

International Workshop on Linear Colliders 2010

I-DEAS for an ILD-TPC

Volker Prahl
DESY Hamburg
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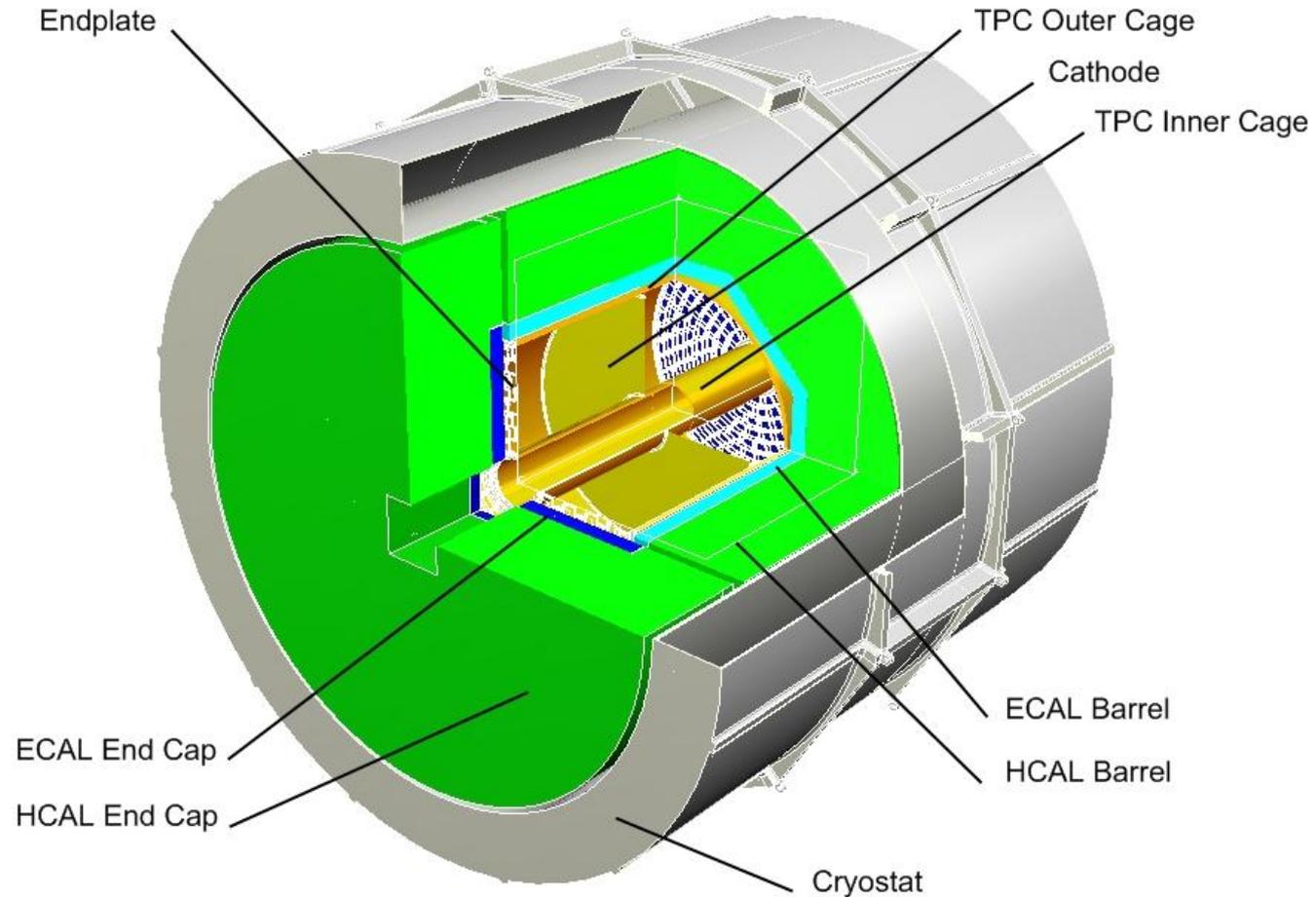
- Overview of the 3D ``Placeholder model``
- Fieldcage design
- How to support the TPC
- Cathode design and support
- SET-Detector integration
- Outlook



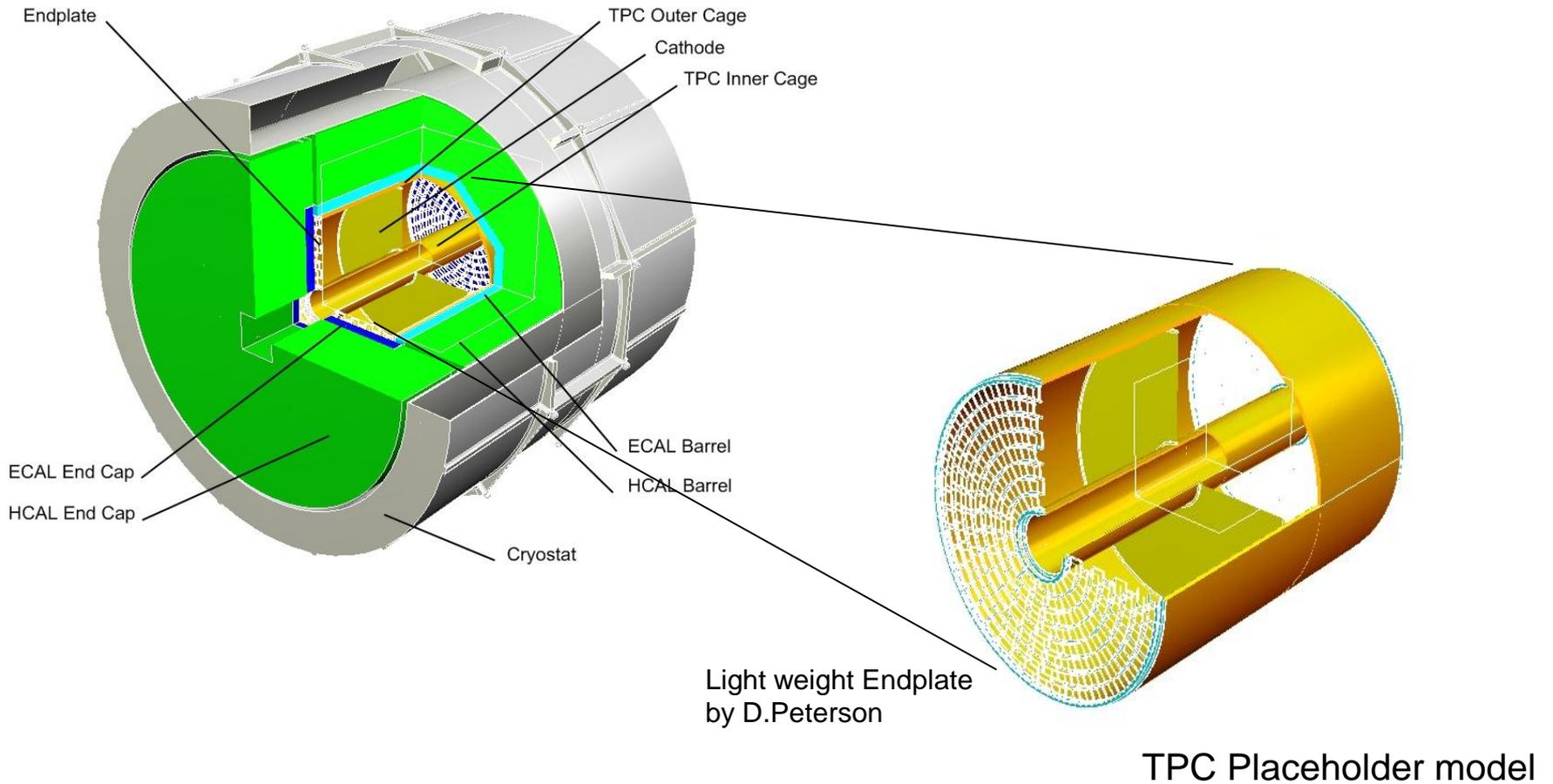
Overview of the 3D Placeholder model

3D Placeholder Model of the TPC

Incl. Cryostat, HCAL,
ECAL, TPC

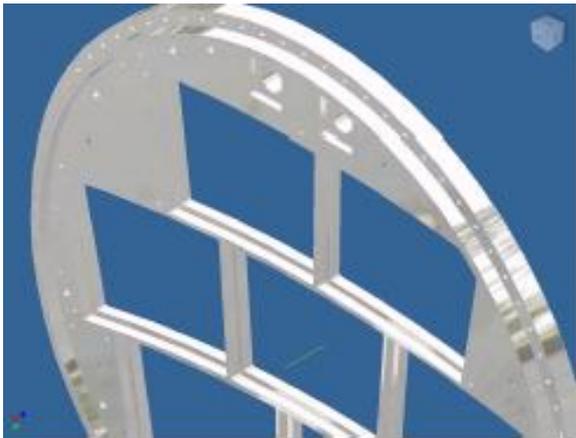
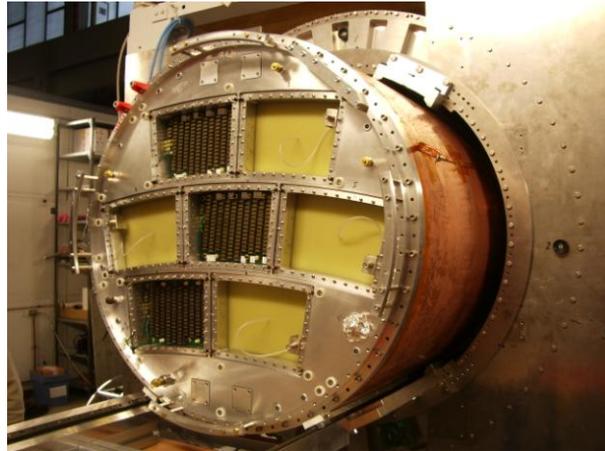


Overview of the 3D Placeholder model



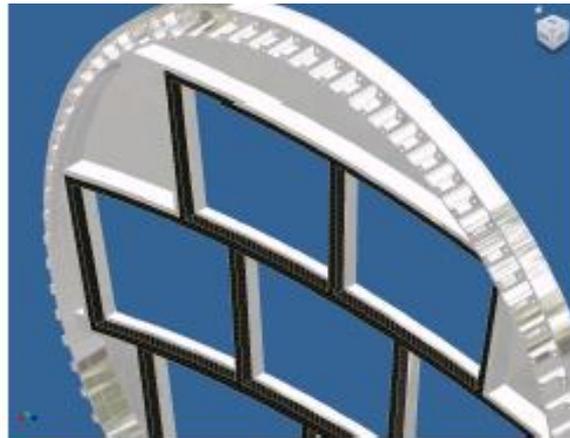
Overview of the 3D Placeholder model LP1

Right:
LP1 assembled with
current and fieldcage

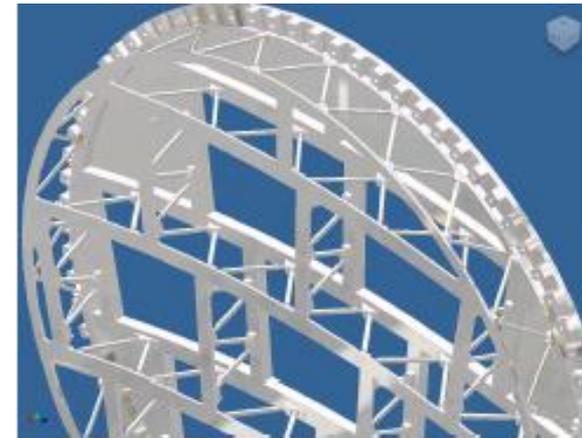


Current LP1 endplate
mechanical structure

PRC report 2010



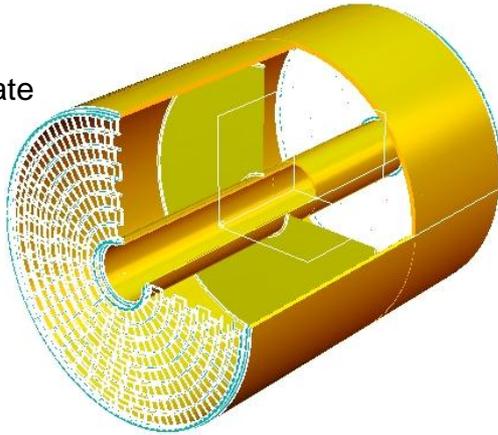
Model of LP1 endplate
Hybrid construction



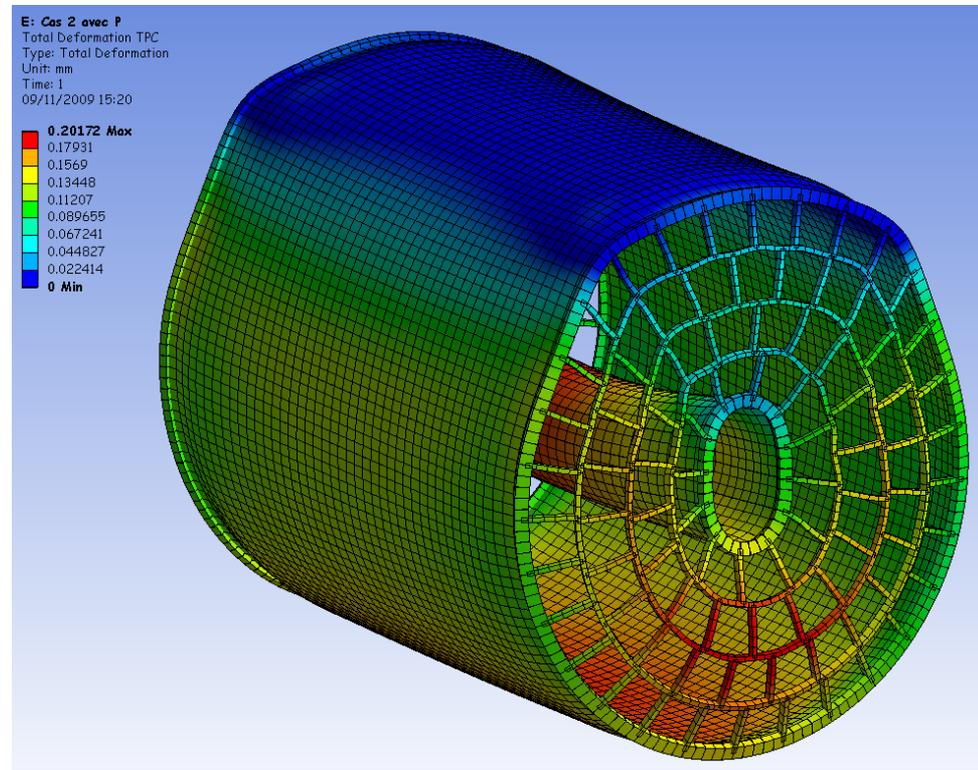
Model of LP1 endplate
Spaceframe construction

Overview of the 3D Placeholder model

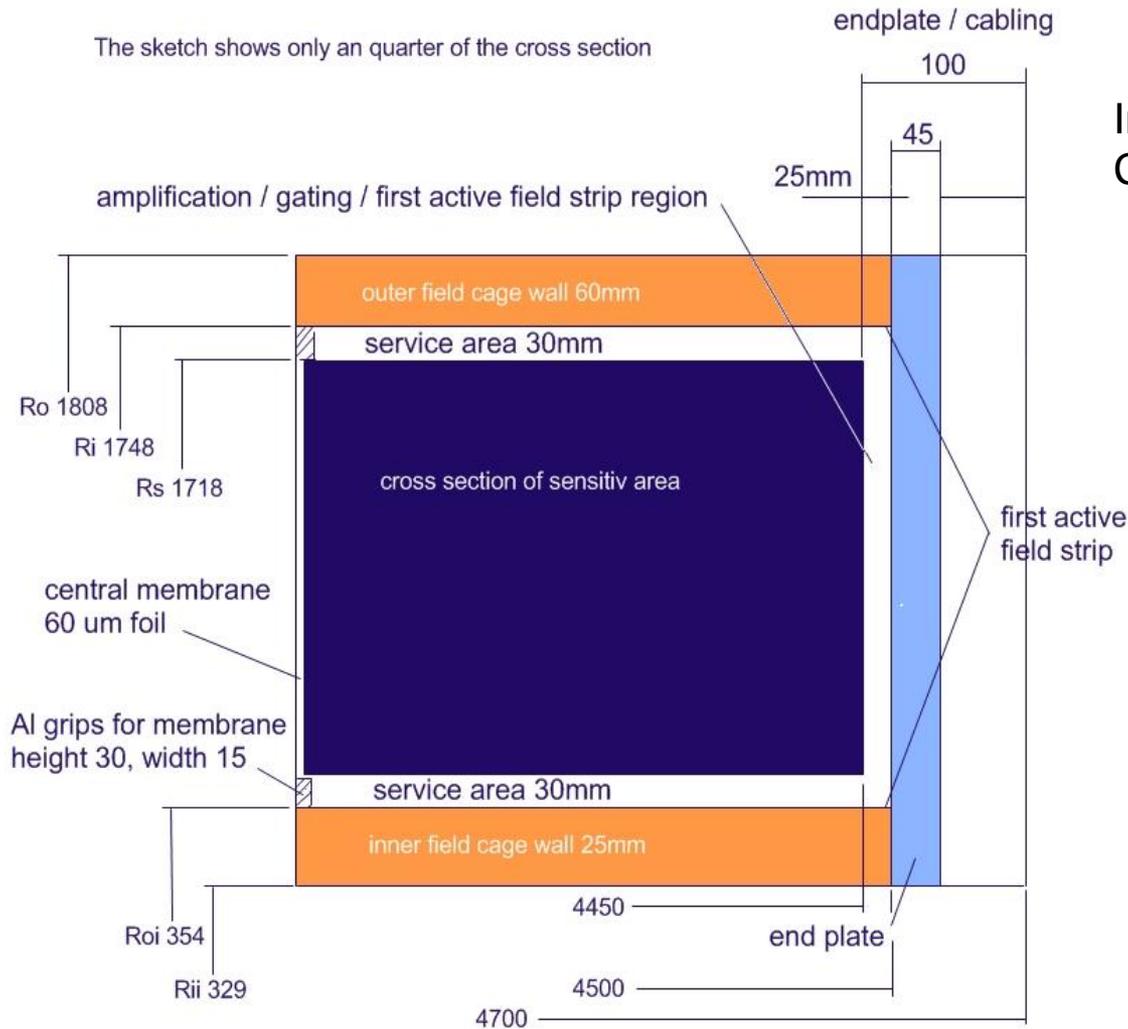
Light weight Endplate
by D.Peterson



FEM Calculations by CEA Saclay:
Deflection $O(150 \mu\text{m})$ @ 3 mbar



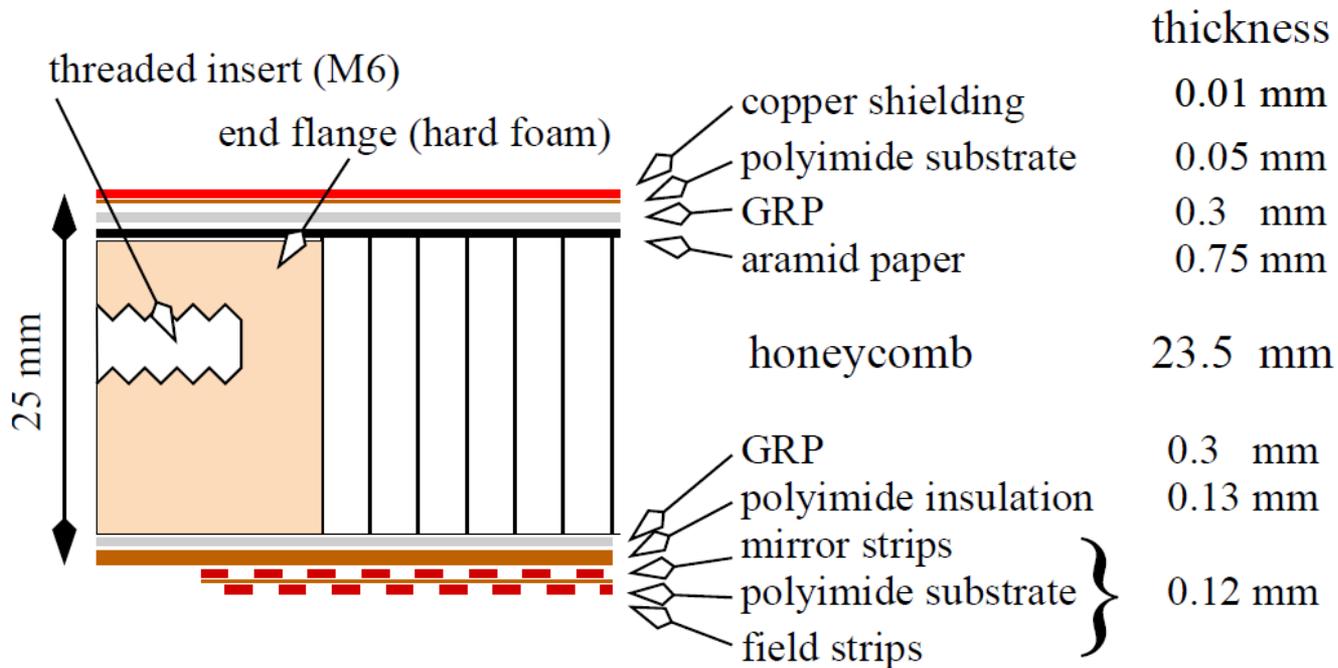
Overview of the 3D Placeholder model TPC Details



Infrastructure (Cables, Gaslines, Cooling, Alignment) C.Clerc

Field Cage Design

Wallstructure Large Prototype TPC: HV stable up to 30 kV
 → extrapolate to ILD-TPC (O(100 kV))



How to support the TPC

Basic requirements of the support design

- > Low budget material
- > High stiffness
- > Vibration absorption
- > Service friendly
- > Adjustable
- > Possible designs are: hanging / shoring



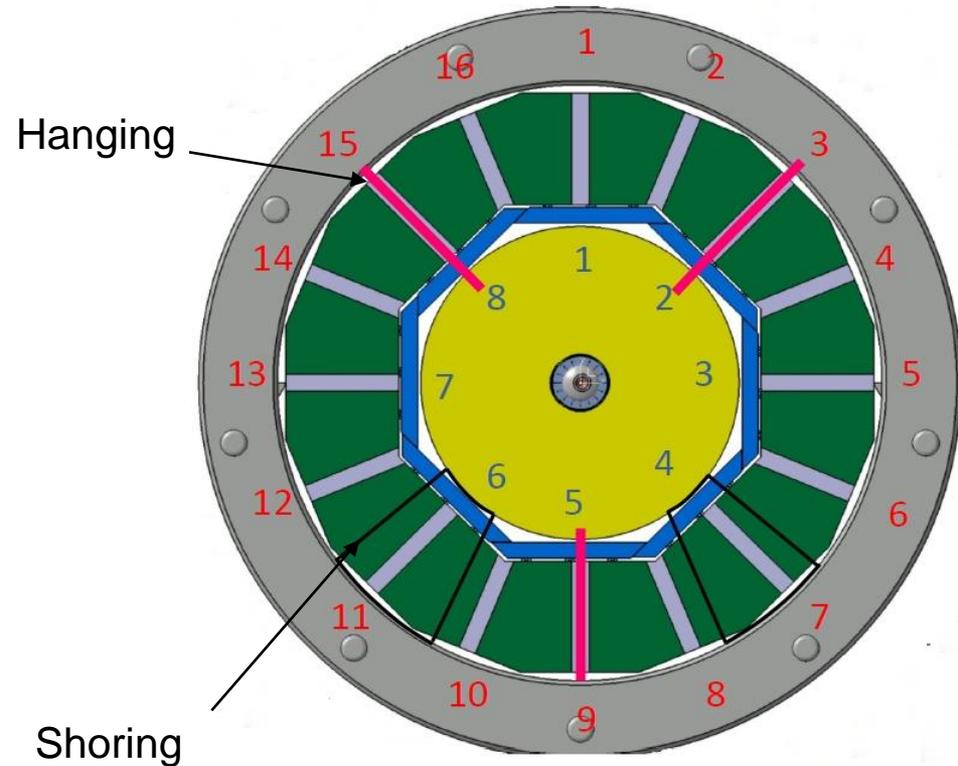
How to support the TPC

Where should the TPC be fixed ?

- Ecal barrel
- HCAL barrel
- Cryostat

How should the TPC be fixed ?

- Hanging
- Shoring



How to support the TPC

Pros and Cons

- Ecal barrel Pro: Short support structure, Con: Not designed for support now
- HCAL barrel Pro: Stiff Con: Many assemblies involved
- Cryostat Pro: Very stiff Con: Long support structure

How the TPC should be fixed ?

- Hanging Pro: Thin support structure,
Con: Complex adjustment, support in Z ?
- Shoring Pro: Easy support structure, adjustment system easier to
implement
Con: Access to ECAL,HCAL limited, support in Z ?



Cathode design and support

Cathode: 70 μm CLK
tensioned to outer
support hoop, mounted
inside OFC, no
mechanical coupling to
IFC



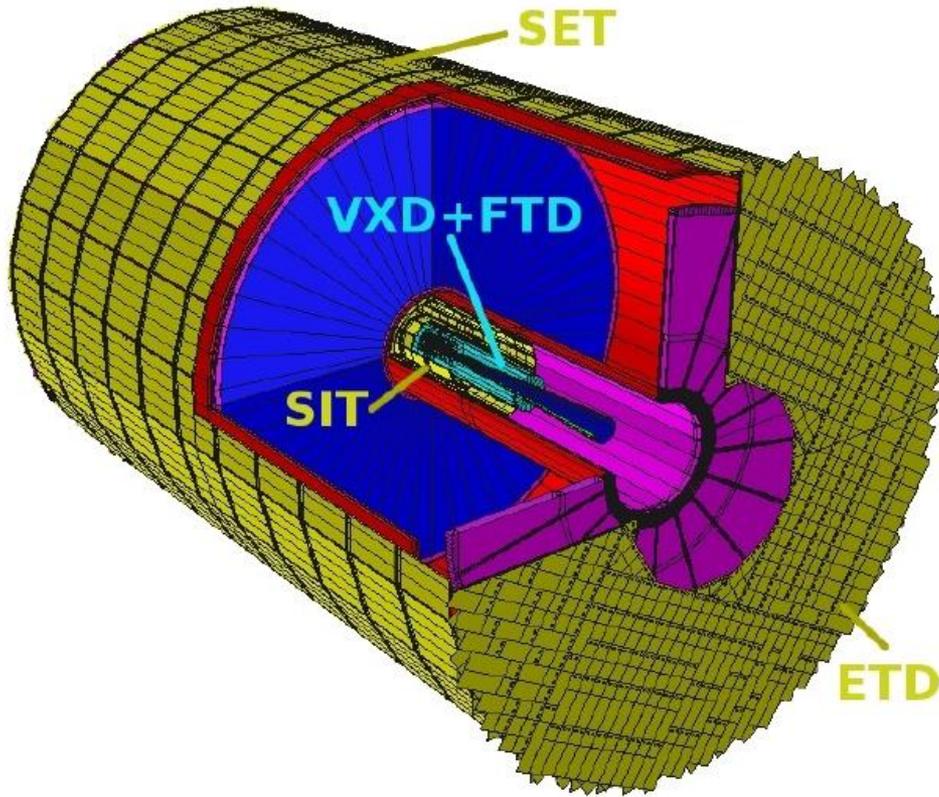
STAR TPC

Cathode: 23 μm aluminized
Mylar, three foils were
glued together w/ 50 mm
wide Mylar bands over the
joints, tensioned to inner
and outer rims, second set
of rims on the other side,
mounted inside OFC



ALICE TPC

SET-Detector Integration



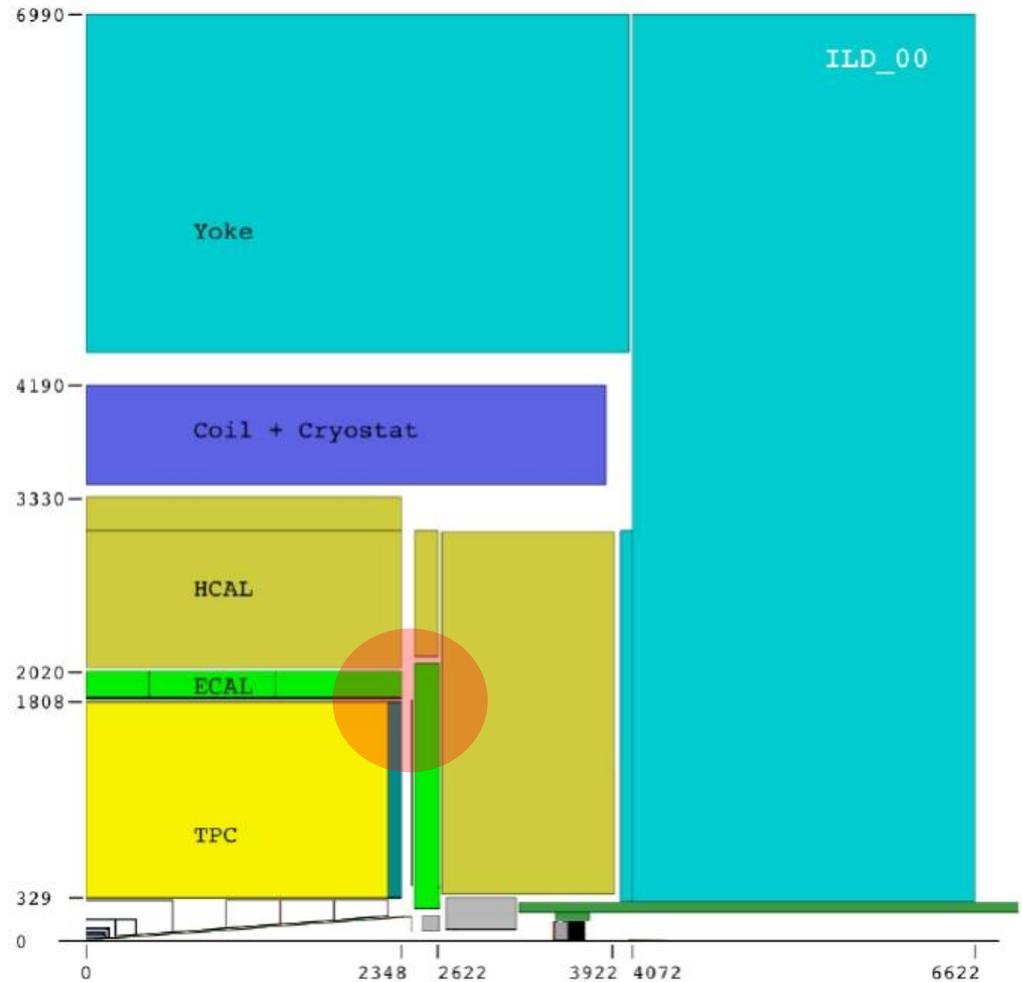
Support of SET ?

- By rails / sliding system
- Supported from TPC
- How to mount the SET?
- Estimated weight of SET
- something else...

- Calculating the wall of the field cage
- TPC support structure
- HV feedthrough
- EDMS system
- Installation
- Installation Tools

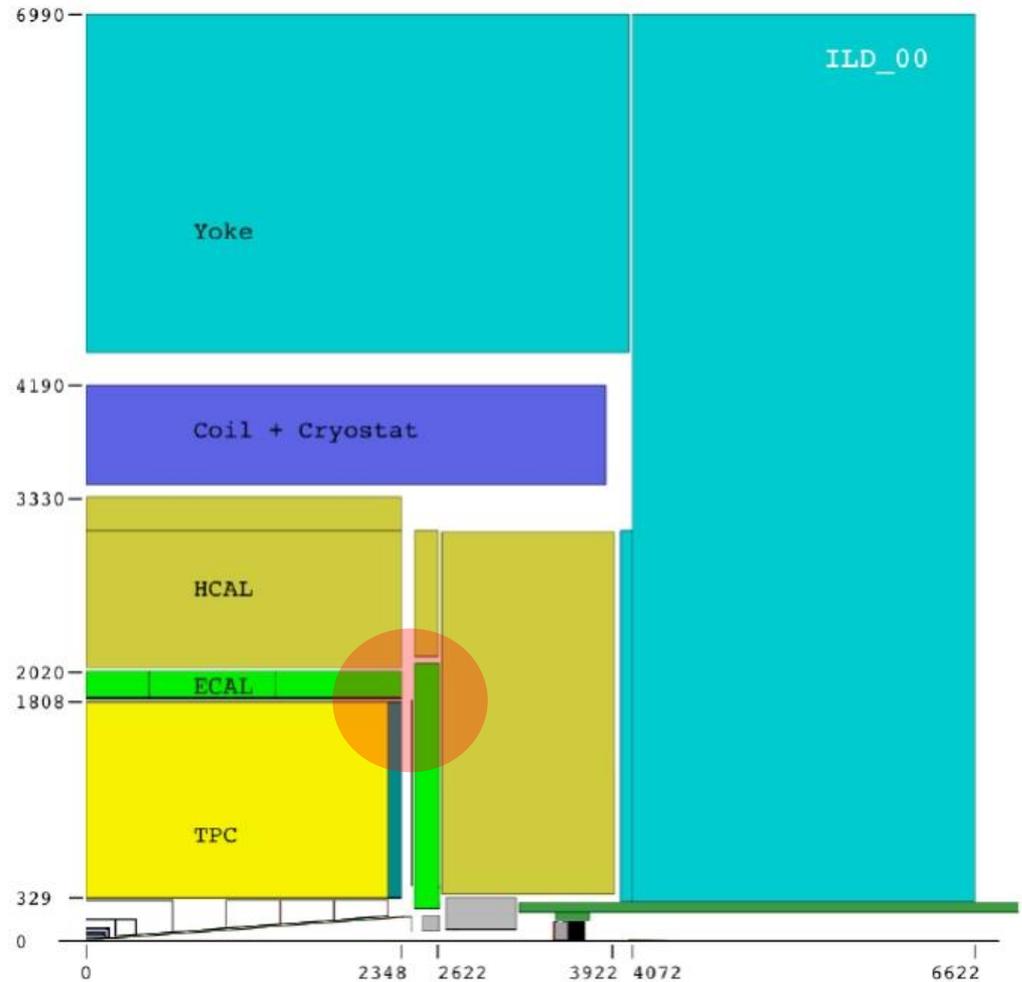


- Critical items



Very limited space

- Critical items
- ???



Very limited space