Chicane simulation in MARS

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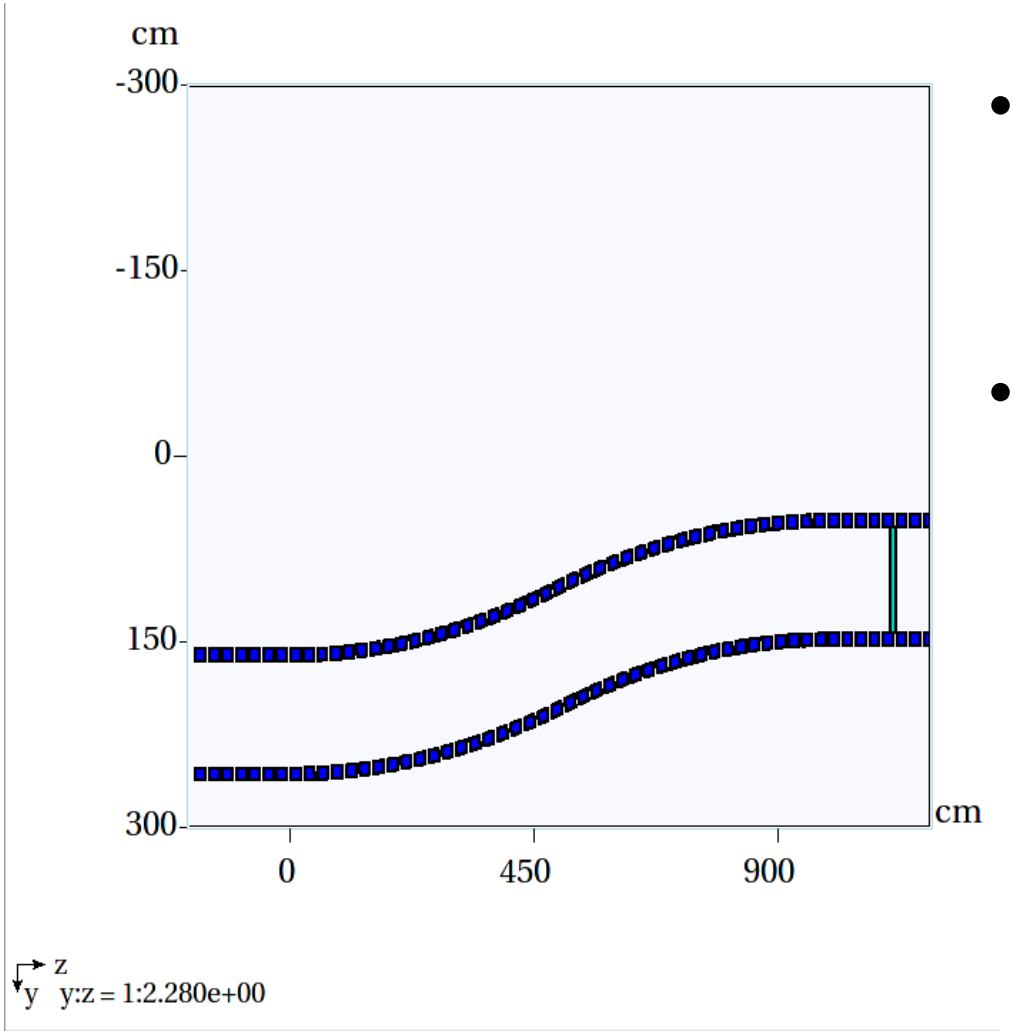
Chicane in MARS

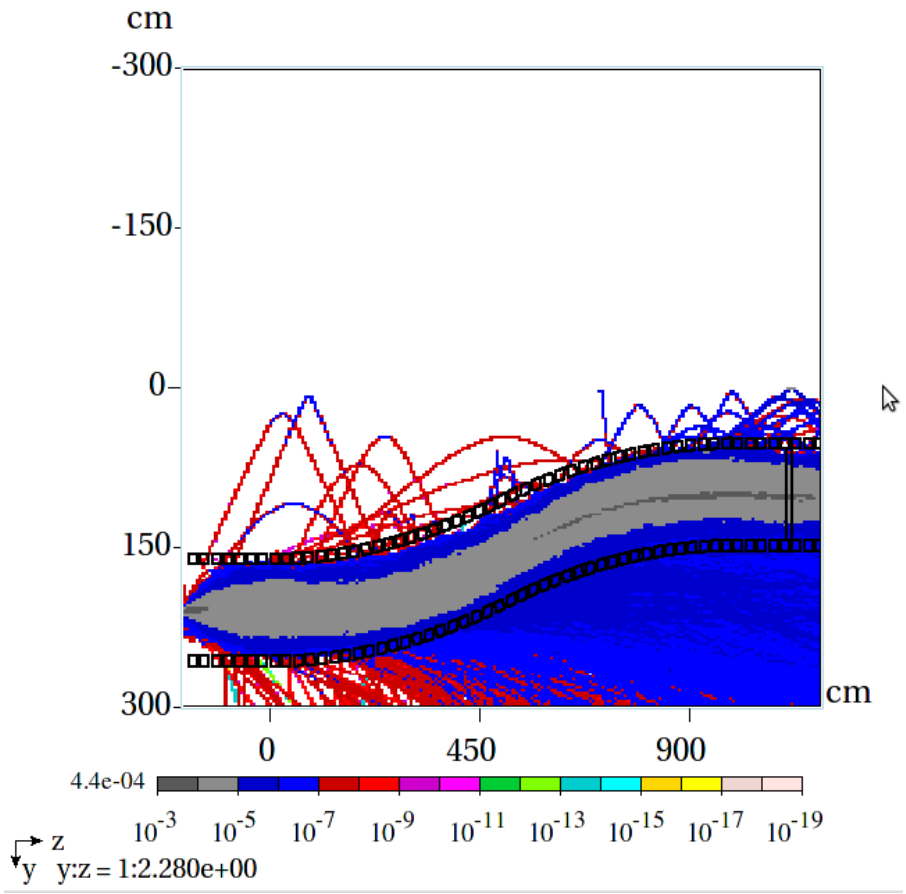
- After some bug tracing and undocumented feature exploration, the chicane works in MARS with
- magnetic field map generated by g4beamline and imported into MARS;
- particle distribution generated by g4beamline from the initial distribution on the target (Hg_8gev_3ns_p11_positives_g4beamline.txt);
- 10000 particles as a test case, positive particles only, all kinds of particles are tracked at the same time (no separation of particles yet).

Chicane geometry

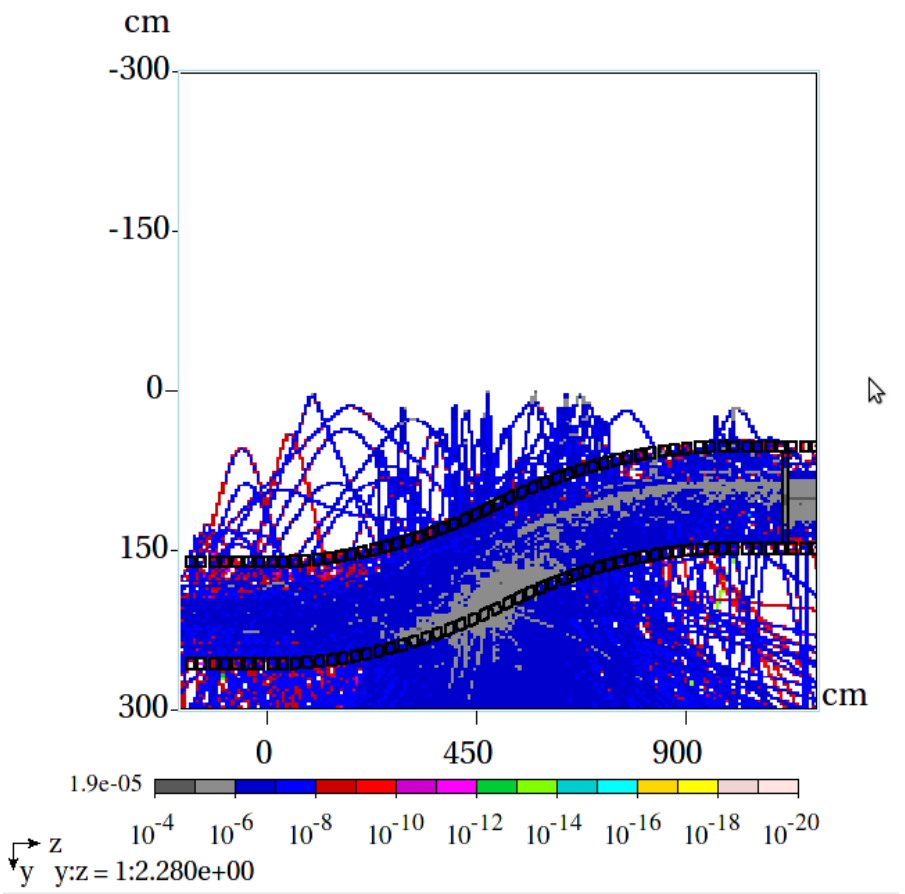


- Horizontal:vertical ratio is not 1:1, the chicane curve is very gentle
- The chicane itself is shifted slightly in the horizontal plane. This is done for histograms to look right (by default MARS only plots y>0).

Fluence, muons and hadrons, [1/m^2]

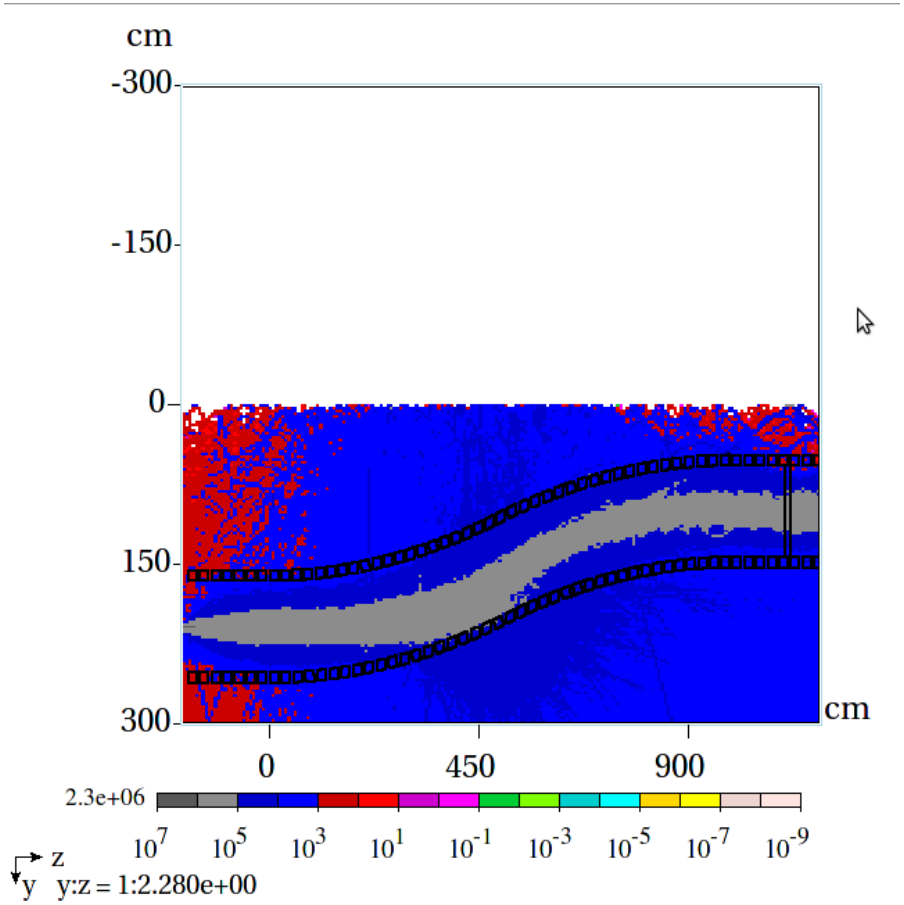


muons

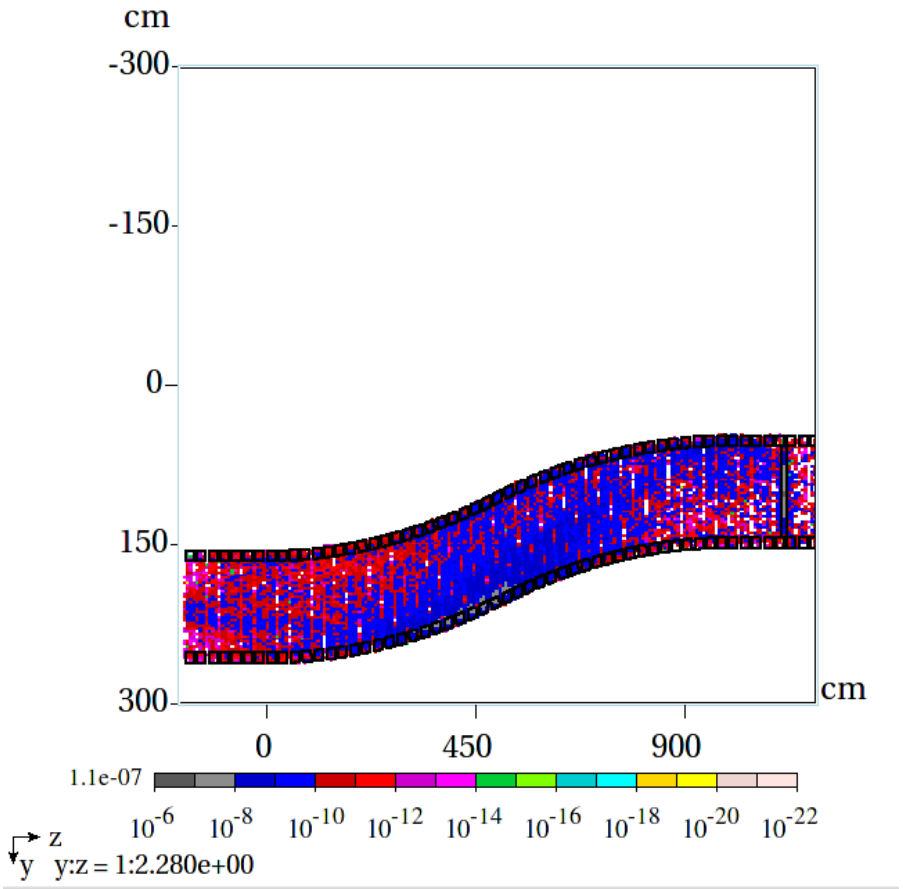


hadrons

Prompt dose [mSv/hr] and total energy deposited [GeV/g/1ppp]



Prompt dose [mSv/hr]



Total energy deposited [GeV/g/1ppp]

Next steps

- Extend the drift channel after the chicane to see what does the absorber do to protons;
- separate different types of particles (particularly, muons and protons), compare with g4beamline results;
- generate a plot: bending angle per cell vs proton absorber thickness vs proton beam power escaping;
- find maximum energy deposited / unit volume, compare to quench limits.