Magnetic Field Modeling

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Status

- Whit Seay has confirmed that stresses and deflections due to “notch” for Light Gas Cherenkov (LGC) at beginning of end cap are OK
- No magnetic modeling has been done since end-February
- A set of mesh sizes was arrived at in November (pre-notch) which solve in four days for a model without eight-fold symmetry imposed. Transverse forces and torques were close to zero for symmetric model. Horizontal torque due to turret cut-out in steel ~200 kN-cm.
- New workstation is 15% faster and has twice the RAM of old one, 20% funded by Hall A. It can run models with twice as many non-zeros as the one cited above, limited by Opera software, not RAM.
- Last six weeks have been spent on issues related to PREX/CREX. See TN17-032. Resistive HRS Q1s have stray field issues about a tenth as bad as SHMS - but still enough to need to mitigate.

Questions for collaboration

- My dimensions for nose piece in end cap:
  - R 66.25 at Z 189.23 via 7° constraint on center of SIDIS target. Originally R 72 via 8°
  - R 85 at Z 342.27 via 7° constraint and 85 cm OR max
- Zhiwen Zhao requests:
  - R 61 at Z 189.23 via 21° from downstream end of PVDIS target
  - R 69 at Z 210 switches to 7° constraint for SIDIS target
  - R 85 as above or R 90 at Z 426
- Removing 16.6% of iron section from the tip of the nose will perhaps double field in surrounding annulus. Is acceptance increase worth it?
- Does the hole in the nose need to have 3° angle or can it flatten to cylinder? Can conical aluminum vacuum tube be hydro-formed?

Angles

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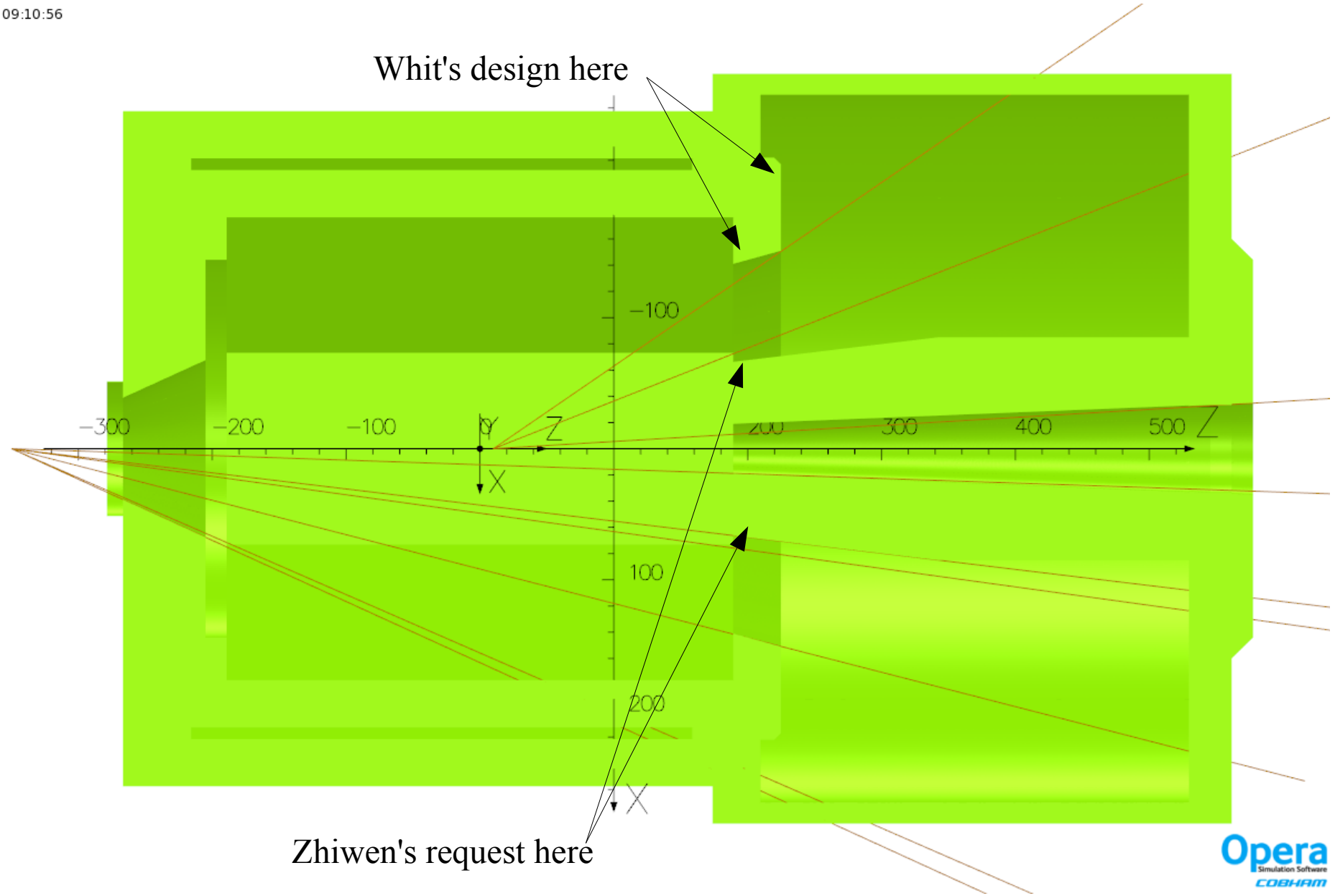

Schedule

- Modeling will resume week of July 3.
- Work efficiency will be lower during PAC week
- Will begin by imposing eight-fold symmetry so solutions are available overnight, tweeking mesh. I will coarsen mesh in rail volume. Then I'll switch to full model without and with turret, as in 4Q16.
- Whatever I finish by end-August will have to suffice until beam operations end for FY18.

Another question

- Zhiwen requests small (GB) field maps with eight-fold symmetry, preferably (r, θ, z) . I want to provide cm-interval field maps with effects of turret (16+ GB) in (x,y,z) space.
- It is my understanding the limitations of CSIM drive request. Since CERN uses GEANT4 for ATLAS and CMS, it must take big maps.
- Opera provides a command line script which provides field maps in

  (r, θ, z) but only with unit changes in each. If someone competent would like to revise the script to allow half-degree changes ....
- Something to discuss with IT after the coffee break Friday morning?