



# CM45 July 29<sup>th</sup> 2016

Engineering



# Not in this talk

- Design of Cooling cell
  - Engineering of alternate RF module access
    - Upstream and downstream.
  - ‘swing door’ – LiH in/out of beam-line
  - PRY mods for
    - Tracker
    - RF couplers
    - RF waveguide support
  - EMR/ToF2 translation stage
  - Etc etc.

# Magnet & PRY movement

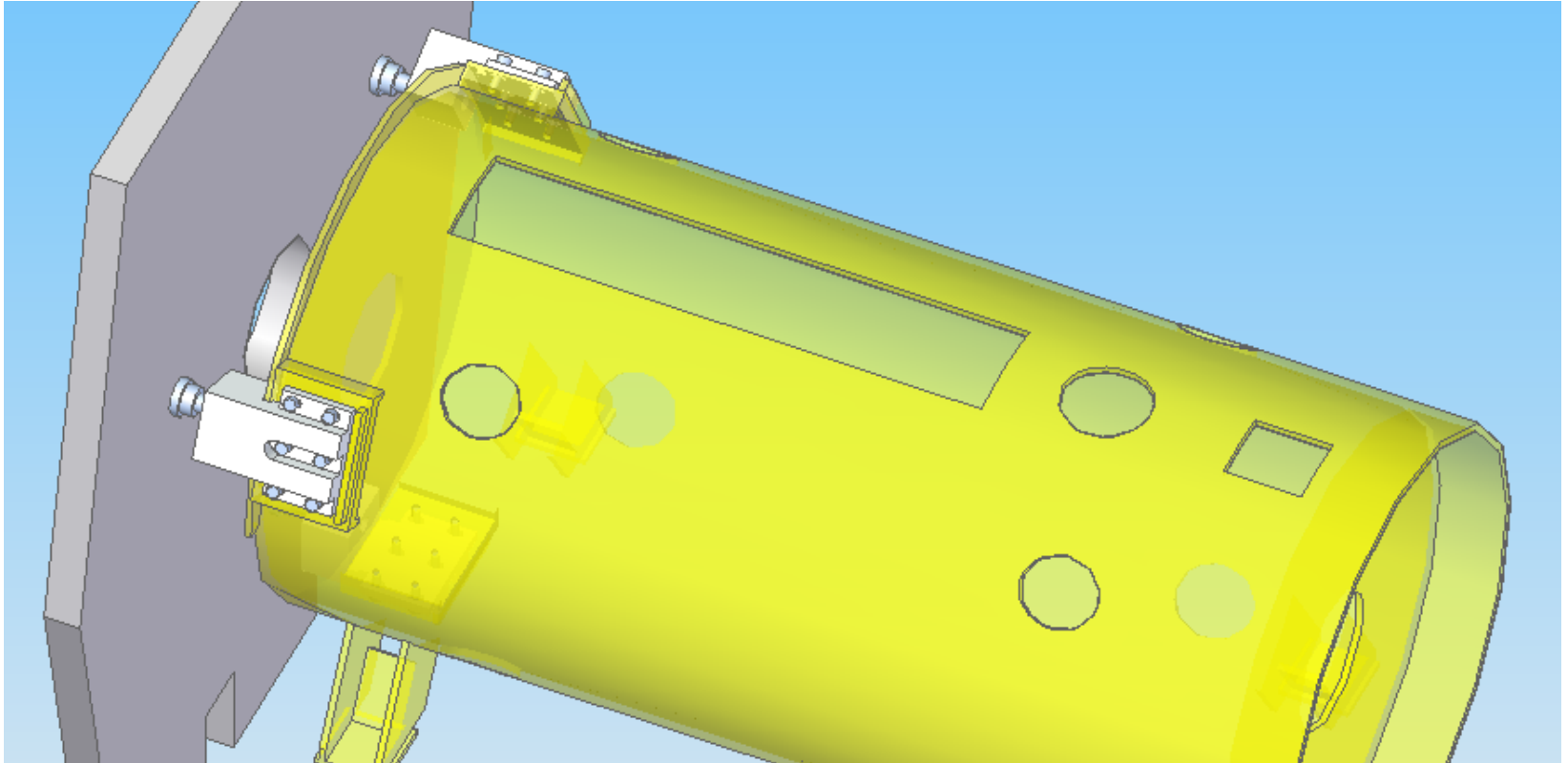
## Movement detectors

- additional channels
  - upper end plates,
  - vertical movement monitors
  - magnet OVC.

Total relative movement between Magnet OVC and PRY of ~4mm at ~210A

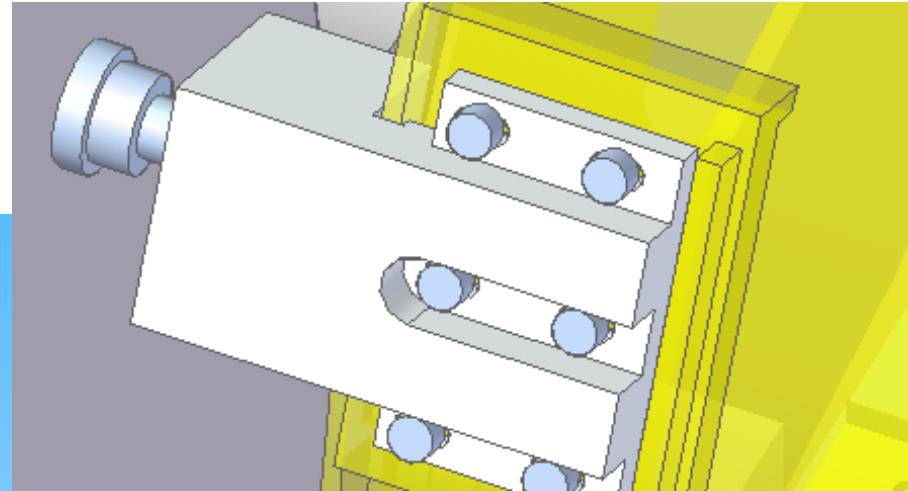
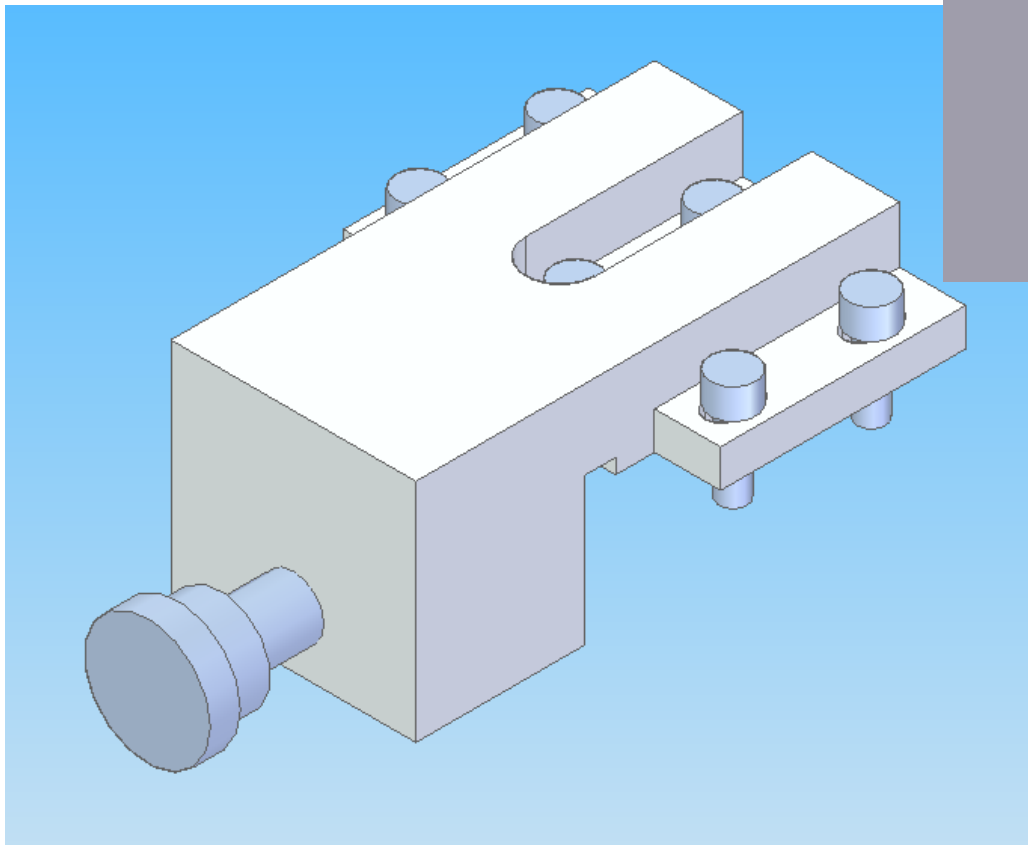
- Draw wires show 2mm PRY movement at 210A
- OVC draw wire reading at 120A – 0.2mm movement – possible indication of stick-slip movement of OVC.

# PRY to Magnet Brace



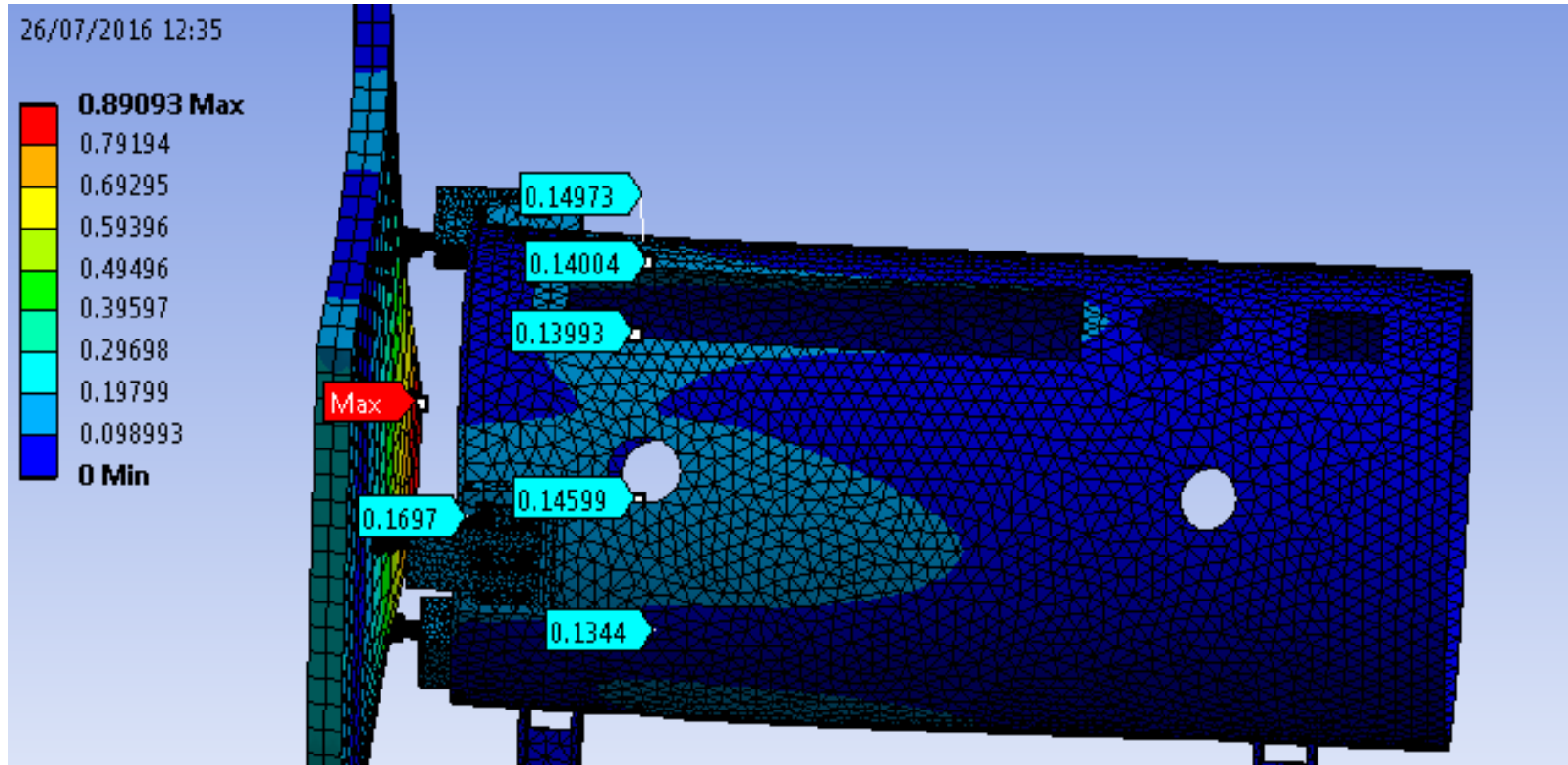
# Aluminium brace

Direct load transfer –  
no bending moment



M52 bolt  
45T load/3

# Stress/deflection analysis



Nothing to see here

# Pressure vessel code

- Vessel must be 'approved' safe
- Nominated engineer system
- Require analysis of vessel with all significant loads
  - Cold mass support
  - End thrust due to PRY brace
  - Interface to Hall floor/jacking bolts
  - Vacuum / air pressure loading
- Simplified model
  - Accurate vacuum envelope representation
  - Cold mass support pillars
  - Feet
  - Braces
  - Cryo-cooler tower
- Results/approval – parallel fabrication.

