA TB target.

Muon yield per proton on primary target: 4.21e-03



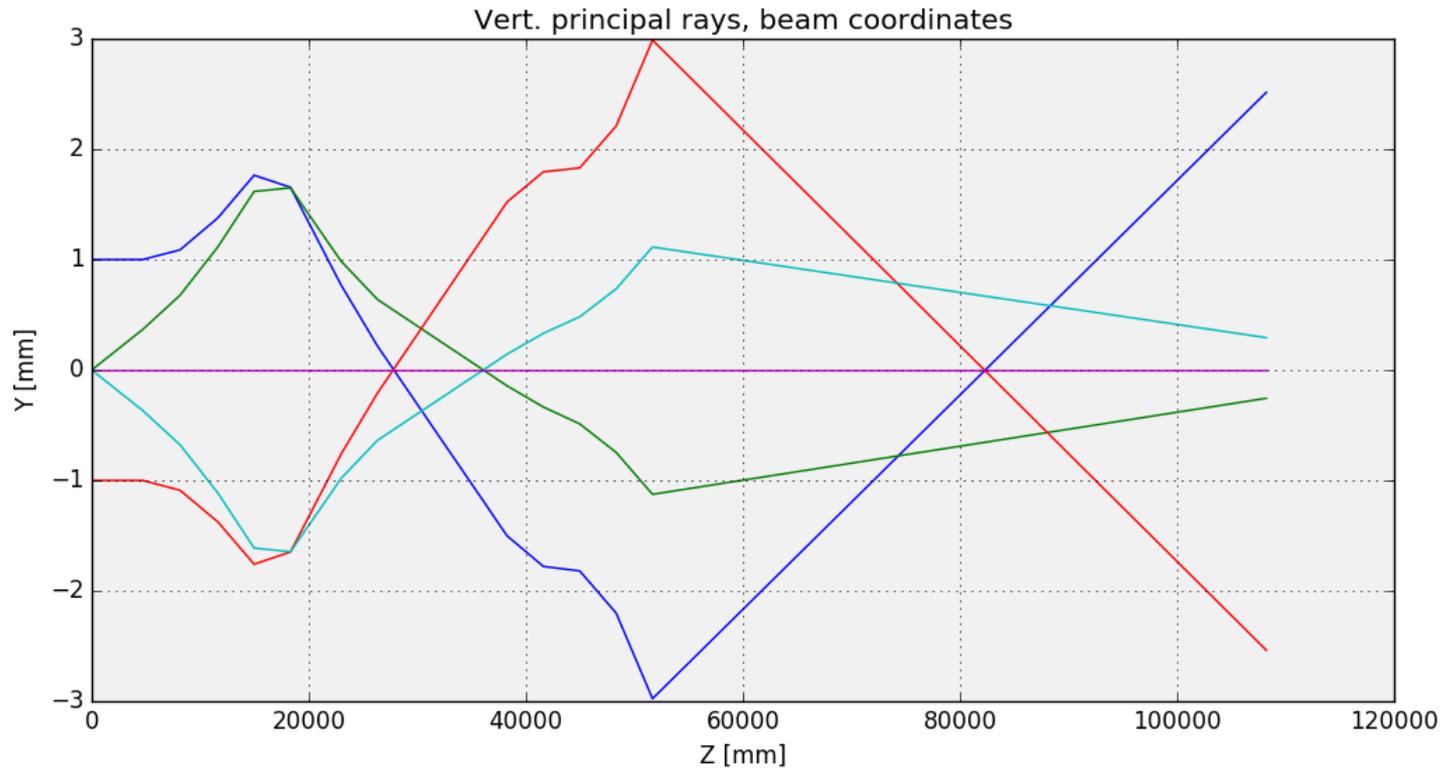
G4BL model, principal rays

Tom K. suggested tracing principal rays through the optics to compare to TRANSPORT. Comparison pending.



G4BL model, principal rays

Tom K. suggested tracing principal rays through the optics to compare to TRANSPORT. Comparison pending.



Alignment data

- Working on plotting SVG of beamline elements from alignment data.
- Elevation good, plan has a bug I'm working on; not a problem with alignment.
- Key elements missing; primary target, momentum collimator, NOvA detector blocks.
- Lots and lots of work to do: adding in apertures, fixed scrapers, getting missing info. from metrology, drawing lines of sight between detector hot-spot and beamline elements...
- Mike W. sent helpful information, can likely work from there to fill in some missing information.

