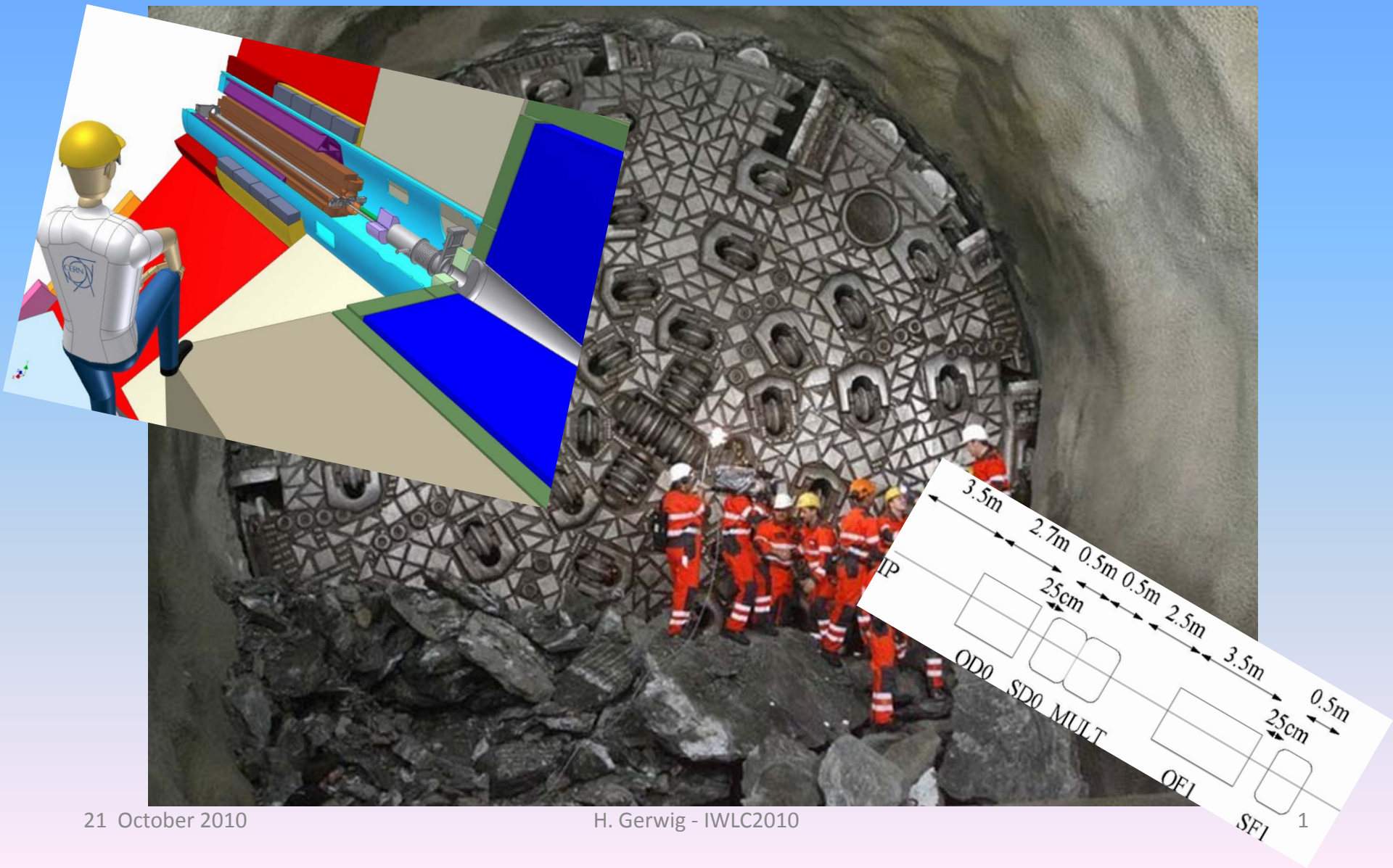
MDI Integration at CLIC



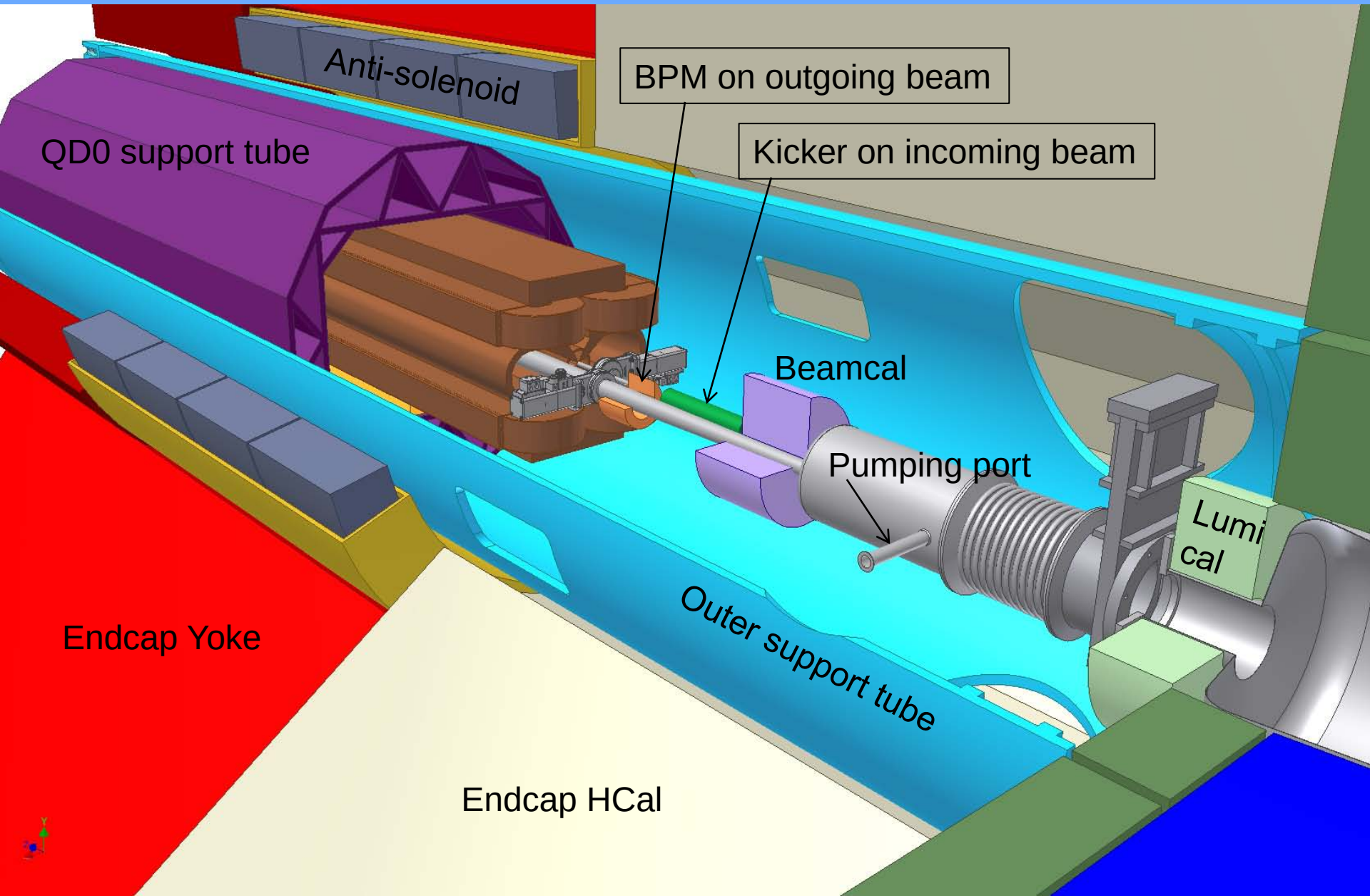
Permanent evolution of CLIC MDI

Parameter drawing for 2 detectors	2 experimental caverns connected via a transfer tunnel	Interface BDS/IP extremely short no pac-man but ring chicane with only linear movement	Each detector on a platform
All FF magnets on a pre-isolator exchangeable via experimental cavern	A two-in-one support tube with eigen-frequencies tuned on function and purpose	A sectorisation of the vacuum that allows pre-pumping, no bake-out, pumping port	Stabilisation directly under QD0 Pre-alignment on pre-isolator in the tunnel
Sectorisation for IP, sliding doors separate data taking & maintenance area	Longer experiment adapts via end coils to shorter experiment	Lumical, Kicker Beamcal, BPM and vacuum valves fully integrated	Survey gallery and emergency escape tunnel integrated in cavern design

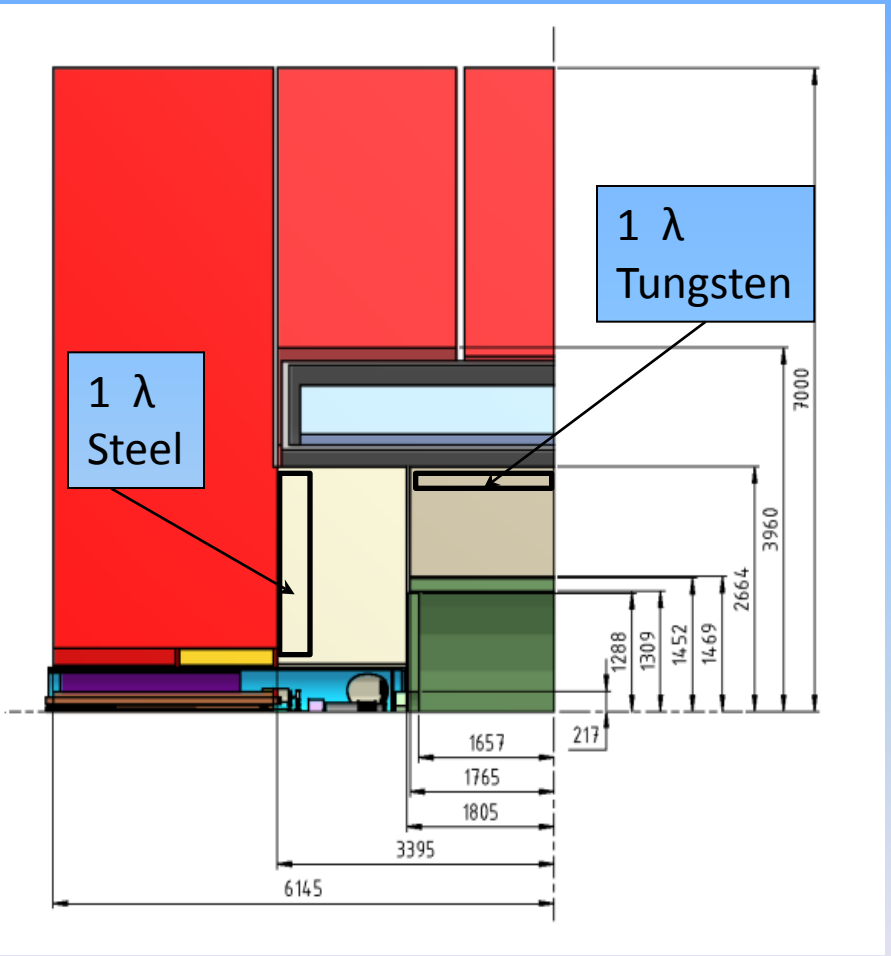
Changes since Beijing LCWS10

- Reduction of 1 lambda in HCAL
- Consequences on length, radius and L*!
- Allow exchange of FF magnets through IR
- Optimize support tube design & pre-isolator
- Include some services & rack space into IR
- Alignment channels through endcap

Layout Inner and Outer Support Tube



Consequences of a 1 λ cut in Hcal



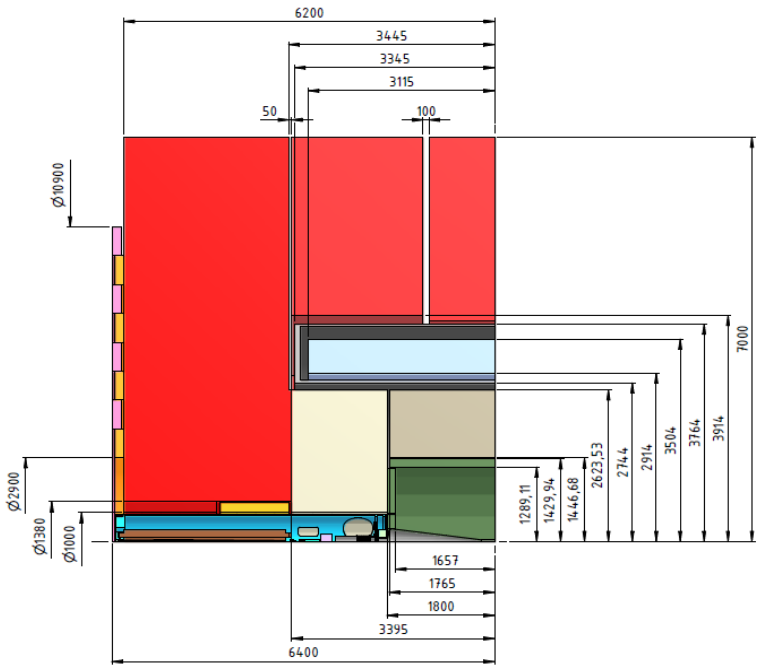
1. Cutting 1 interaction length in the endcap HCAL shortens the detector ca. 300 mm/ per side

2. Also radially space had to be re-arranged between Hcal barrel and
3. coil dimensions

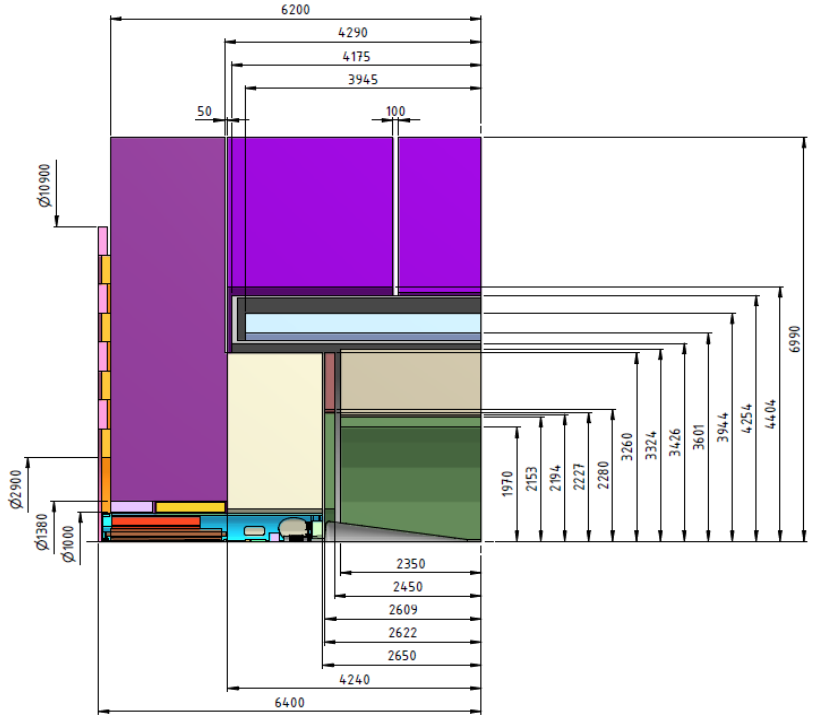
→ See Talk of Benoit Curé WG5

Actual CLIC detectors in comparison

CLIC_SiD [5T]



CLIC_ILD [4T]



DRAFT

CLIC_SiD & CLIC_ILD COMPARATIVE LAYOUT	ECHELLE SCALE 1:50	DES/DRA	N. Siegrist 19.10.2010
		CONTROLLED	
		RELEASED	
		APPROVED	
NON VALABLE POUR EXECUTION NOT VALID FOR EXECUTION	DAC	SIZE A2	IND.

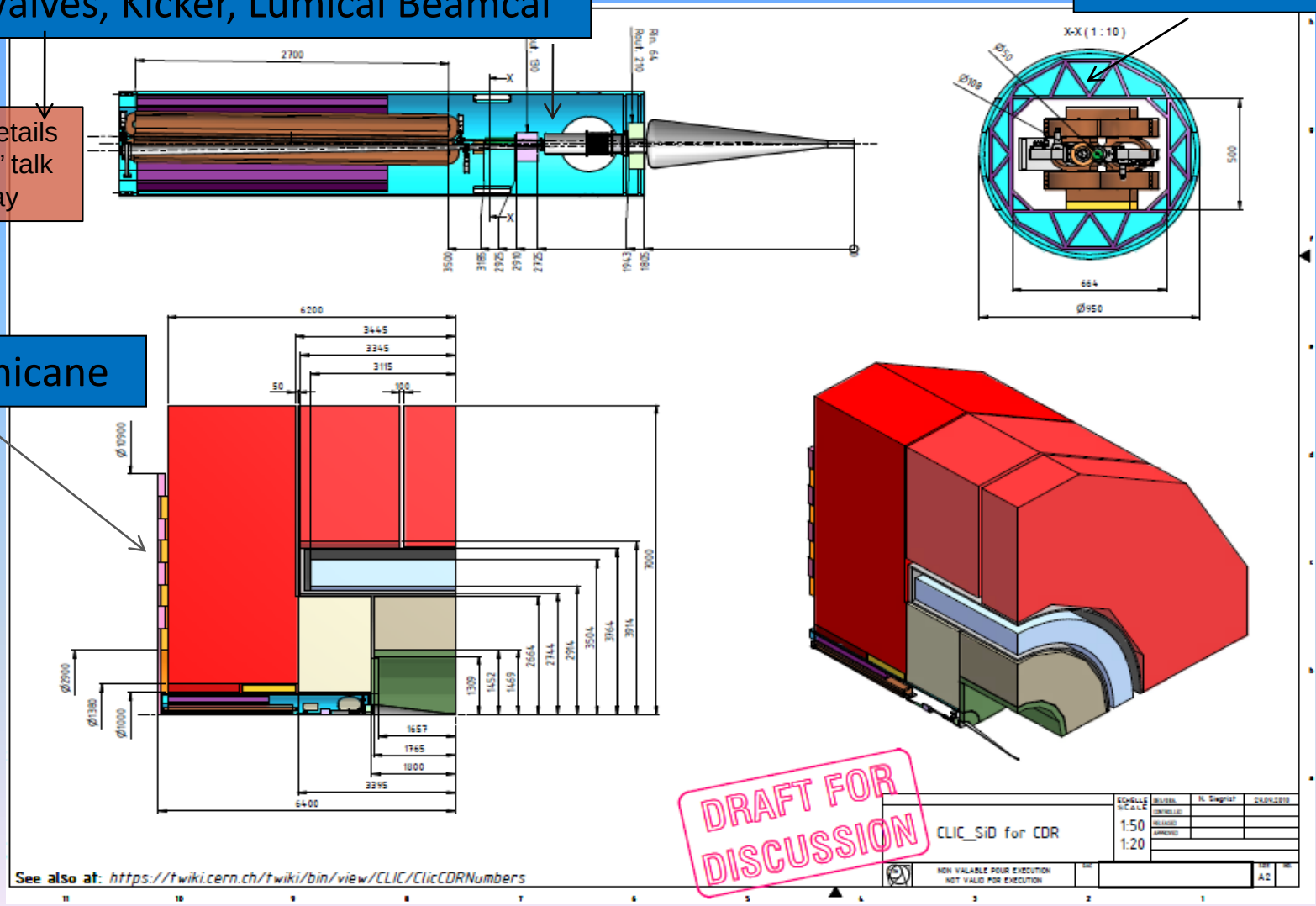
CLIC_SiD

Valves, Kicker, Lumical Beamcal

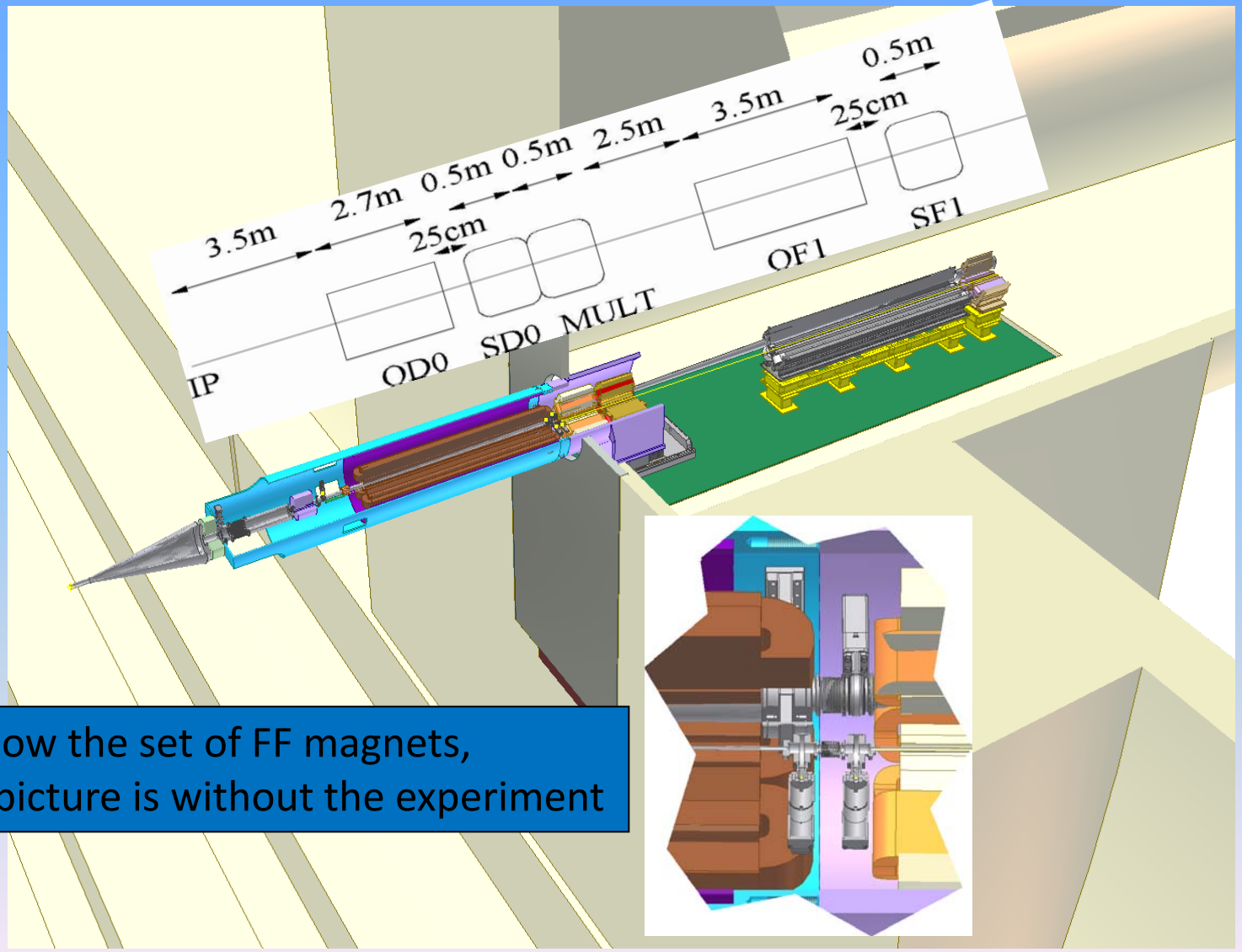
Inner support tube

Vacuum details
R. Veness' talk
WG5 today

Ring-chicane

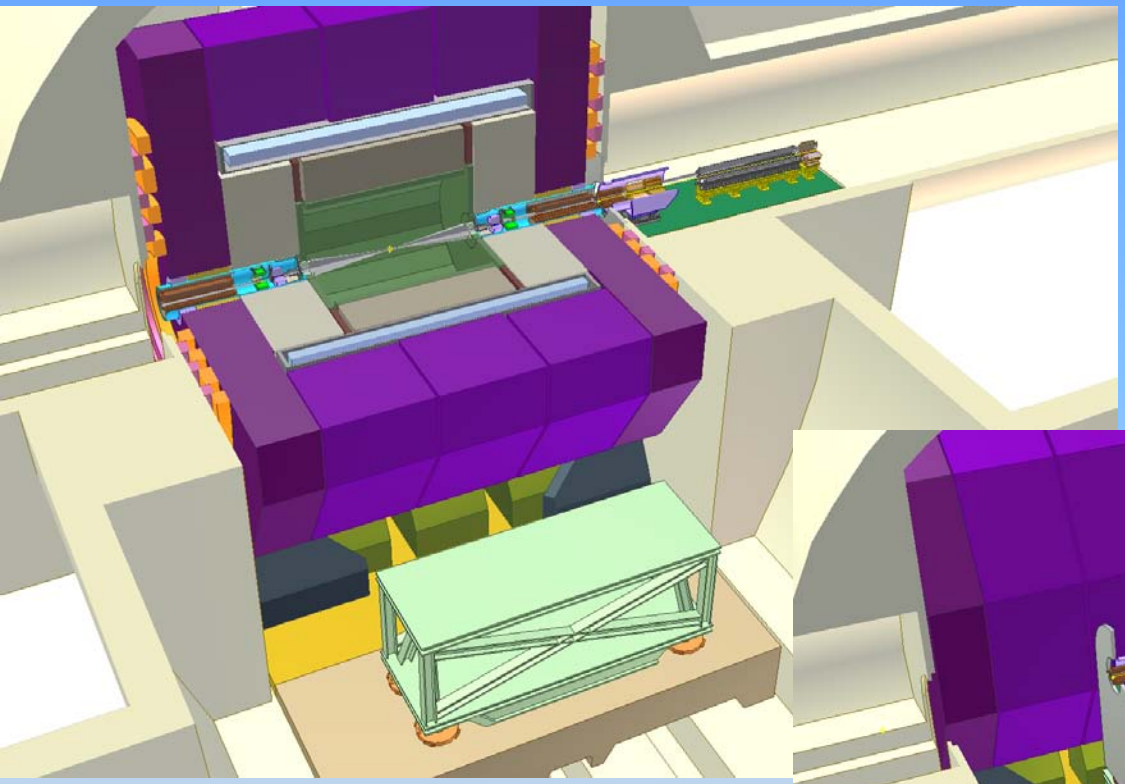


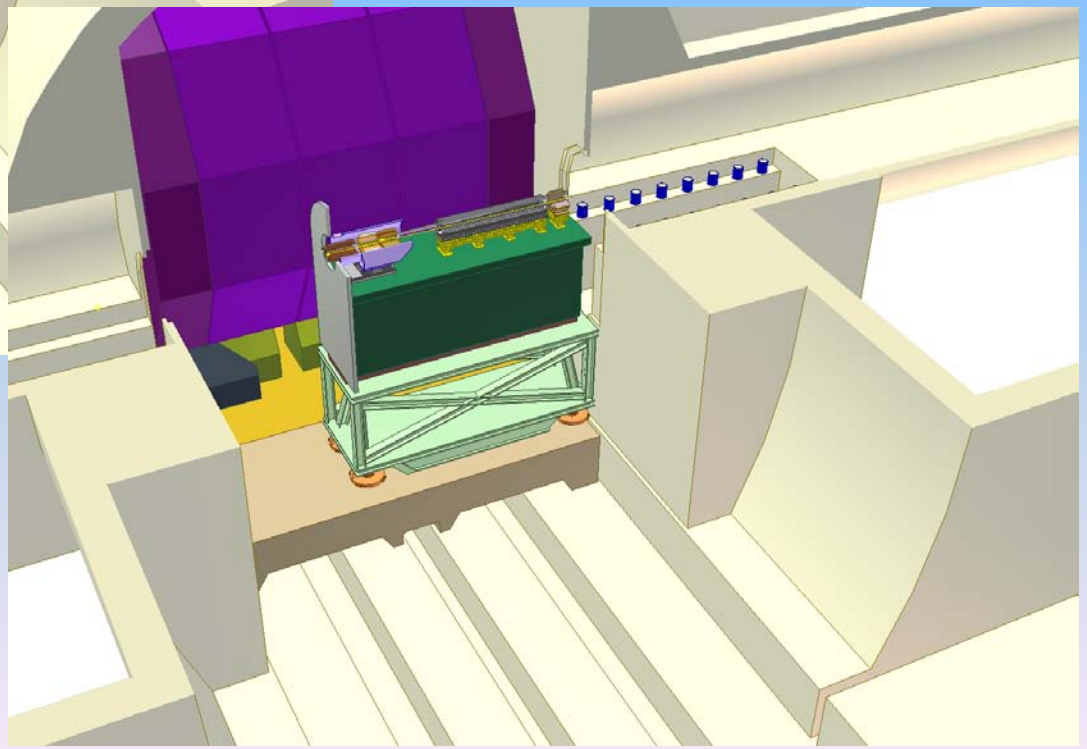
Change of FF magnets possible



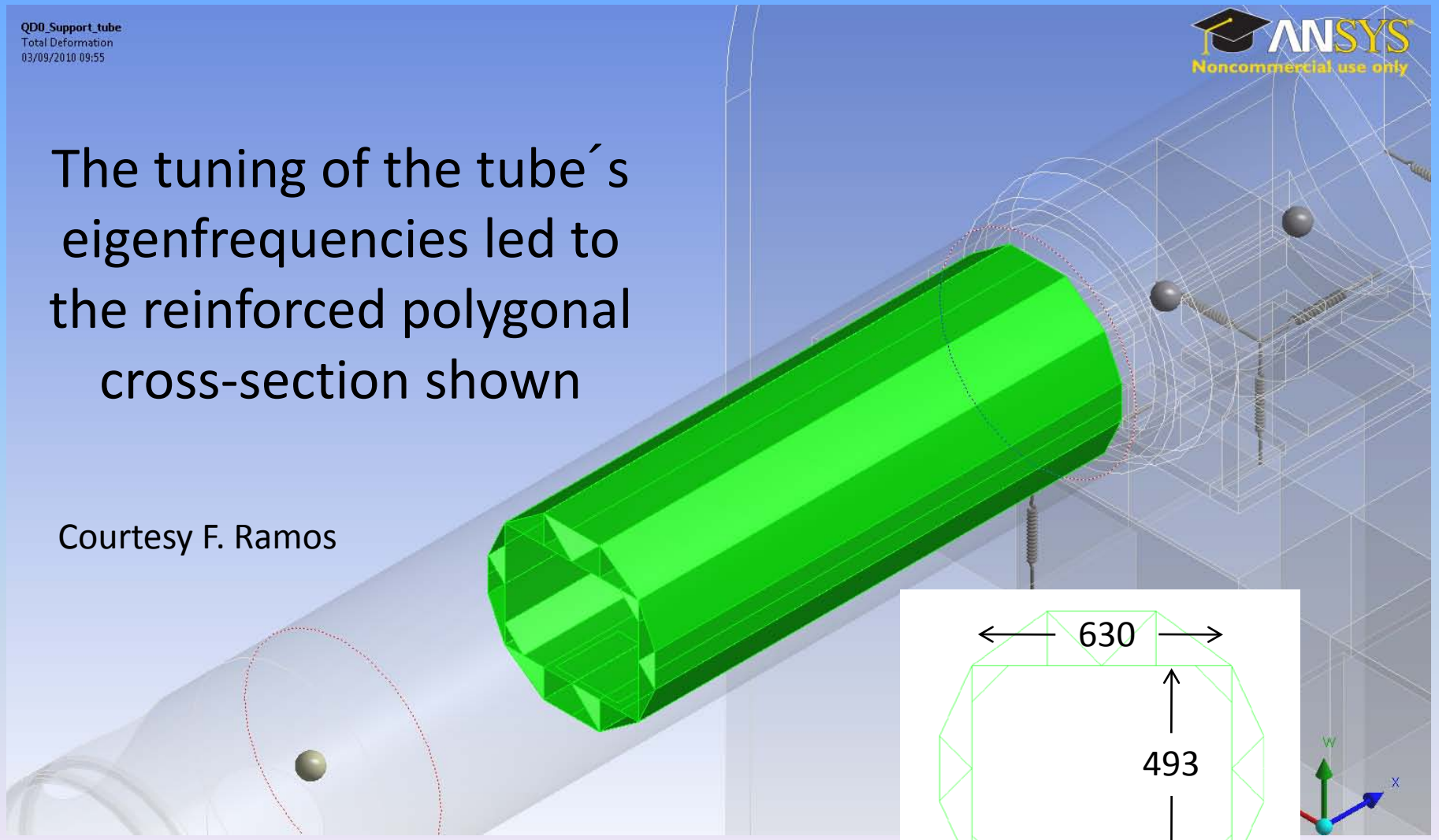
To show the set of FF magnets,
This picture is without the experiment

Change of FF magnets possible





Optimize support tube design

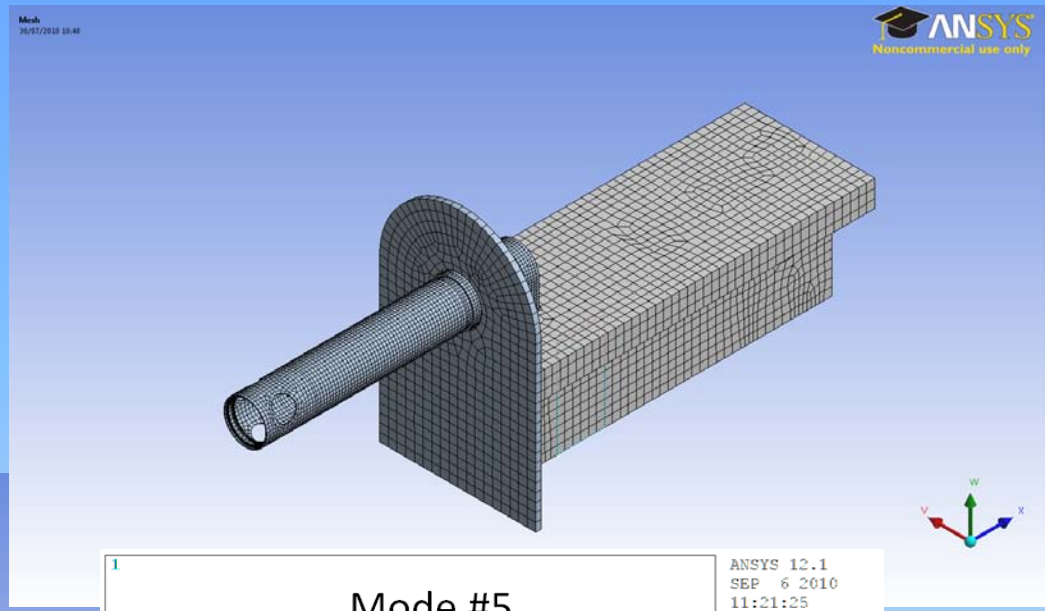


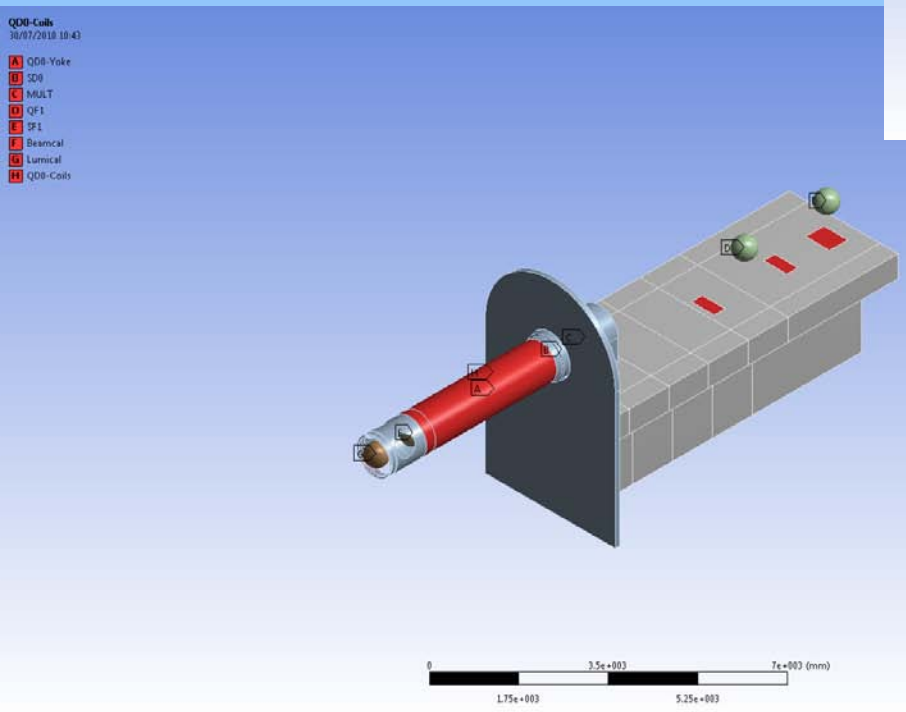
The tuning of the tube´s eigenfrequencies led to the reinforced polygonal cross-section shown

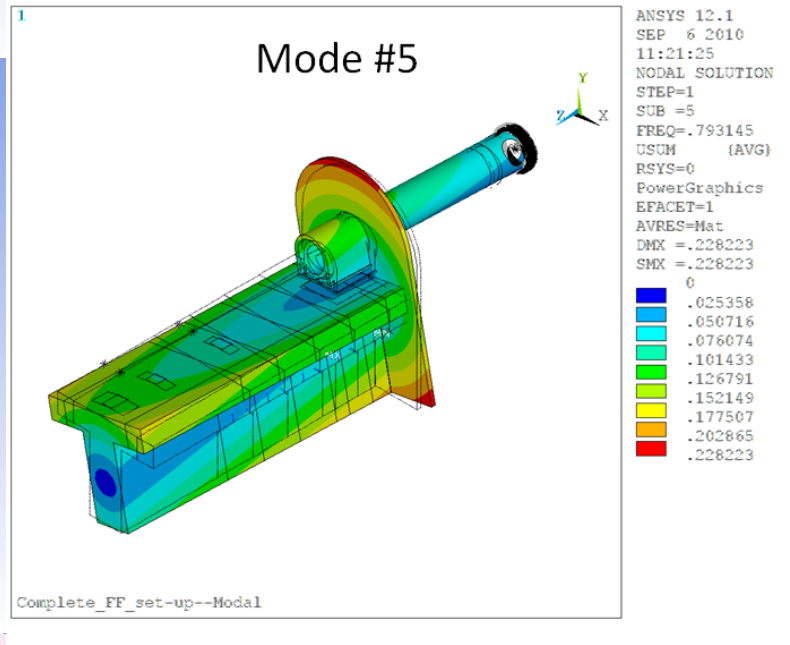
Courtesy F. Ramos

Pre-Isolator FEA simaulation

See Andrea Gaddi's talk



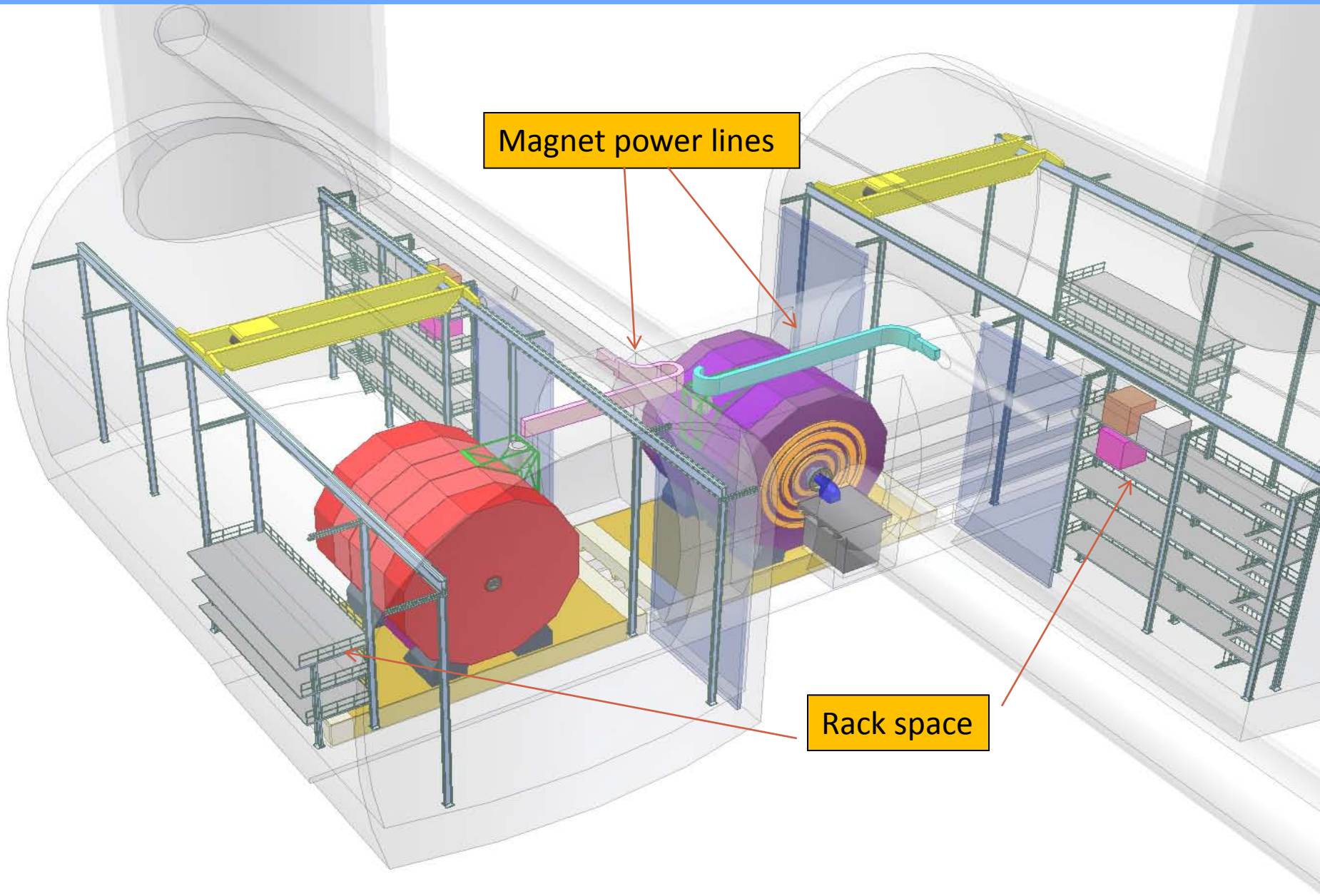




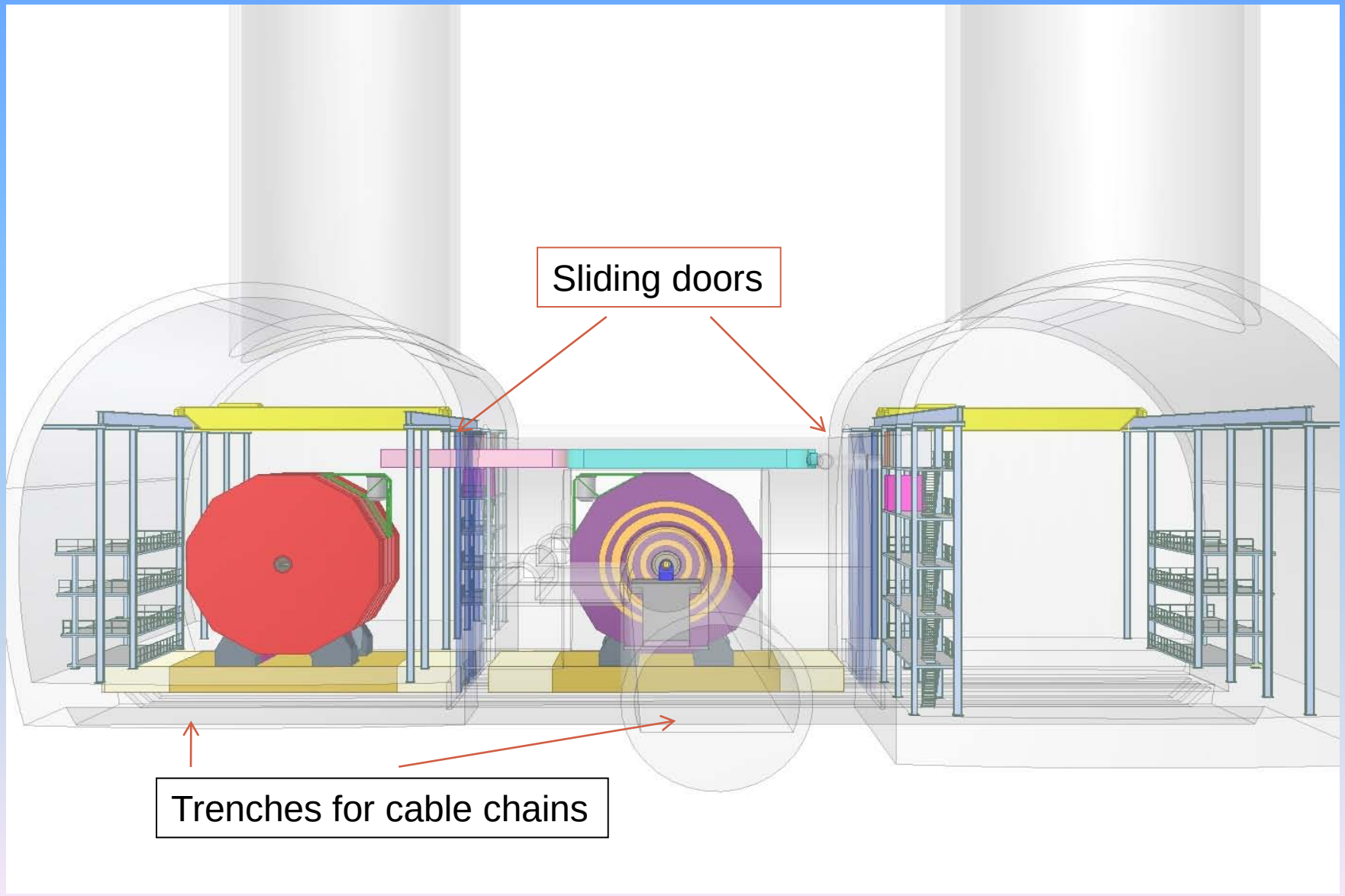
Pre-Isolator Prototype at P5

Measurements under way with EN-MME M. Guinchard et A. Slaathaug

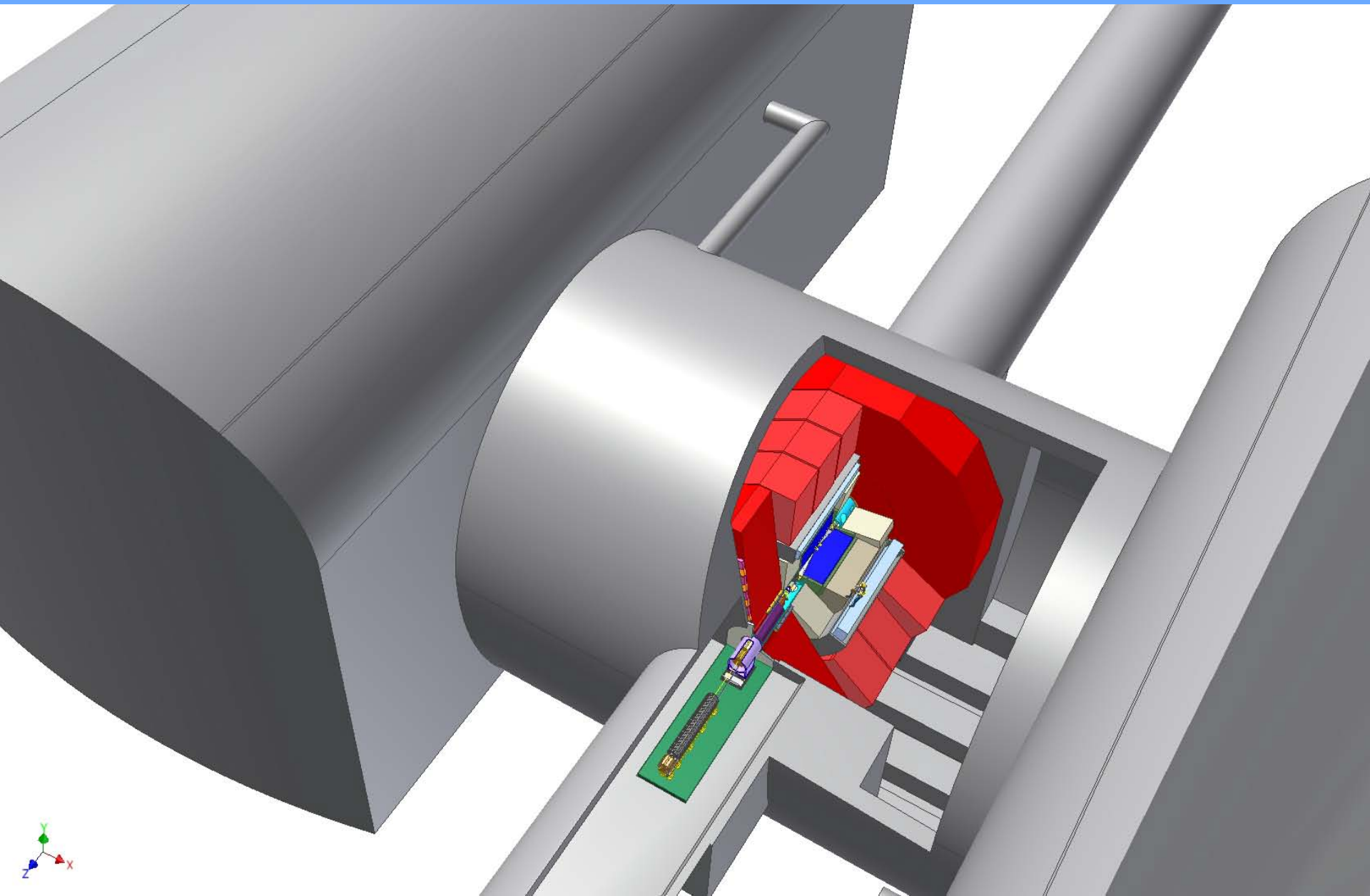
Cavern: Magnet powering and Cryoline



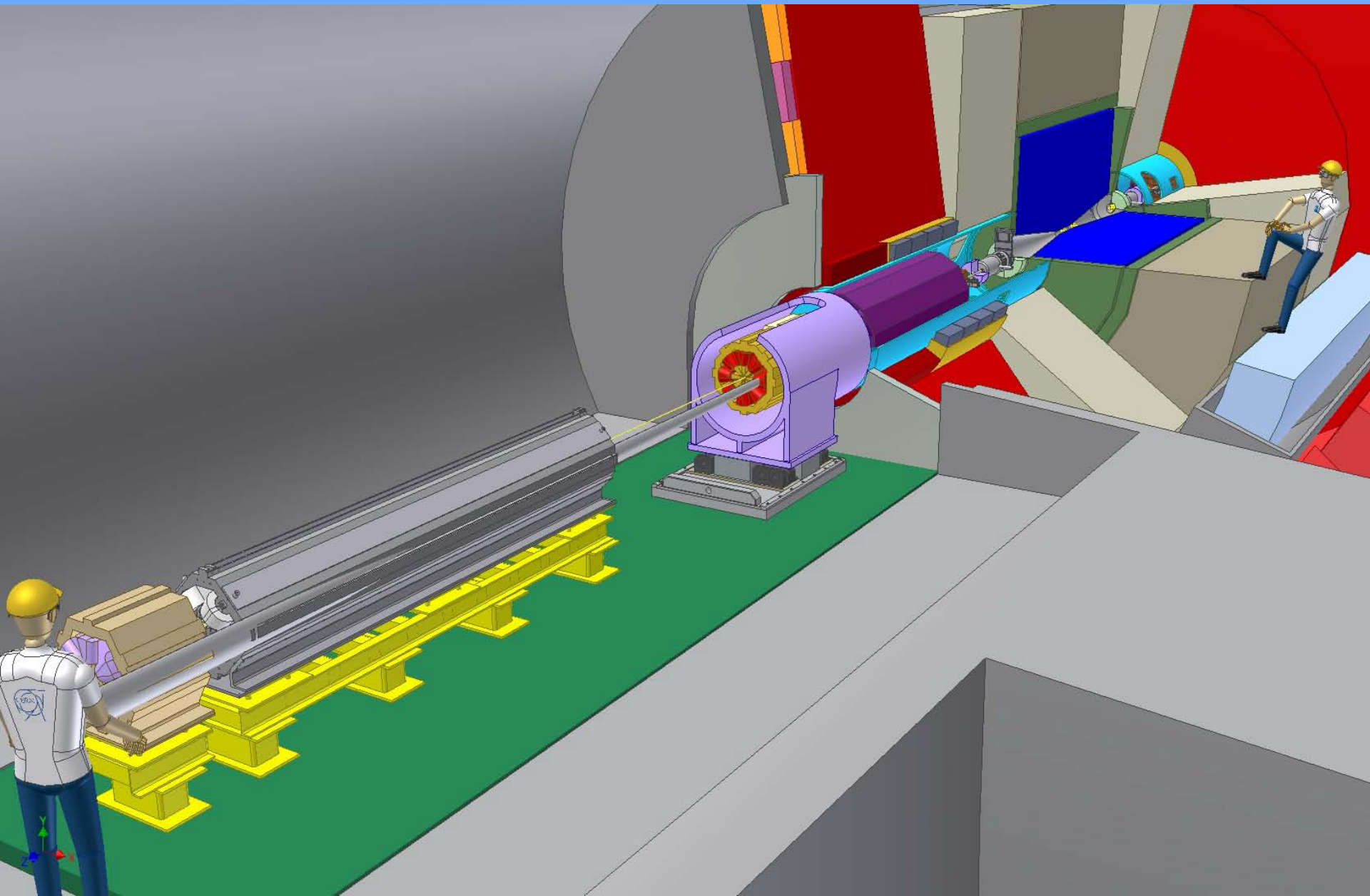
Separated interaction region



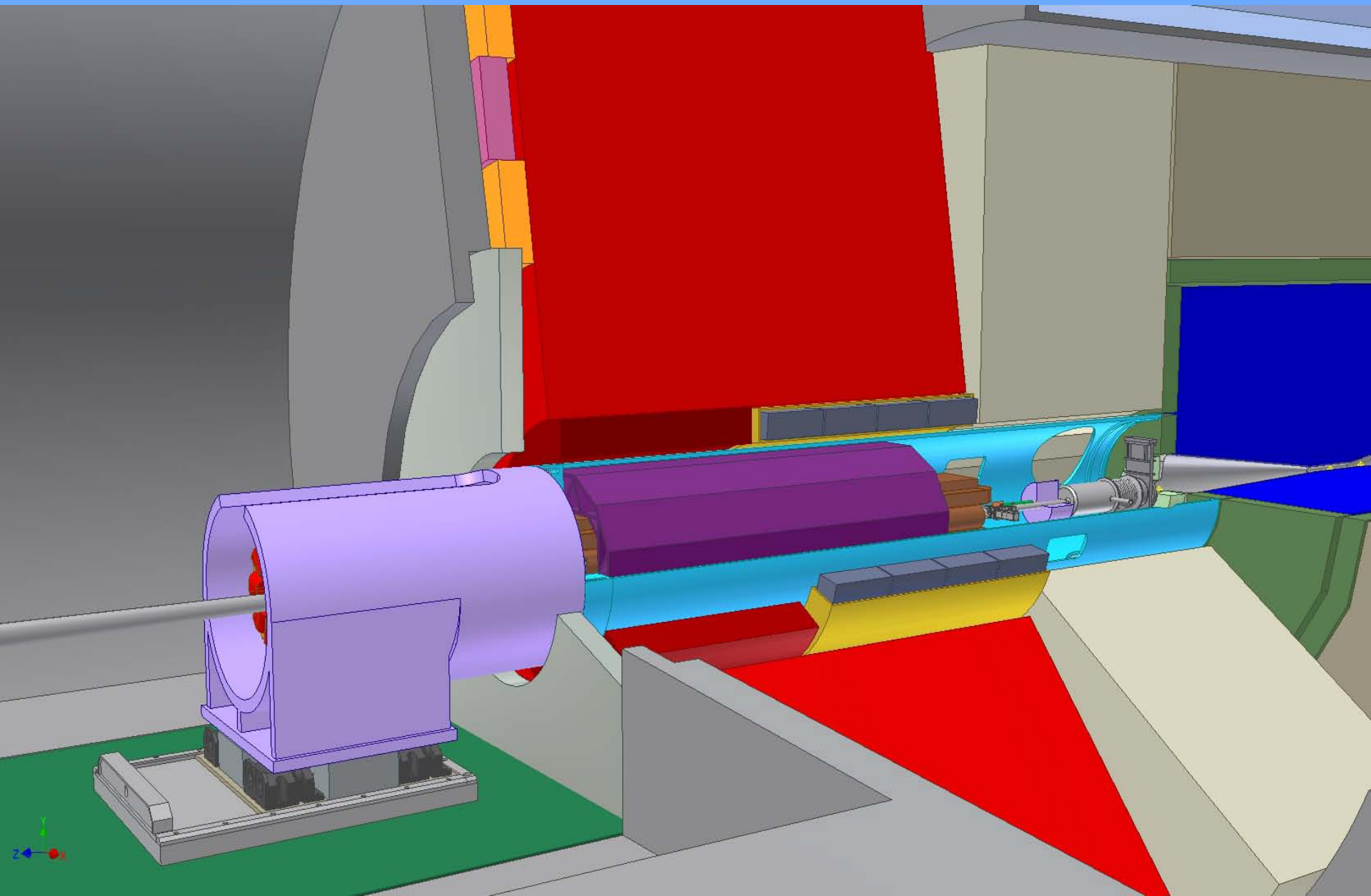
Detector on IP



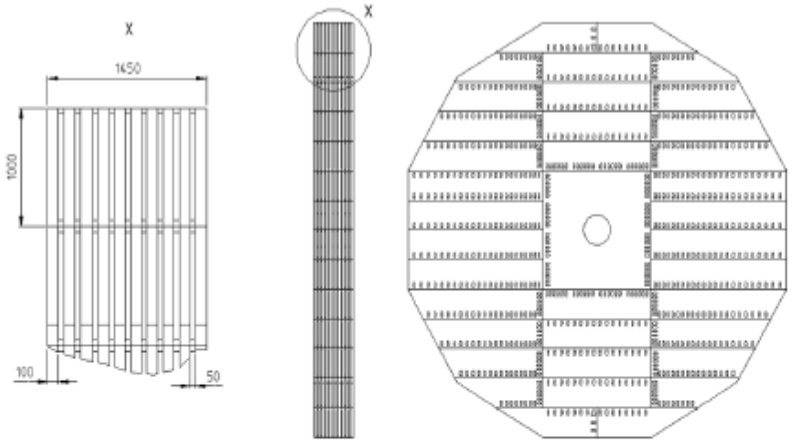
Detector on IP seen from tunnel



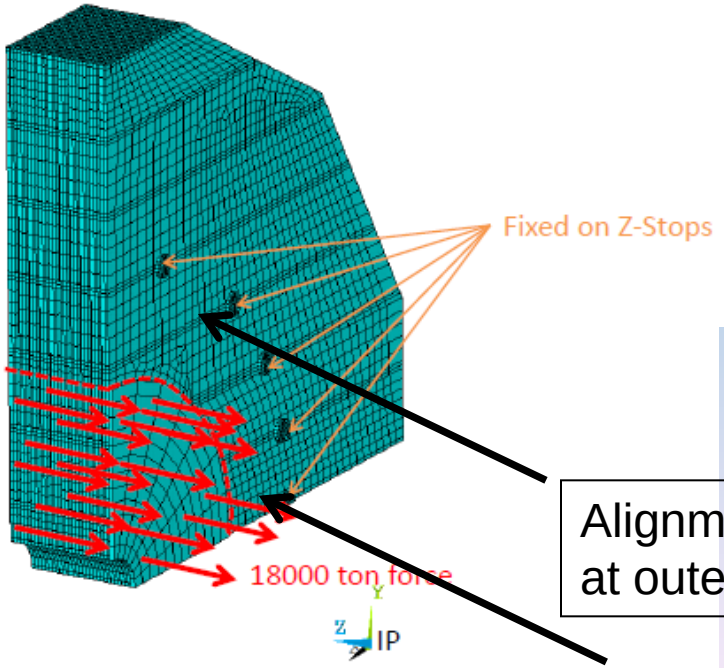
Tunnel end – Ringchicane - Yoke



End-cap analysis for alignment

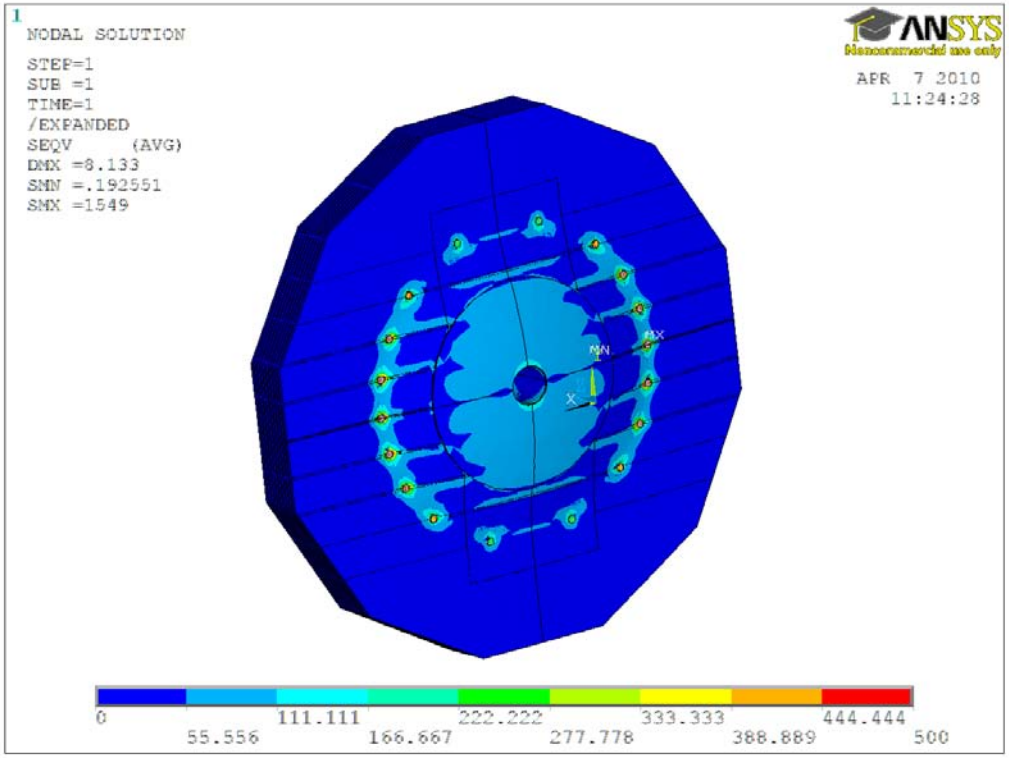


- 37 stacked modules (9 different types + 1 central block)
- Weight of each module kept below 40 ton
- Total weight of ~1300 ton
- Bolted & welded construction
- Spacers placed horizontally
- **Easy installation and access to muon chambers**

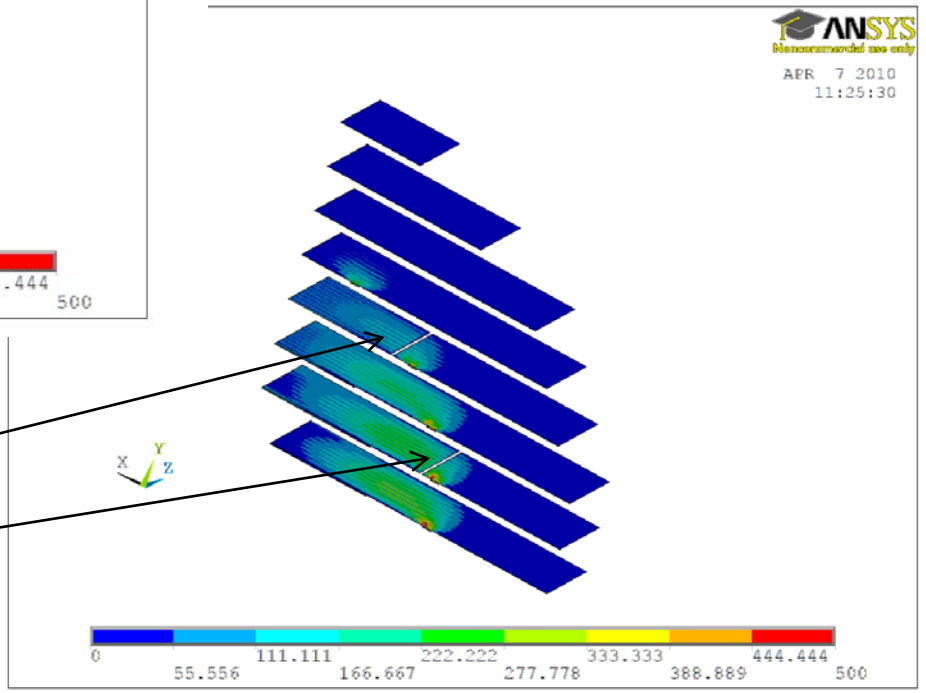


Alignment channels
at outer radius of HCAL

60 mm slots for alignment channels



Stresses are ok for a fine grain structural steel



8 Alignment channels of Ø 60 mm through endcap are feasible

Conclusion

- The integration of the CLIC MDI region has made tremendous progress since 2009
- Many problems have been studied and solved(!)
- There are many (sometimes hidden) details that makes the whole design looking sound
- We (A. Hervé, A. Gaddi, N. Siegrist, F. Ramos) are confident of the actual design

Thank You for your attention!