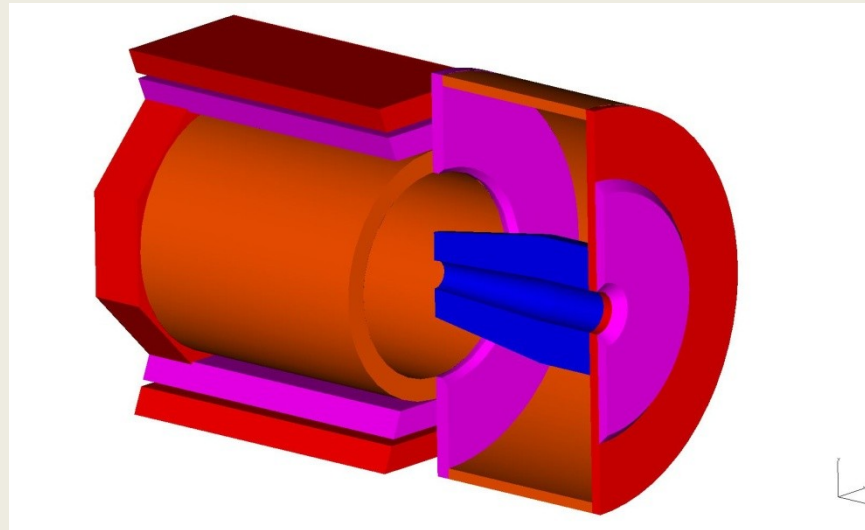


SoLID Collaboration Meeting

Magnet Support and Infrastructure



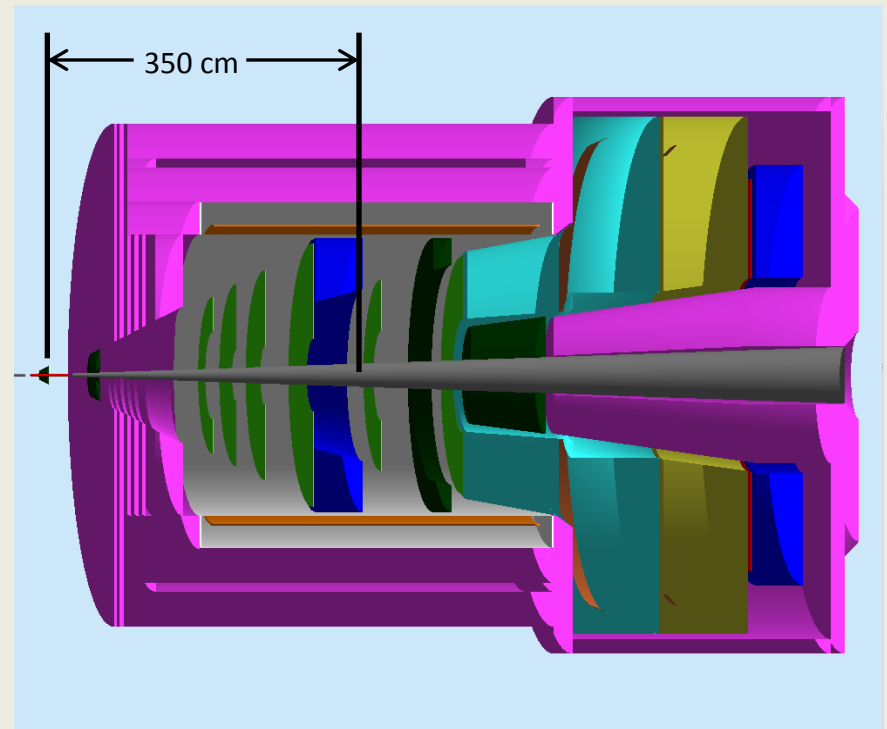
Whit Seay (Robin Wines)
March 22, 2013 (May 23, 2013)

Magnet Support and Infrastructure

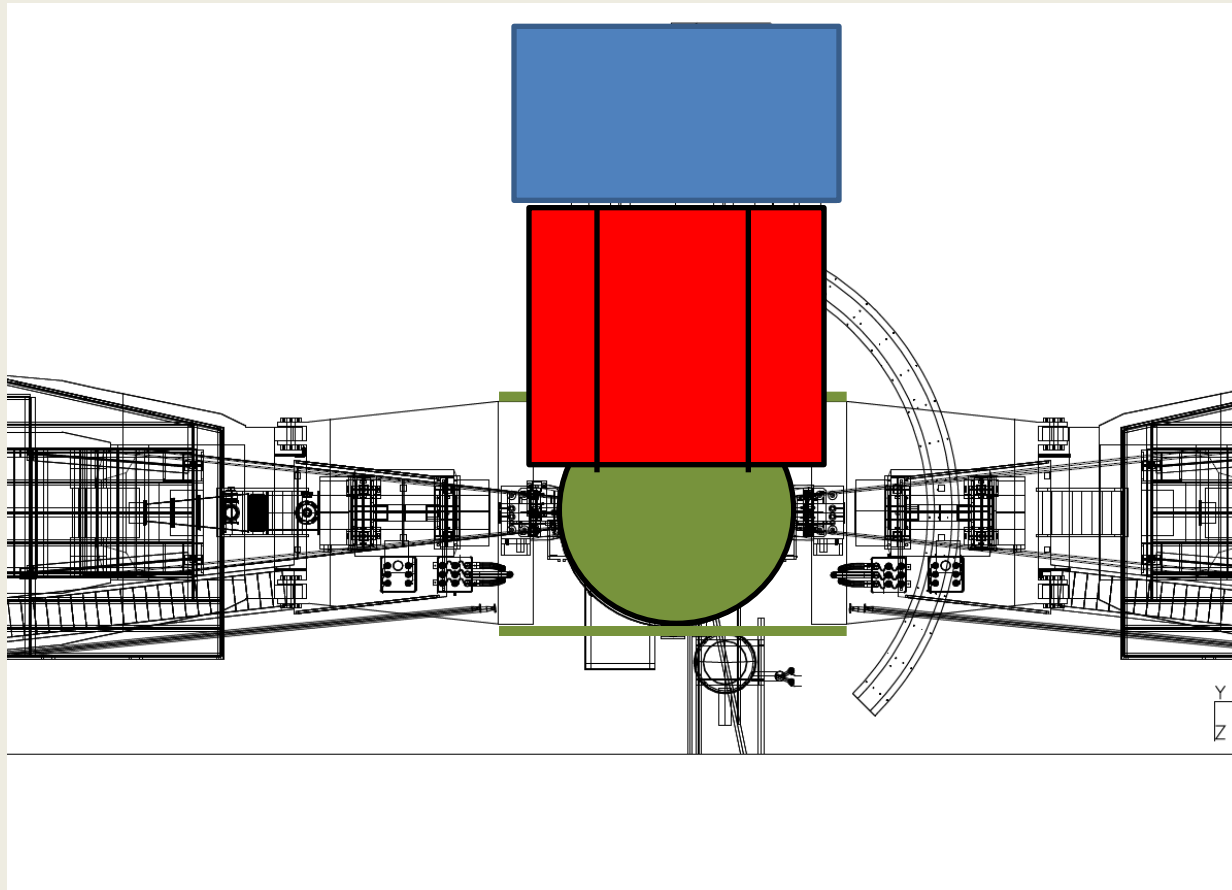
- Very little progress since Whit's presentation at the March 2013 meeting
- Continue to develop CAD/FEA model of magnet, supports, detector hut and detectors
- Thank you to all who have sent models of their detectors. Please continue to send Whit detector details as the designs develop.

Center to center distance of target and magnet (SIDIS)

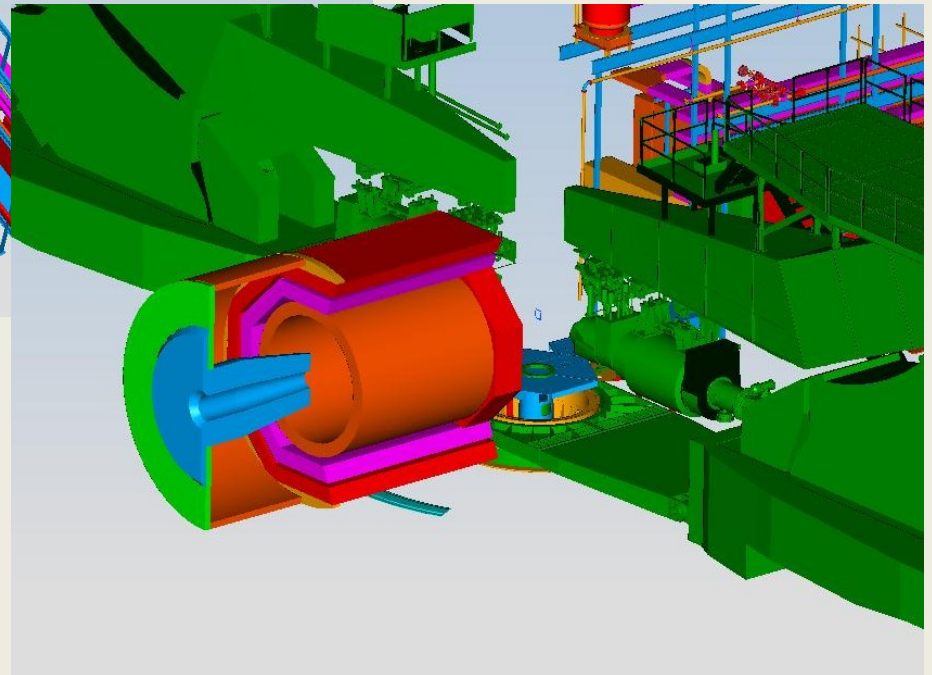
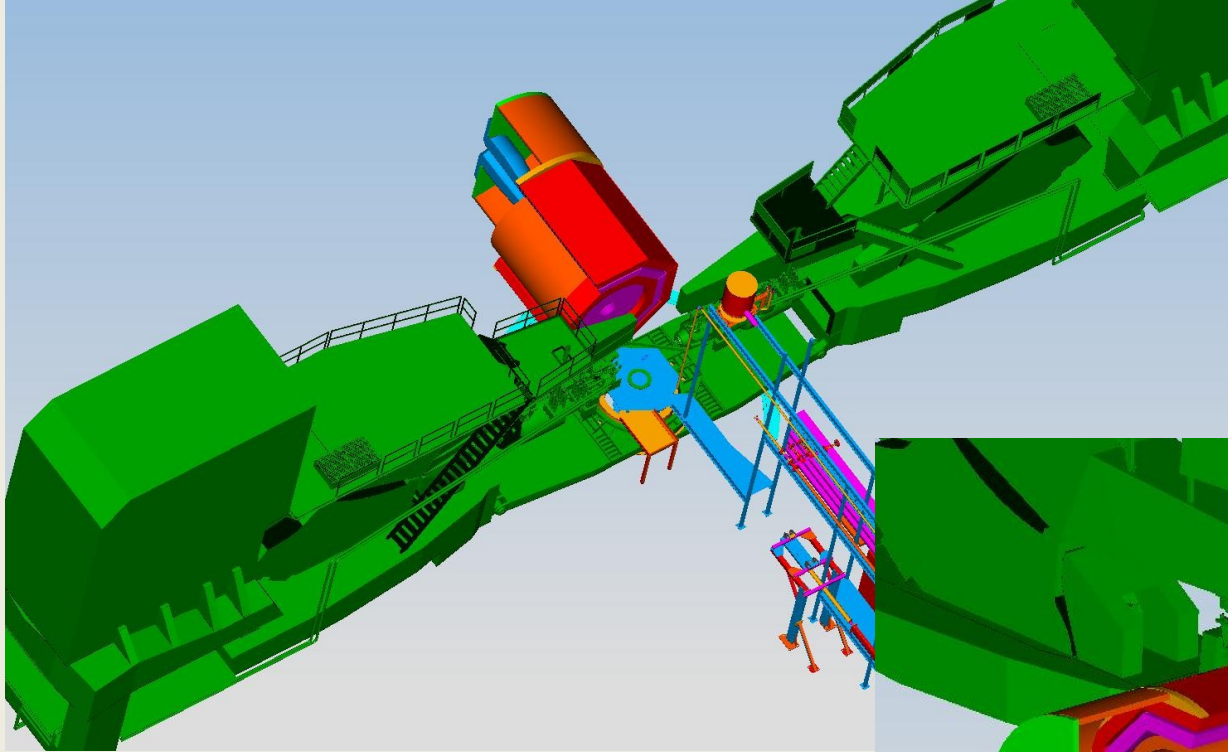
- 350 cm between target center and magnet center.
- Magnet and target will have to be shifted a minimum of 115 cm downstream to prevent front of magnet from interfering with HRS bearing assembly.
- HRS spectrometers parked at 90° angle to the beamline.
- All in agreement to downstream shift of target and magnet ?



Without the 115 cm shift downstream



Magnet shifted 115 cm downstream



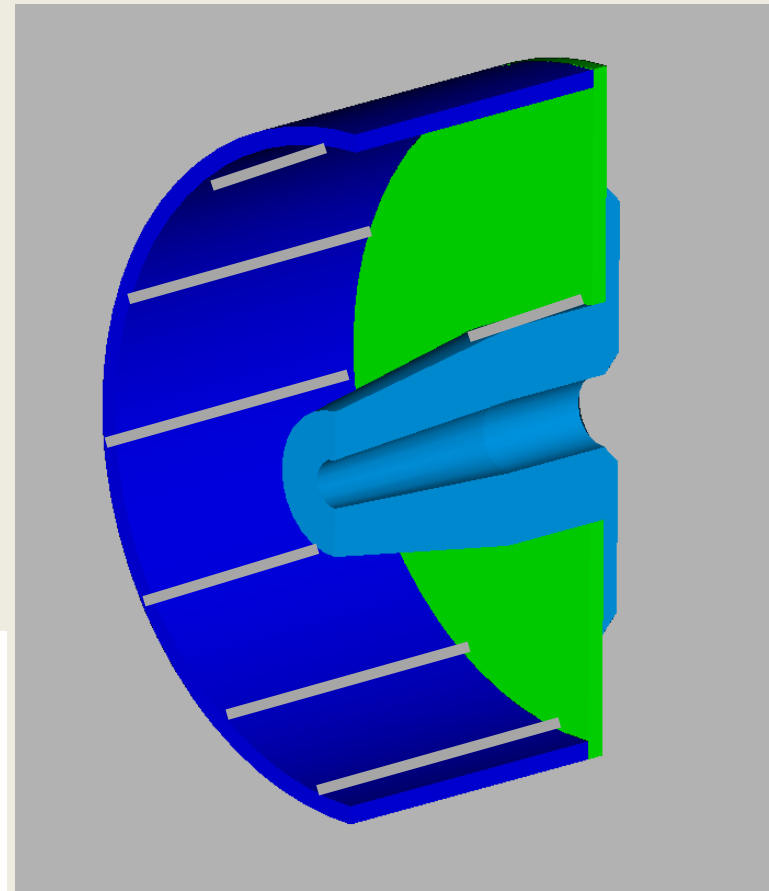
Detector mounting system for stacking detectors in one piece detector hut half

Several off the shelf options exist that would allow the detectors to be slid in from the front on rails. Below is one option. Rails are made of stainless steel and bolted along the length into the outer shell.



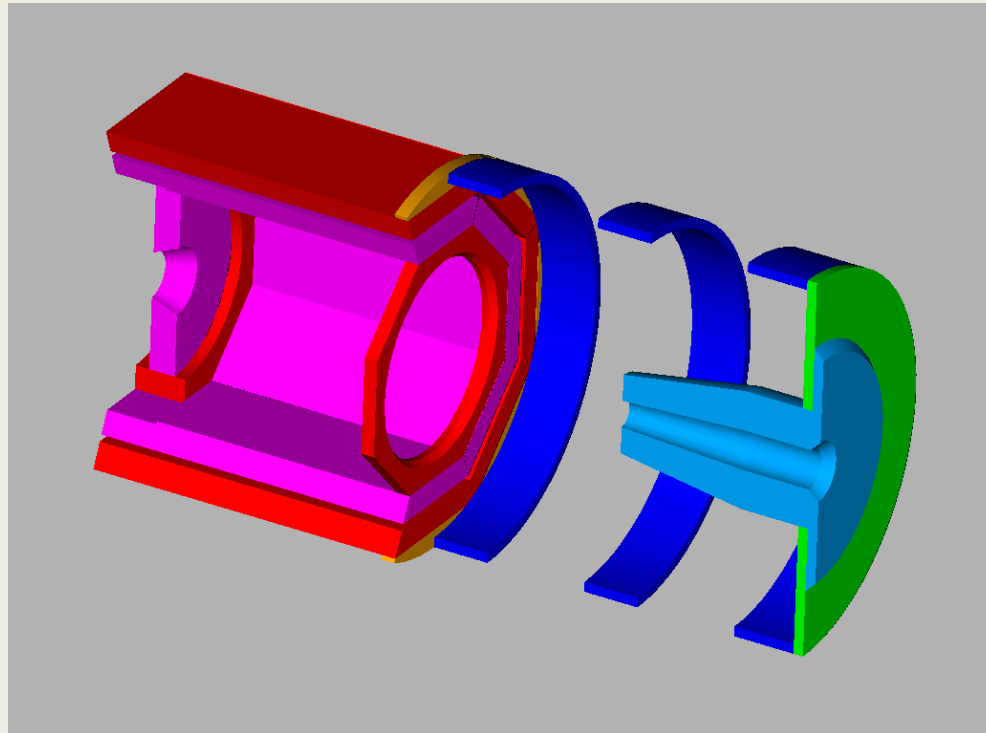
Rexroth
Bosch Group

The Drive & Control Company



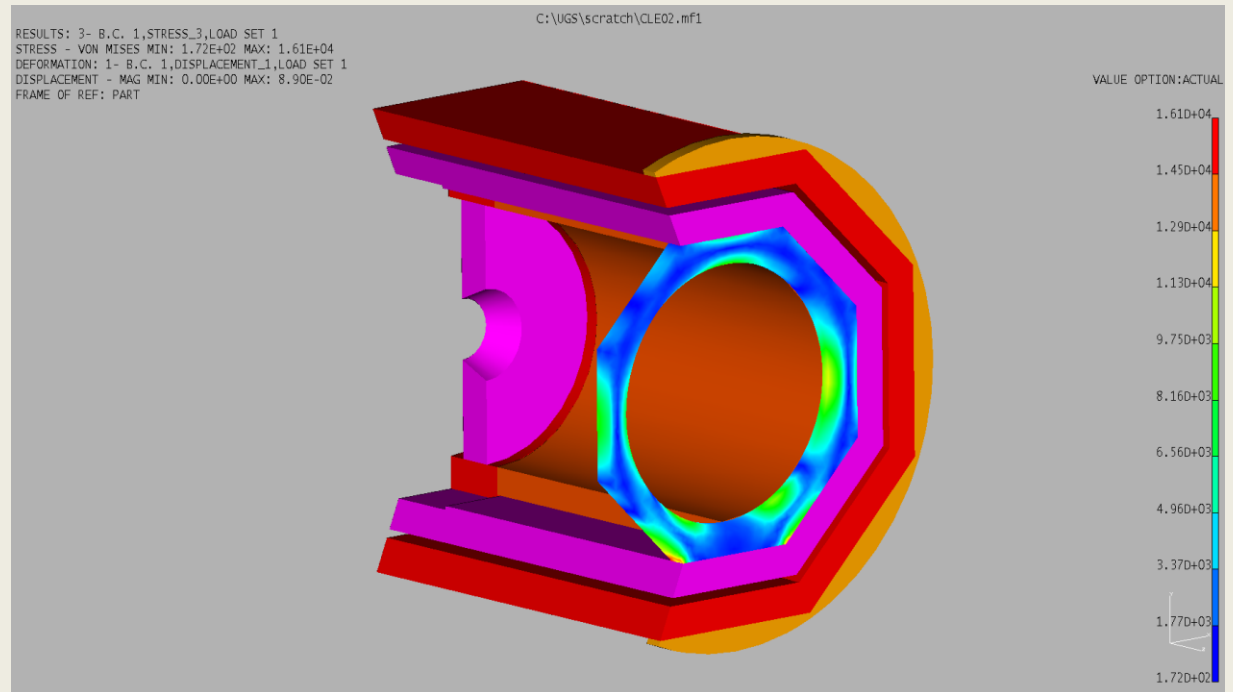
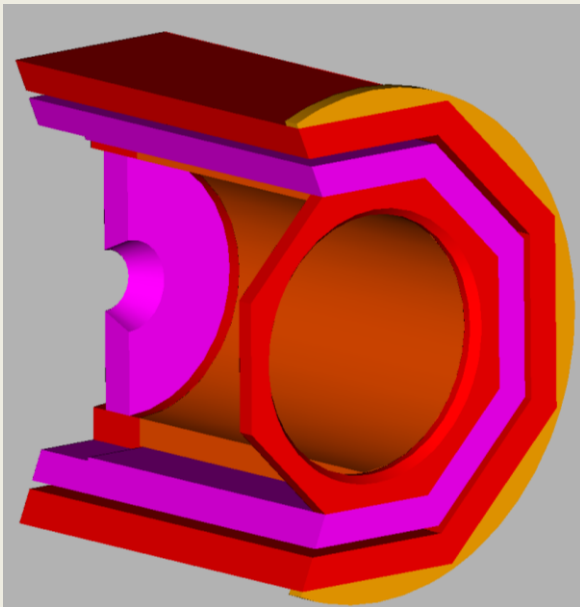
Multiple section detector hut

- Will require each section to have its own outer support frame
- Frames will be tied into track system and used for stability
- Would gain access front and back of detectors (except rear detector?)
- This is the concept “on paper” only
- Structural feasibility has not been looked at
- Compatibility between various experiments will also have to be studied



New downstream coil collar

- Allowable stress for 1008 hot rolled steel = 14820 psi
- Peak stress due to rigid constraint at the bottom is the only overstress. Conservative simple restraint.
- Buckling not checked – will be retained by the slabs.
- Forces due to gravity only



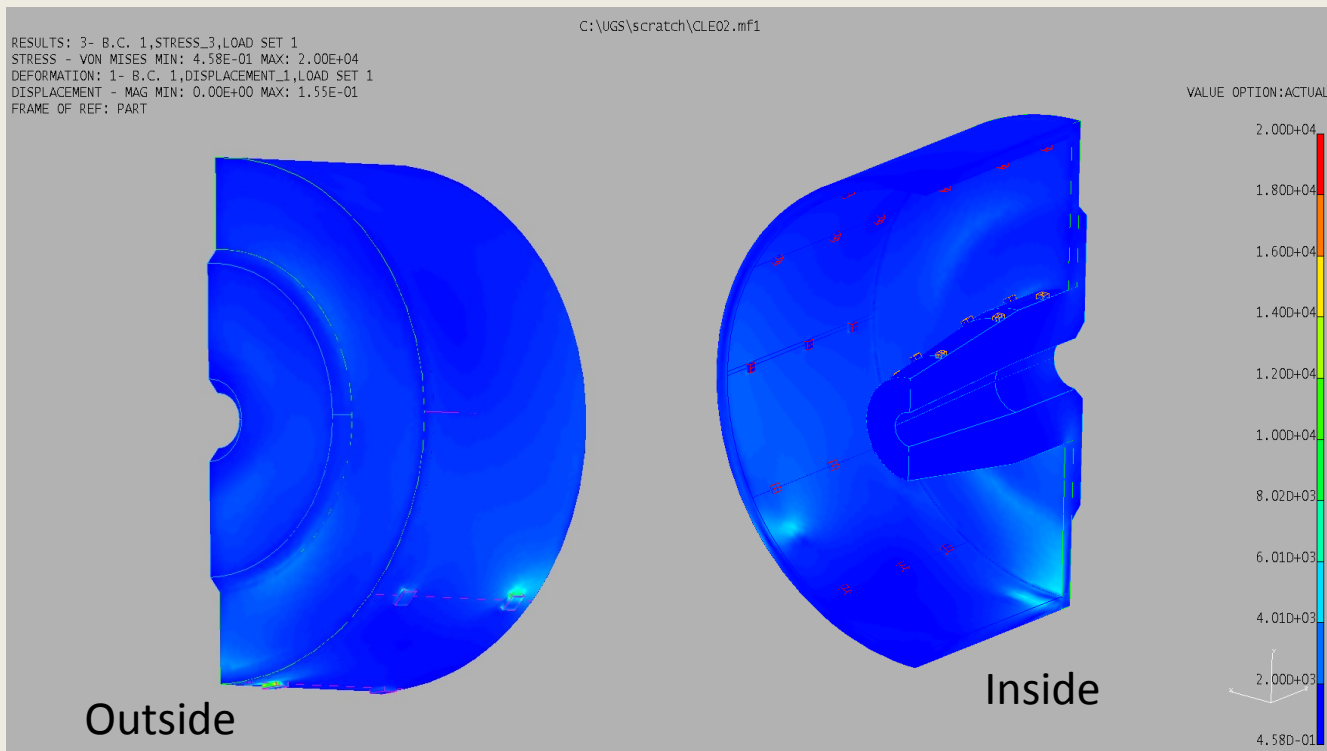
Detector hut stress analysis

Half of detector weight placed on the outer shell and half on the nose

Forces due to gravity only

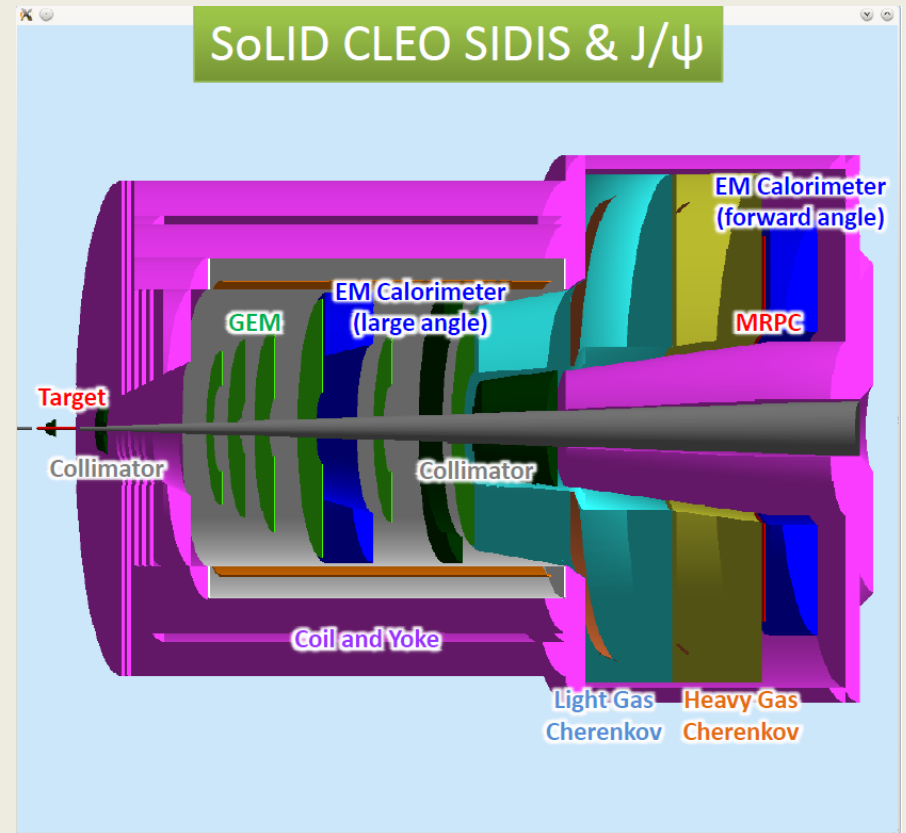
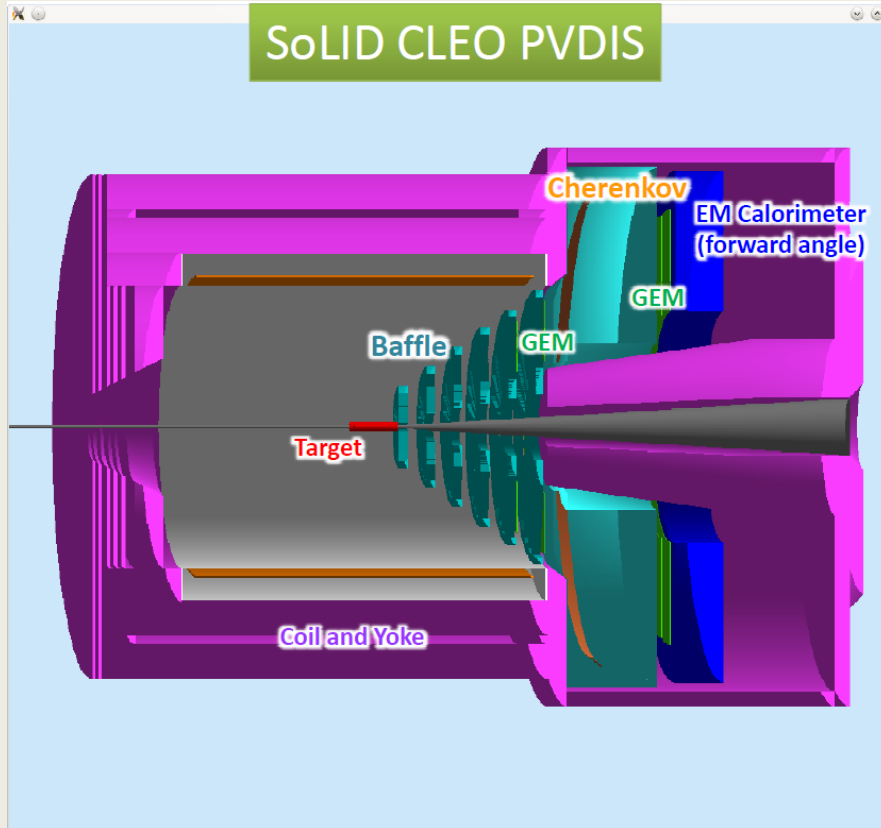
Only overstress is from rigid constraint

- Light gas Cherenkov = 6 metric t
- Heavy gas Cherenkov = 8 metric t (assumed)
- Calorimeter = 23 metric t
- W forward angle absorber = 13 metric t



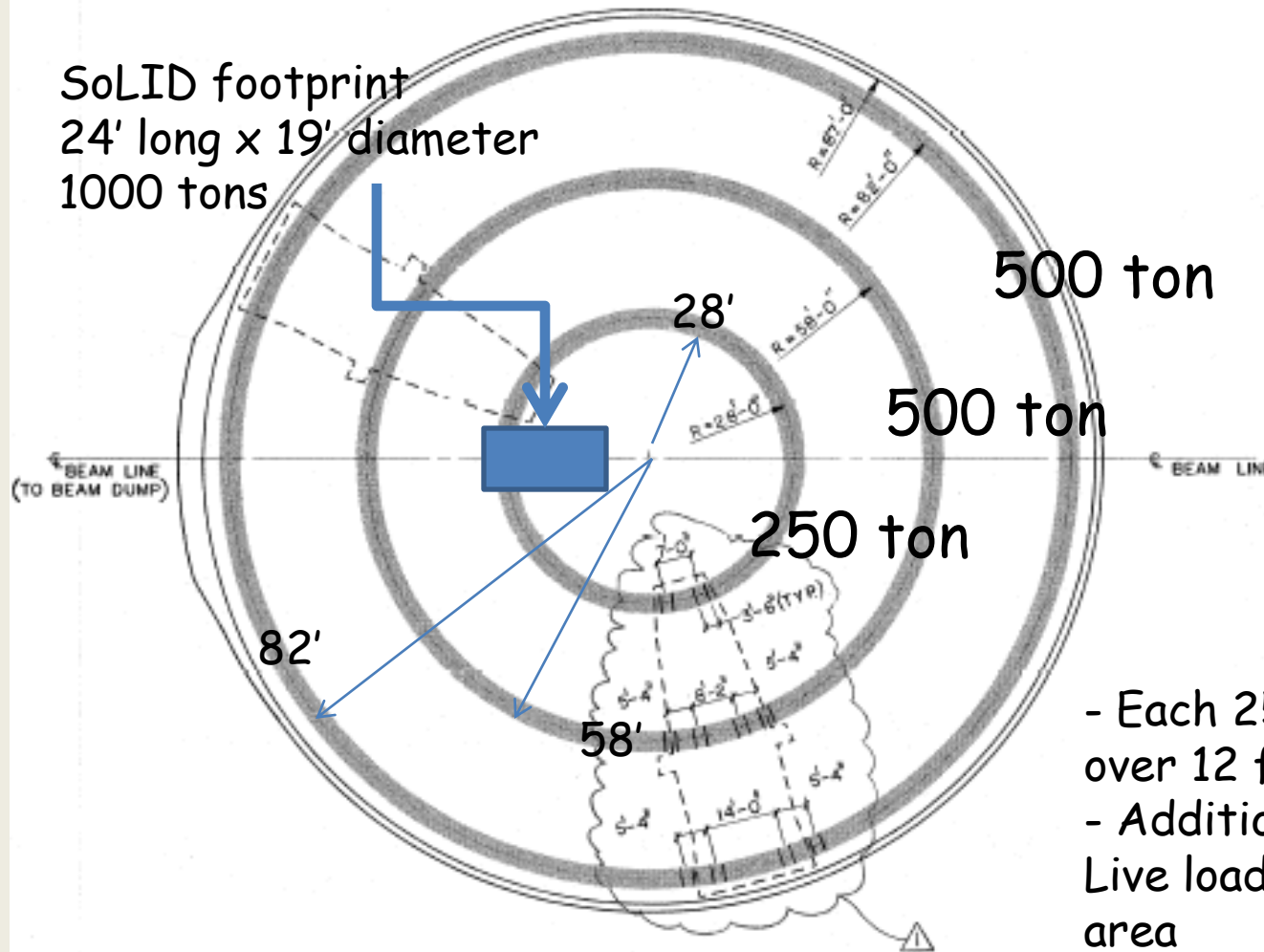
Information from Cornell, CLEO cryostat was NOT used to support detectors in the past. For CLEO, detector structures were supported by collars bolted to the inner magnet yoke pieces.

Next, we will look at options for support frame to carry loads to coil collars and yoke.



Additional Slides

Floor loading



SoLID footprint
24' long x 19' diameter
1000 tons

500 ton

500 ton

250 ton

- Each 250 ton is over 12 ft² foot print
- Additional 150 PSF Live load over entire area

END STATION 'A' LOADING PATTERN
SCALE: $\frac{1}{16}'' = 1'-0''$