DarkLight@ARIEL

Particle Trajectories

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31 MeV/c Beam, 0.325 x Nominal Field

Field for 11 MeV positron

Elastic scattering 31 MeV/c

+/- 2 degrees in-plane

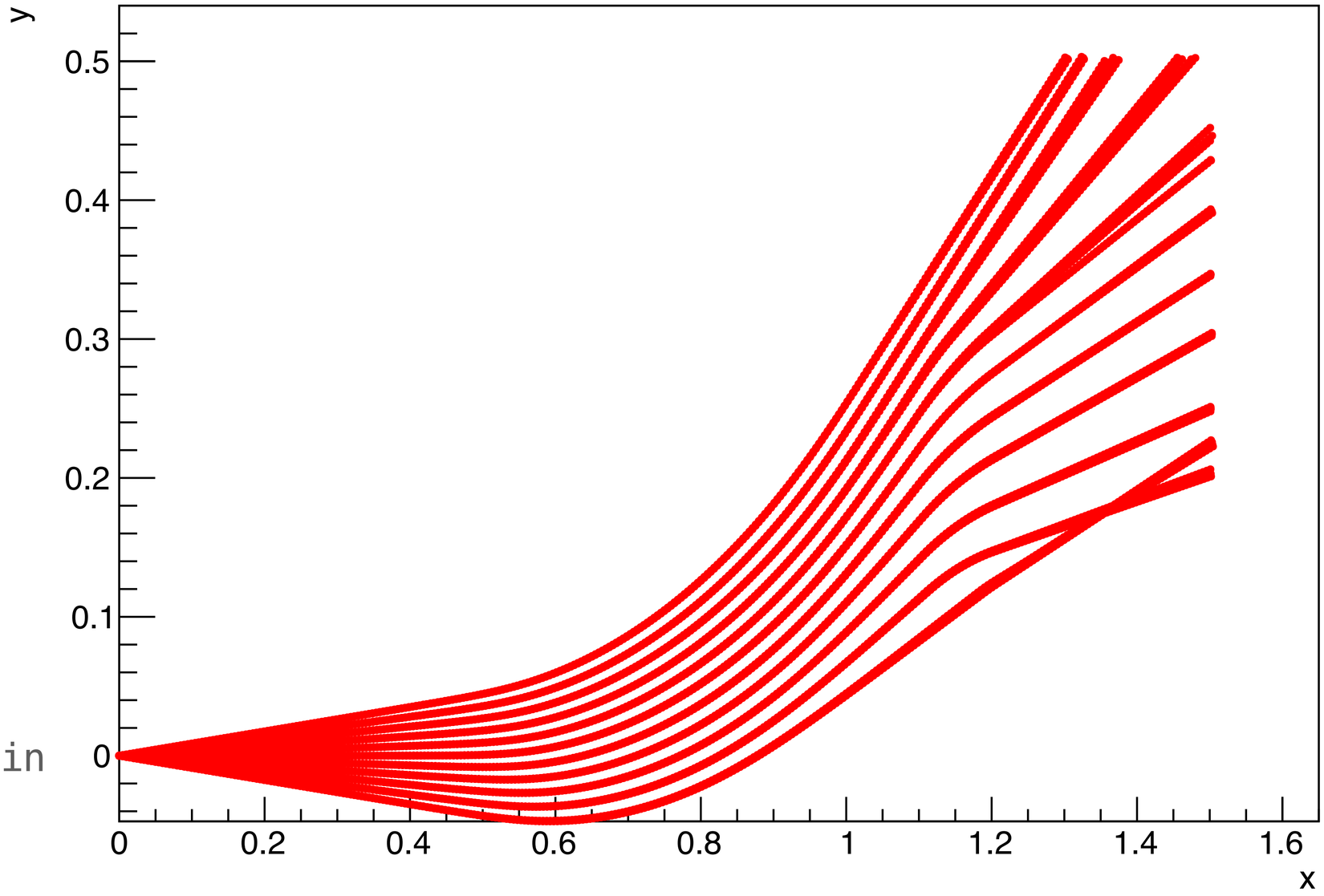
+/- 5 degrees out-plane

Doesn’t exit back of yoke

Forget about the exit

Terminate internally

Make back of yoke solid again

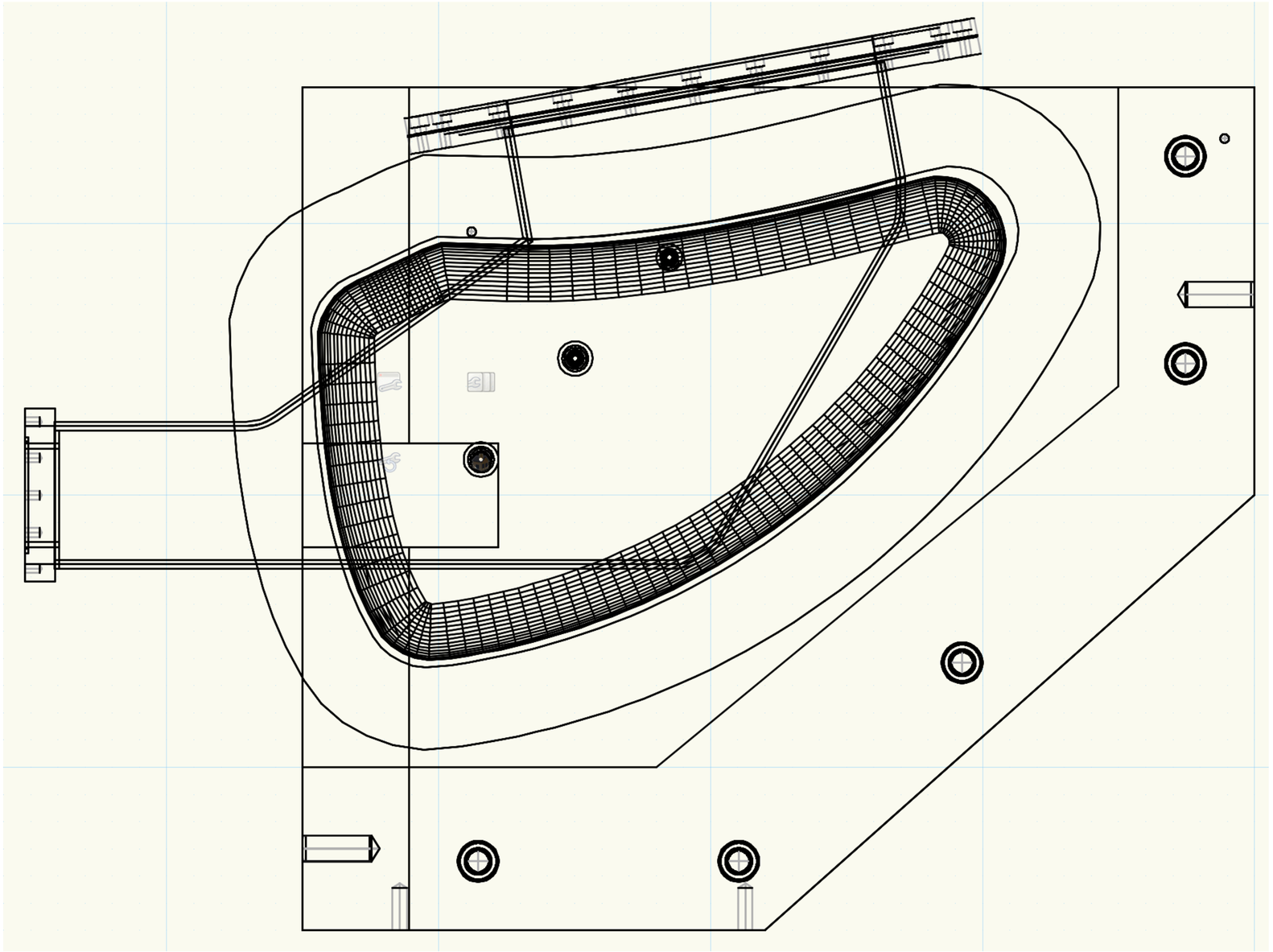


Dipole Vacuum Chamber No Elastic Exit

Elastics don’t exit

Terminate in chamber

Live with background



31 MeV/c Beam, Nominal Field (Xiaqing)

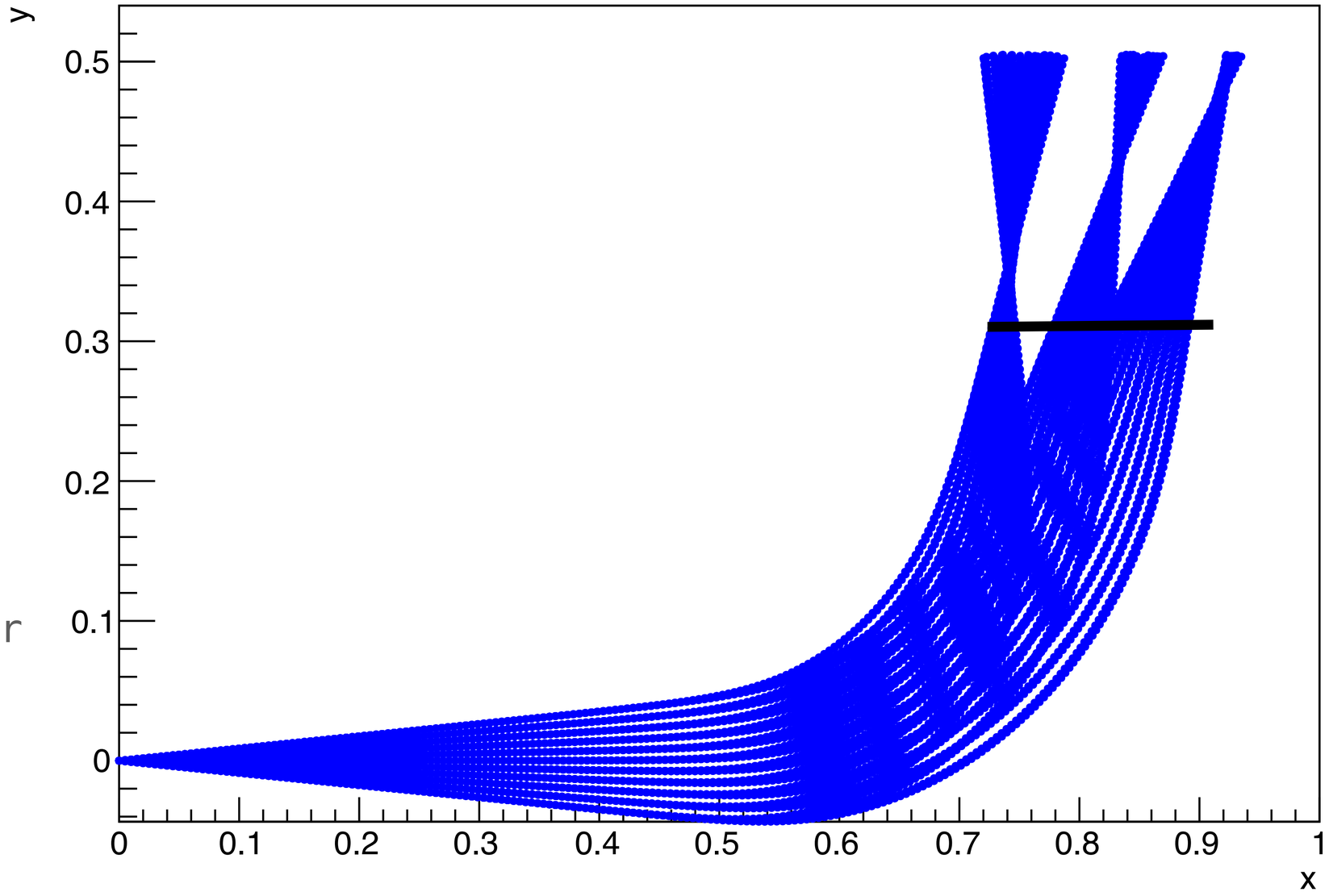
24.8, 31.0, and 37.2 MeV/c

+/- 2 degrees in-plane

+/- 5 degrees out-plane

Mostly fits through chamber

Exit to GEMs could be longer



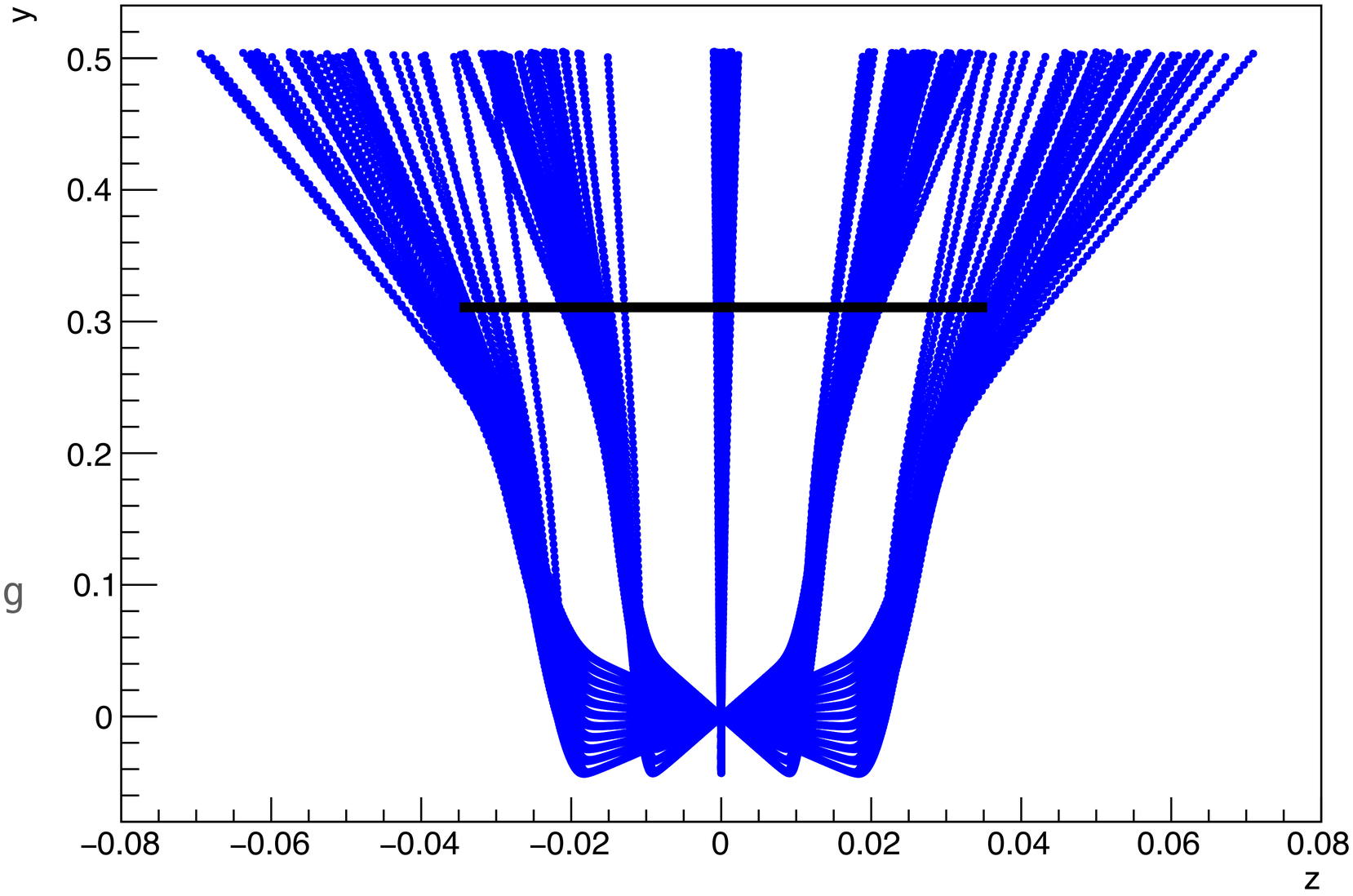
31 MeV/c Beam, Nominal Field (Xiaqing)

+/- 2 degrees in-plane

+/- 5 degrees out-plane

+/- 2 doesn’t fit

Would need 9 cm wide opening



31 MeV/c Beam, 0.325 x Nominal Field

Field setting for positrons

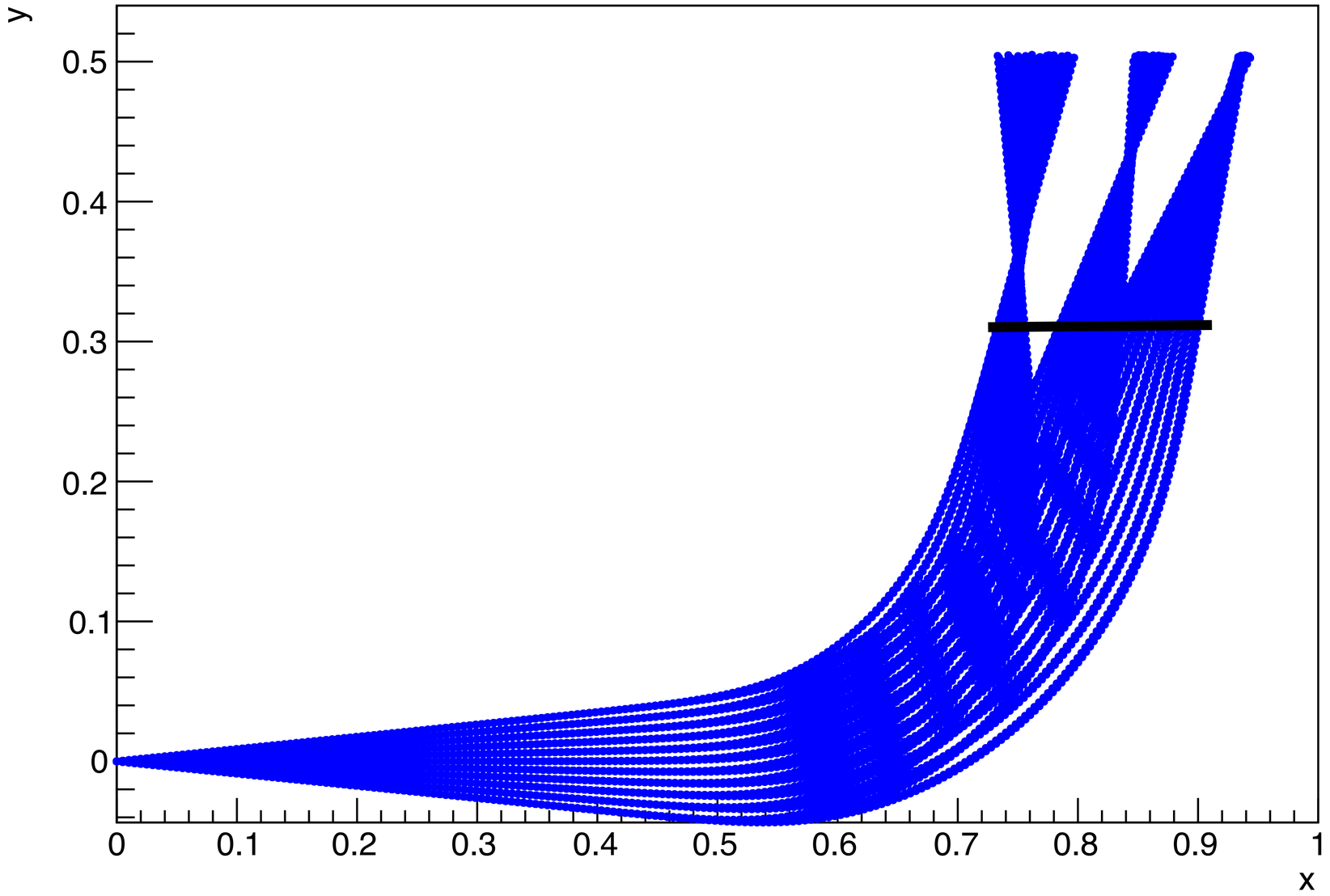
8.8, 11.0, and 13.3 MeV/c

+/- 2 degrees in-plane

+/- 5 degrees out-plane

Fits through chamber

In this view



31 MeV/c Beam, 0.325 x Nominal Field

Field setting for positrons

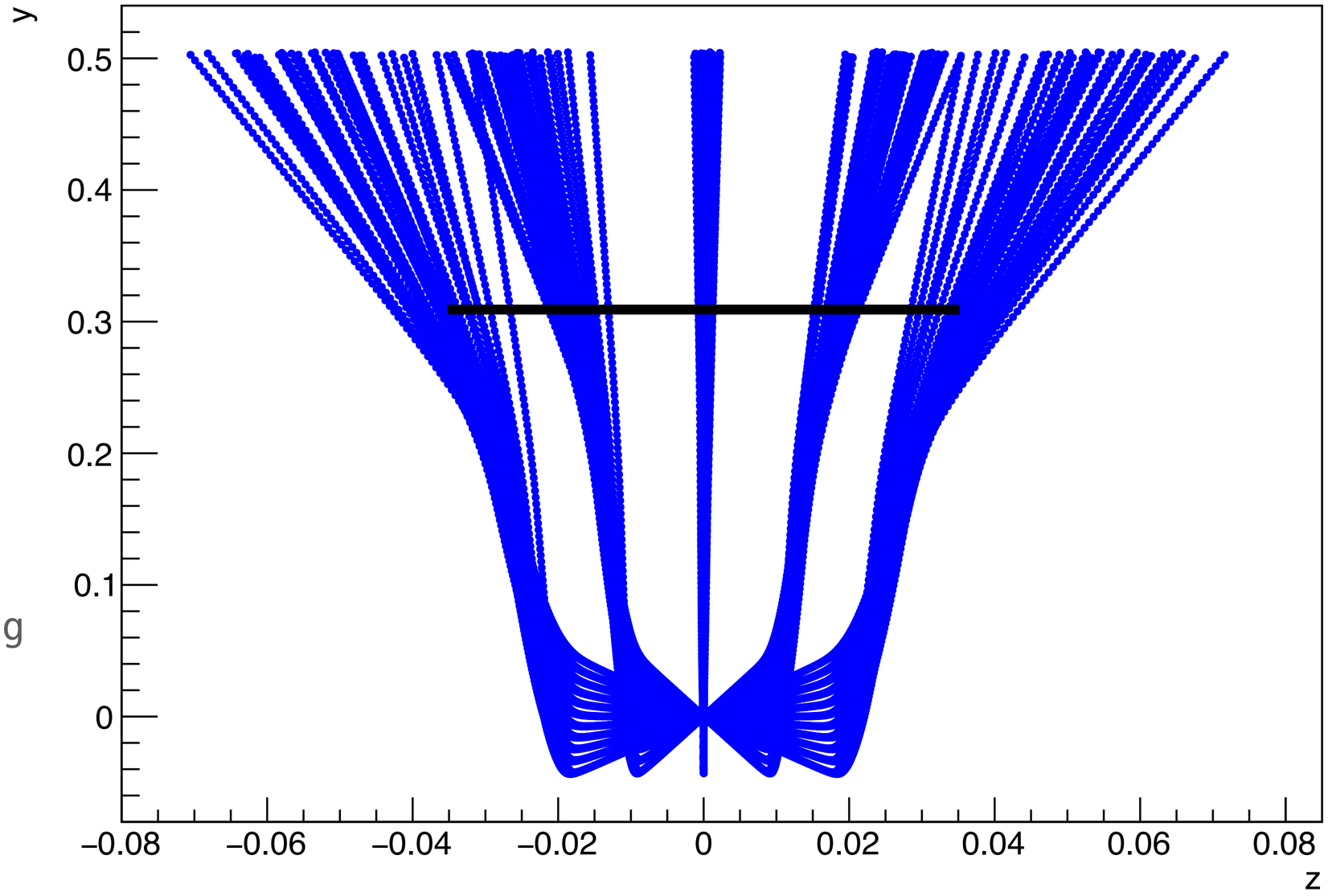
11.0 MeV/c

+/- 2 degrees in-plane

+/- 5 degrees out-plane

+/- 2 doesn’t fit

Would need 9 cm wide opening



31 MeV/c Beam, Nominal Field

31.0 MeV/c

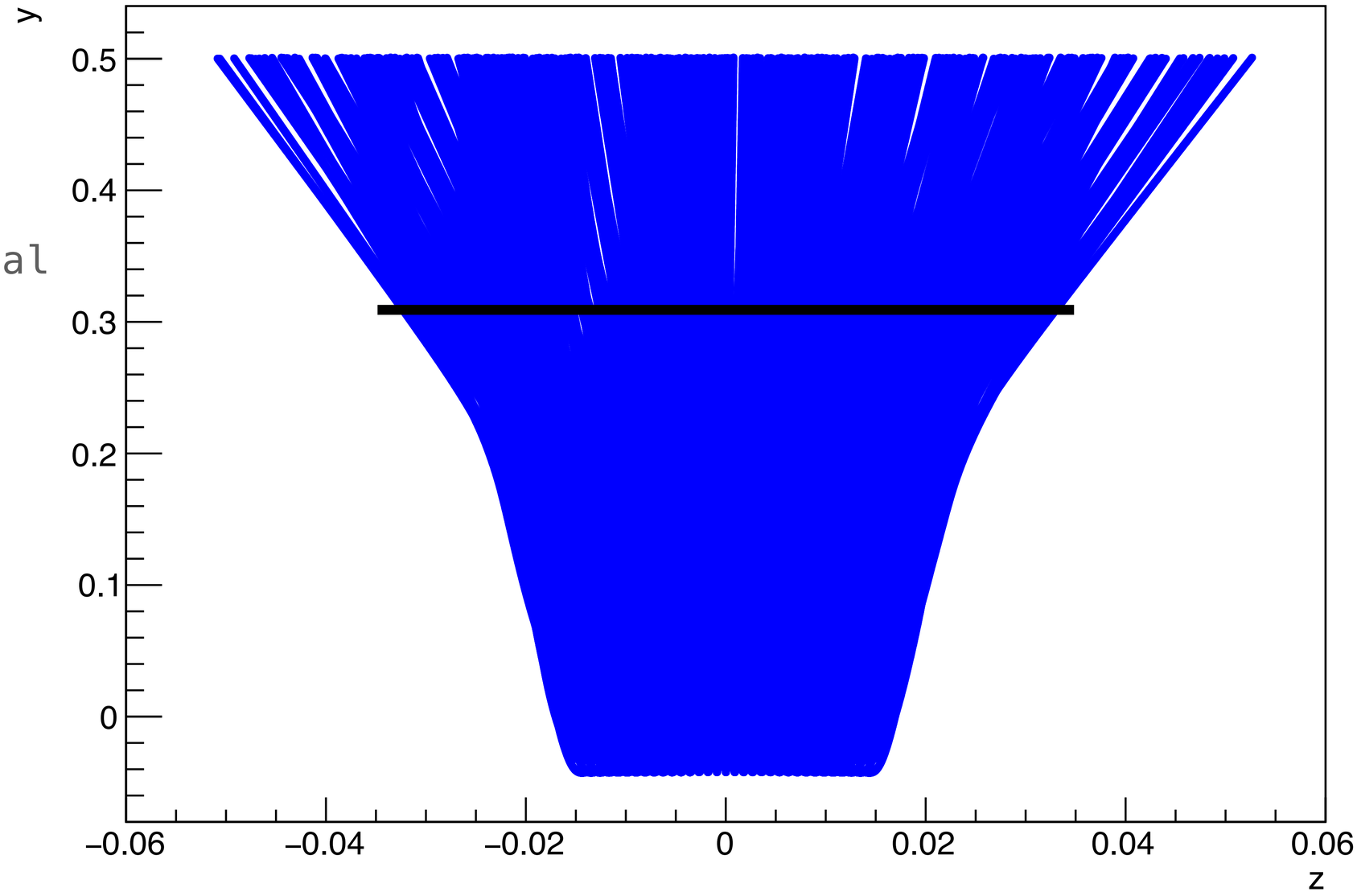
7 cm vacuum chamber internal

+/- 1.6 degrees in-plane

+/- 5 degrees out-plan

Just fits, suggest

+/- 1.5 degrees in-plane



31 MeV/c Beam, Nominal Field

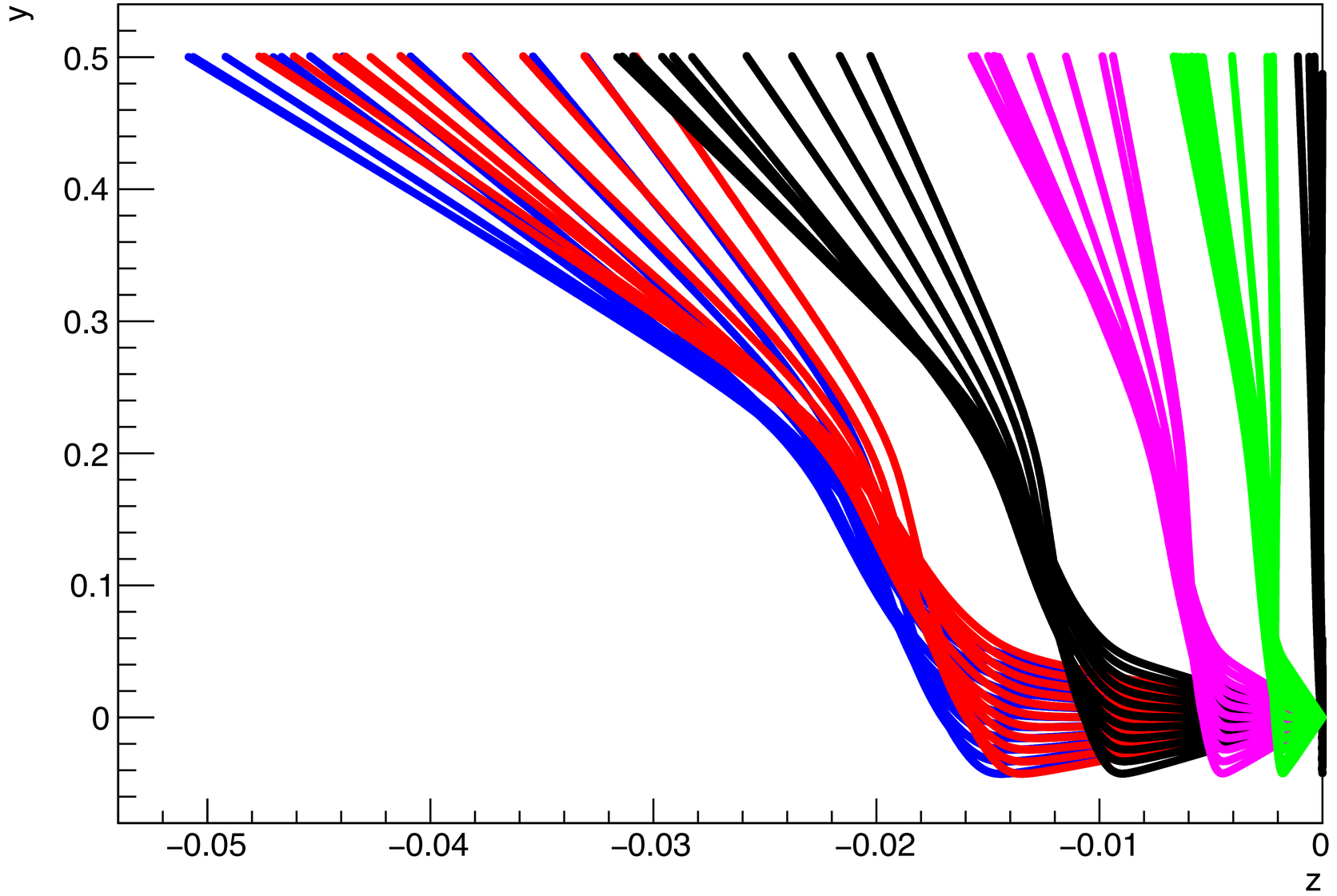
31.0 MeV/c

+/- 5 degrees out-plan

0, 0.2, 0.5, 1, 1.5, 1.6

Impacts polar resolution

+/- 1.5 degrees in-plane



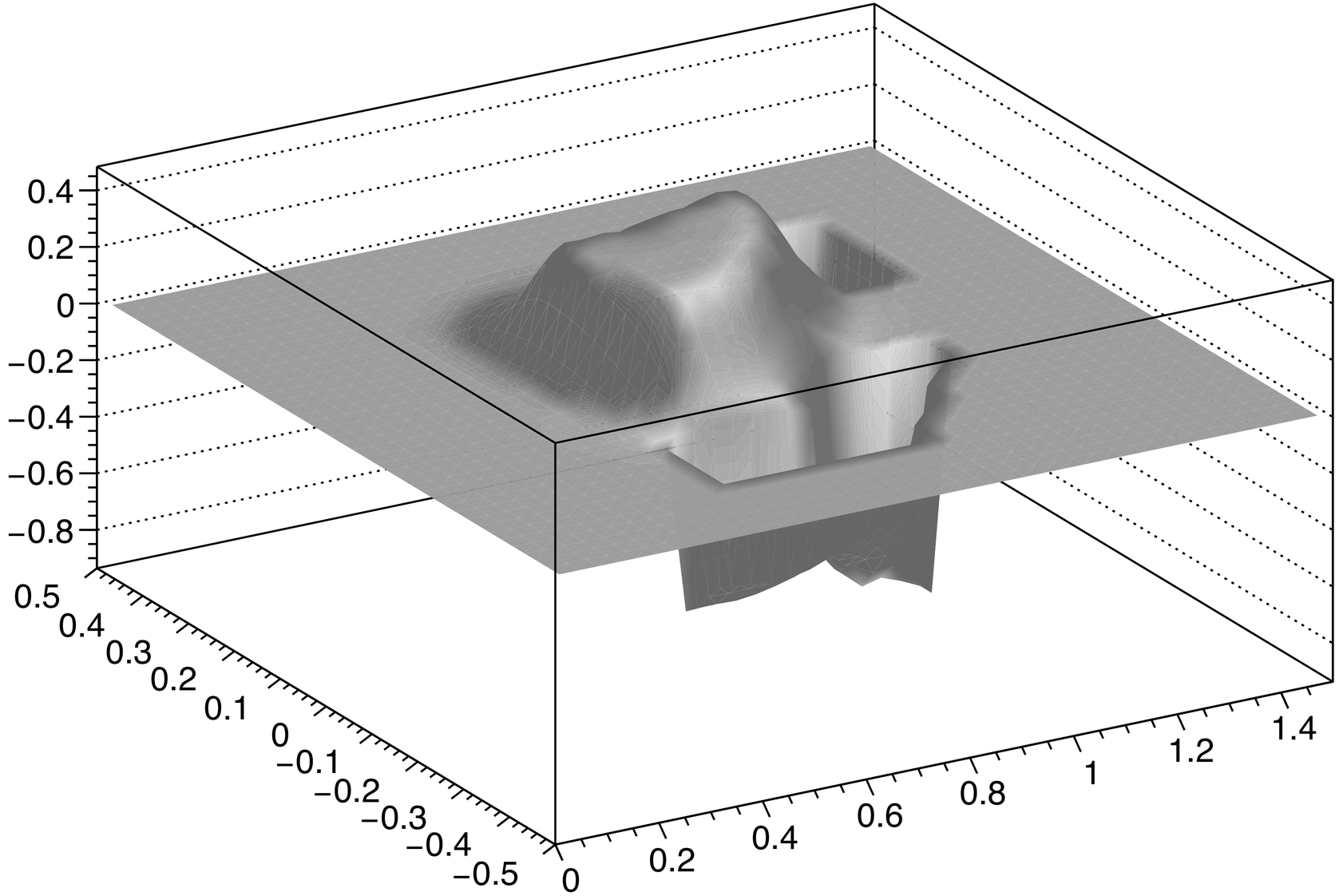
Magnet / GEM calibration

- With 31 MeV beam can use nominal field and have elastic centred in GEM
- Positron arm at 20 degrees can use Moller at ~6 MeV
- Electron arm at 39 degrees Moller at 1.4 MeV becomes a bit questionable

Nominal Bz Field - Courtesy of Xiaqing

0.35 Tesla nominally

0.8 Tesla in iron



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