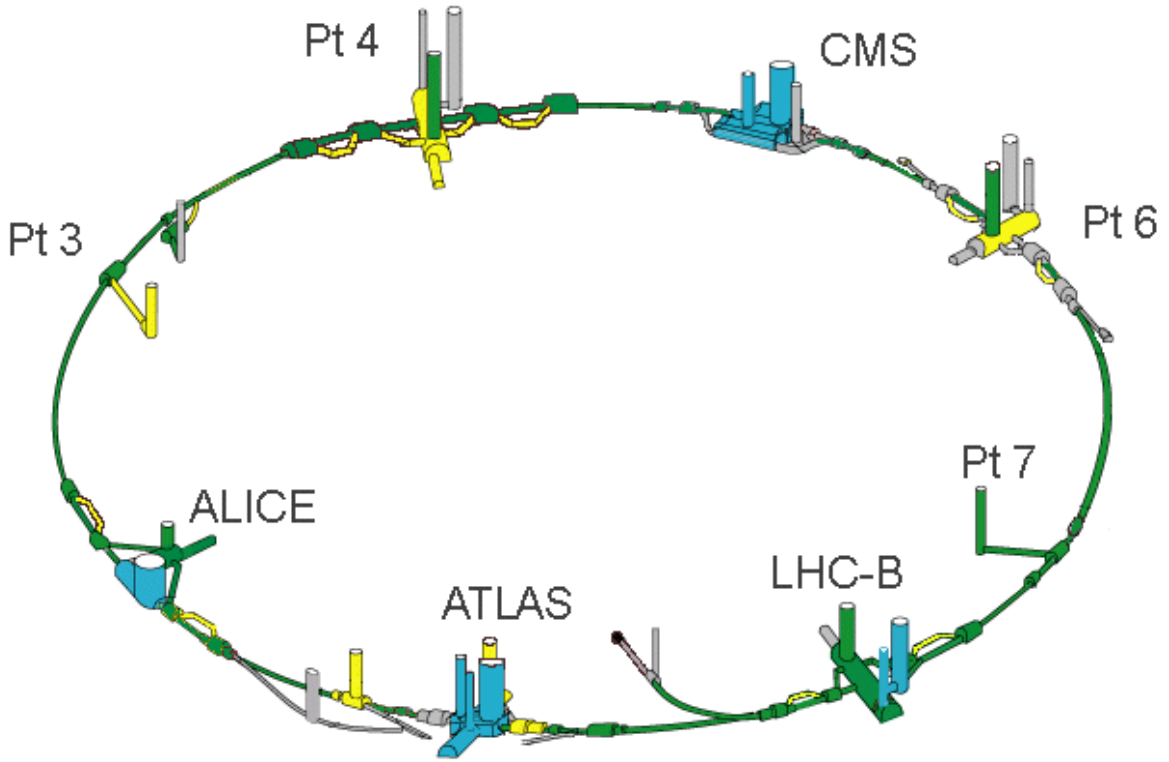
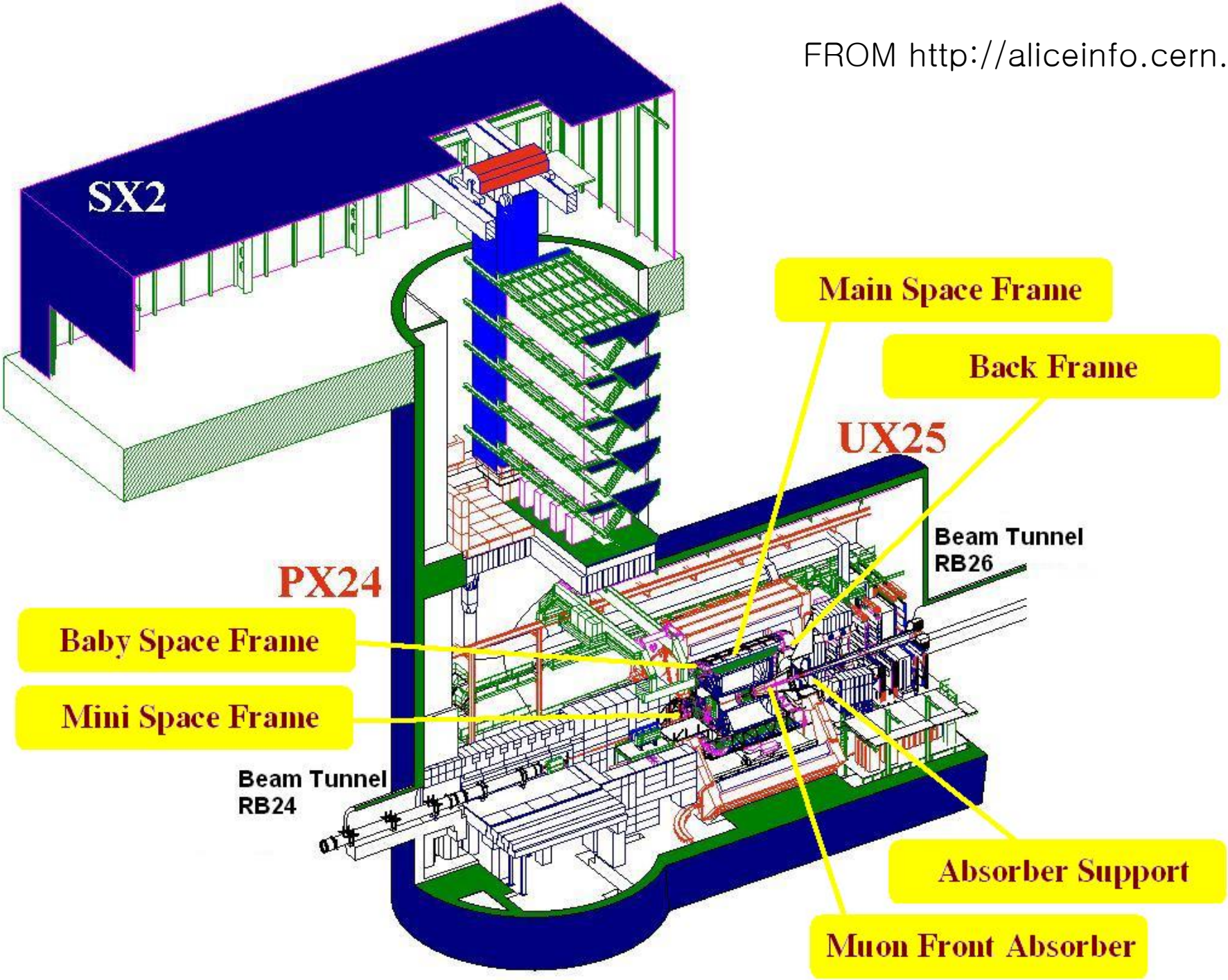
ALICE
seen by a student

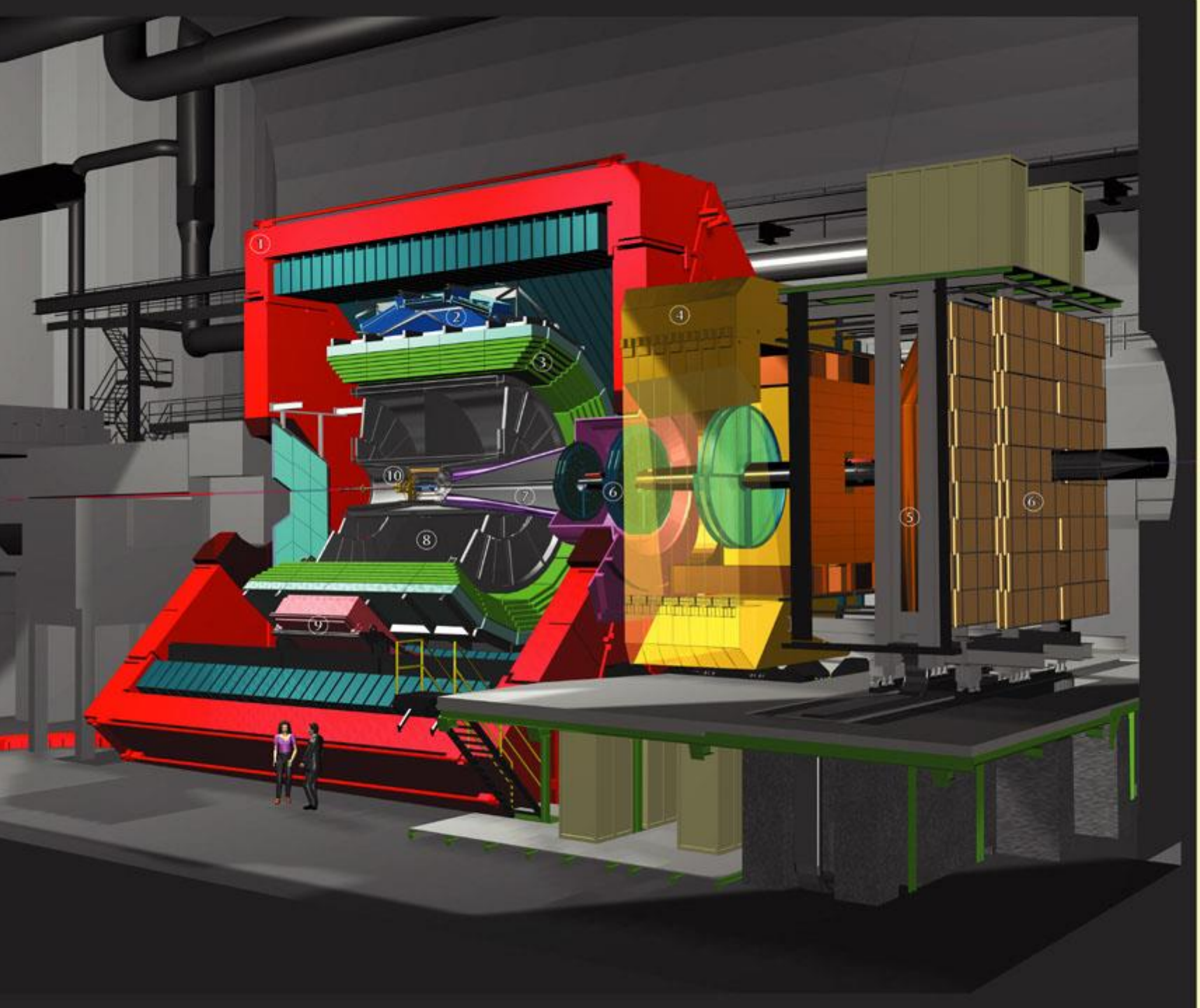


FROM CERN webpage

FROM http://aliceinfo.cern.ch

FROM http://aliceinfo.cern.ch

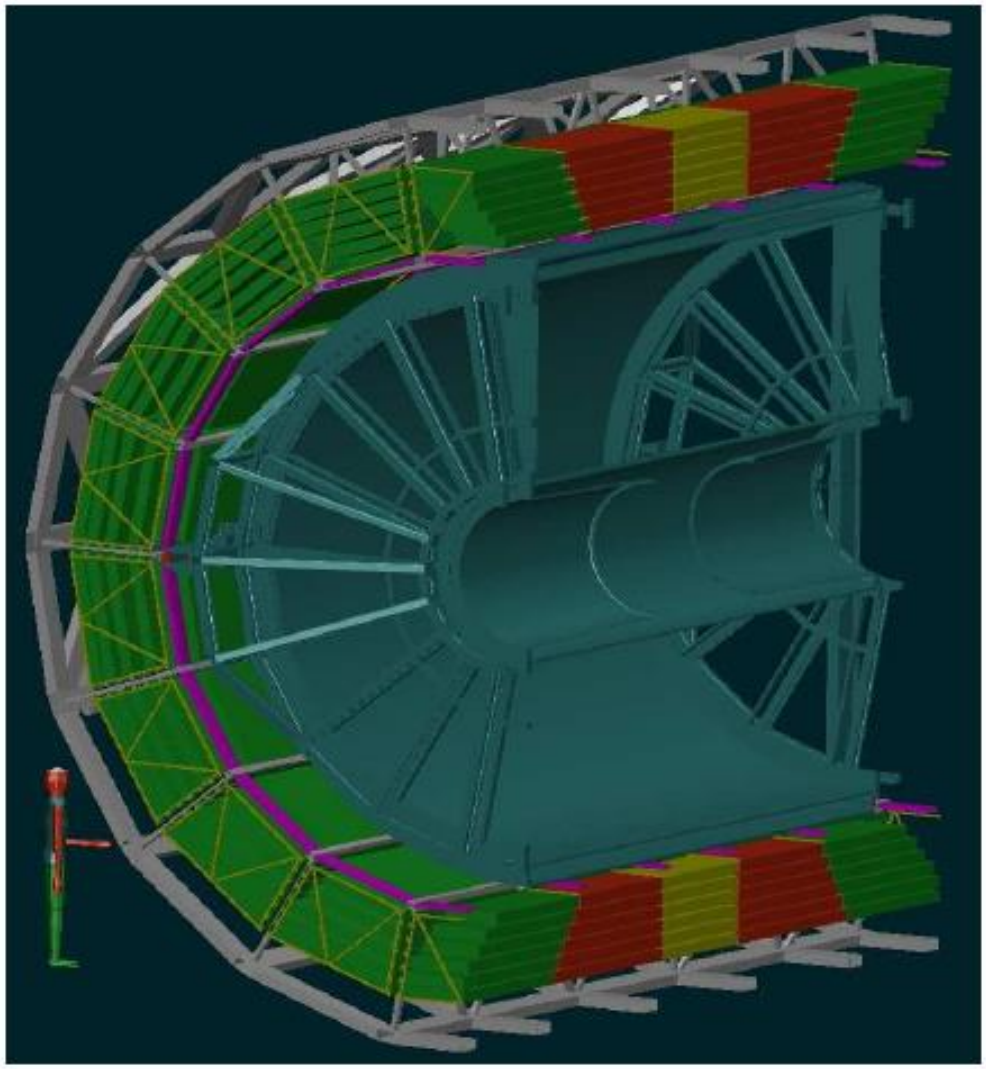




1• L3 MAGNET
2• HMPID
3• TOF
4• DIPOLE MAGNE
5• MUON FILTER
6• TRACKING CHA
6'• TRIGGER CHAM
7• ABSORBER
8• TPC
9• PHOS
10• ITS

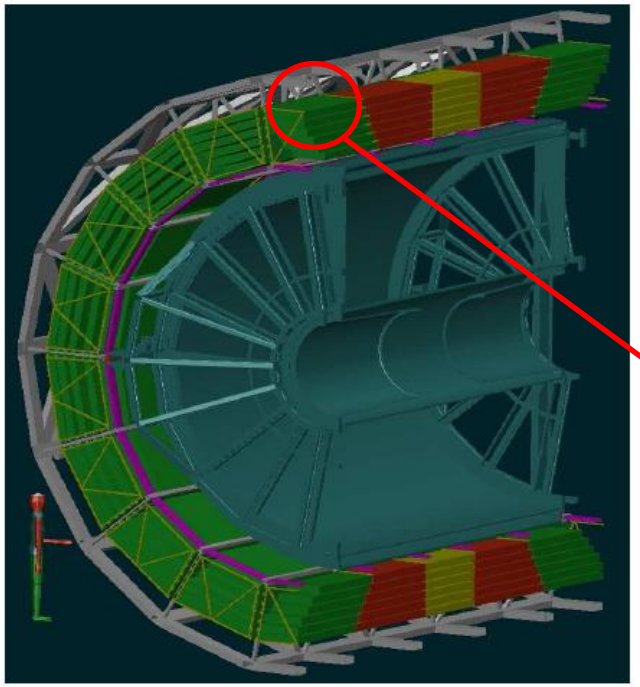
TRD
(Transition Radiation Detector)

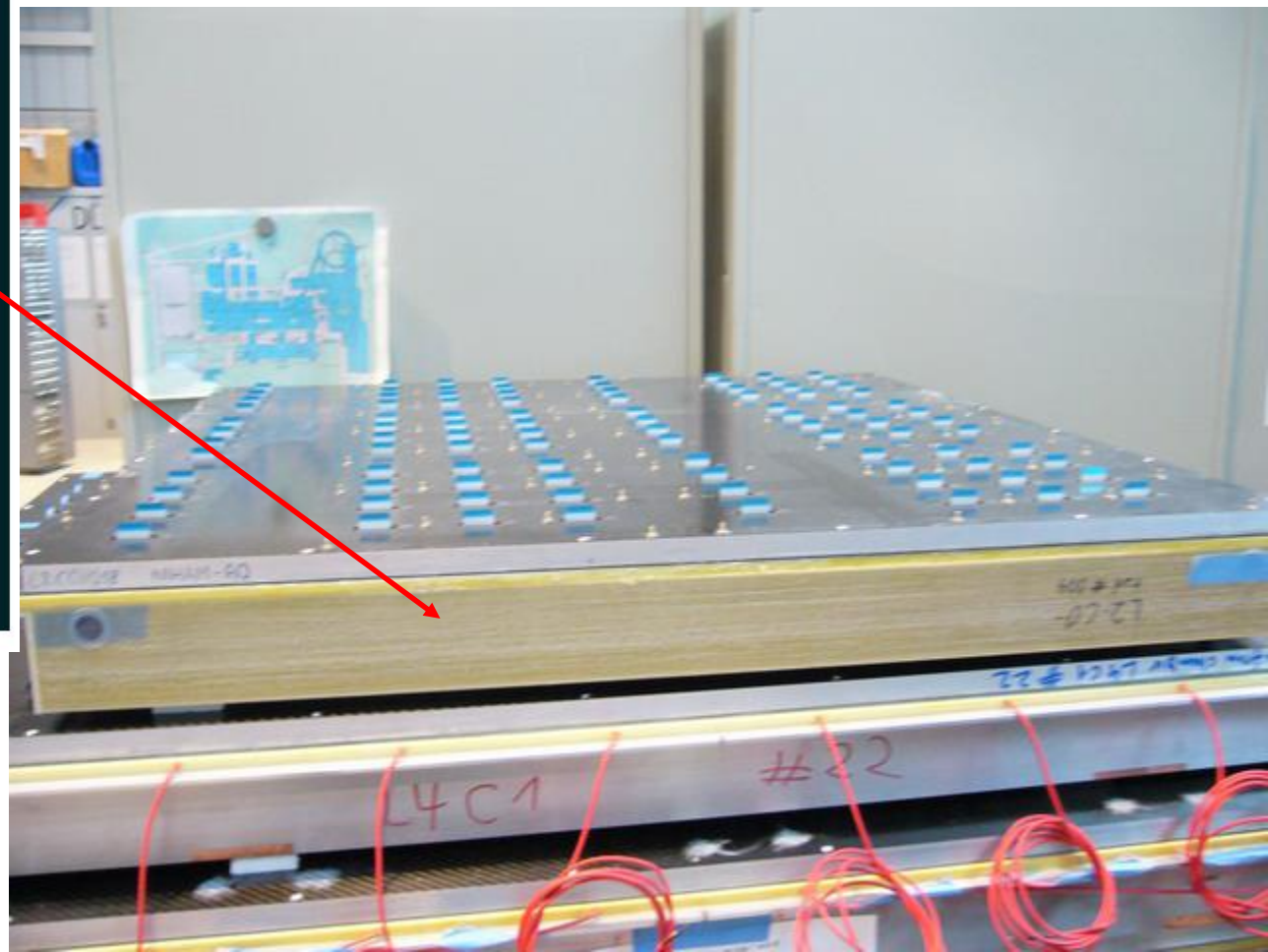
- $|\eta|<0.9$, $45°<\Theta<135°$
- 18 supermodules in Φ sector
- 6 Radial layers
- 5 z-longitudinal stack
  - → total 540 chambers
  - → 750m² active area
  - → 28m³ of gas
- In total 1.18 million read-out channels



FROM C. Adler -- Hadron Collider Physics, Les Diablerets, 4-9 July 2005

TRD
(Transition Radiation Detector)



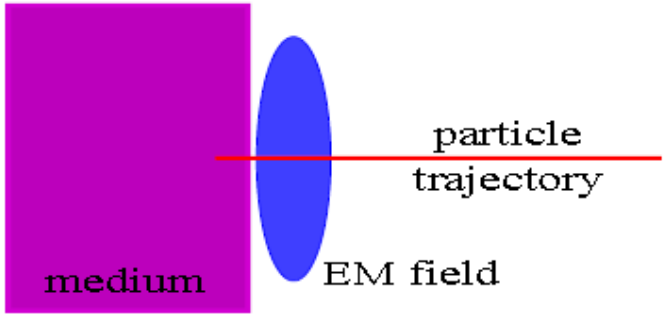


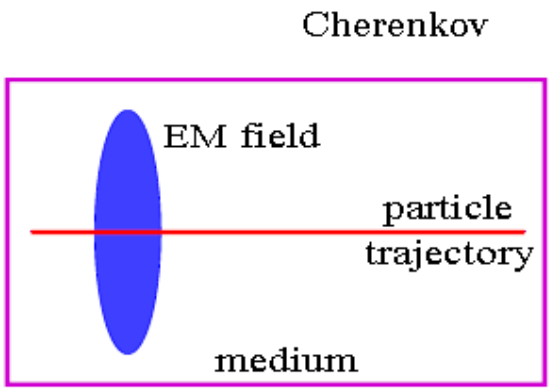
What is transition radiation?

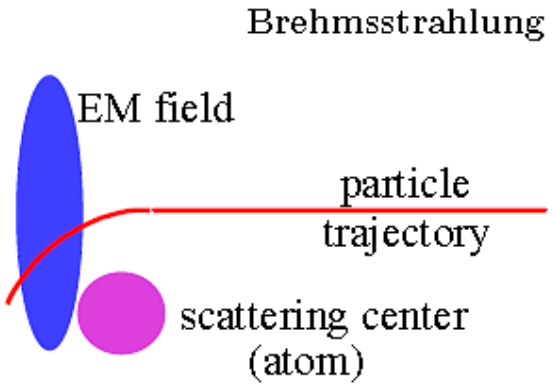
"Transition radiation is emitted whenever a charged particle crosses an interface between two media with different dielectric functions."

– L.Durand, Phys. Rev. D 11, 89(1975)

- Predicted : Ginzburg & Frank, 1946
- Observed : Goldsmith & Jelly, 1959(optical)
- It's sizeable(X-rays) for relativistic particles.

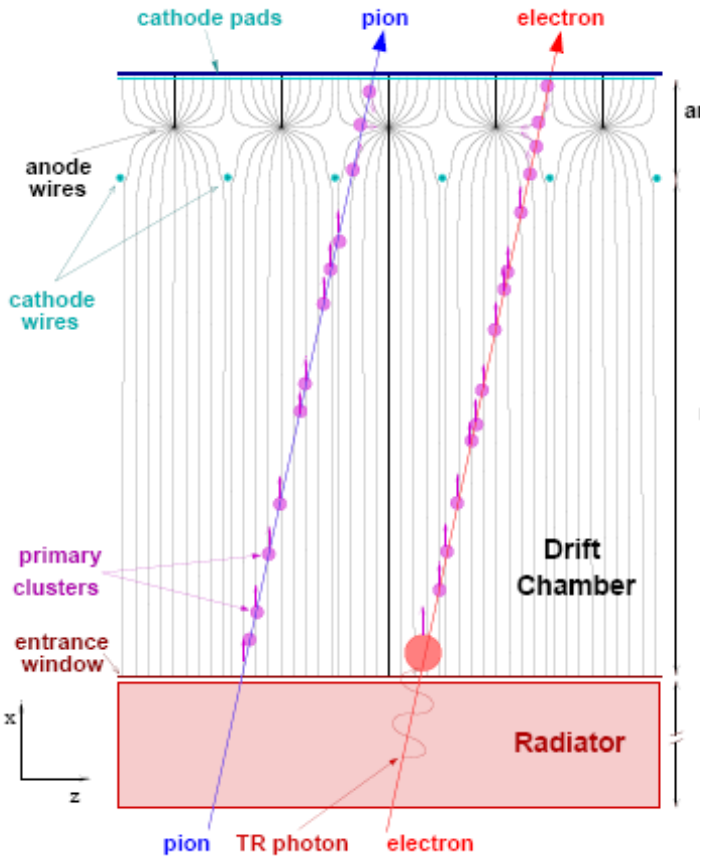






FROM A. Andronic -- an overview for students, GSI, Feb. 6th, 2007

TRD working principle



The total energy loss by TR for charged particle

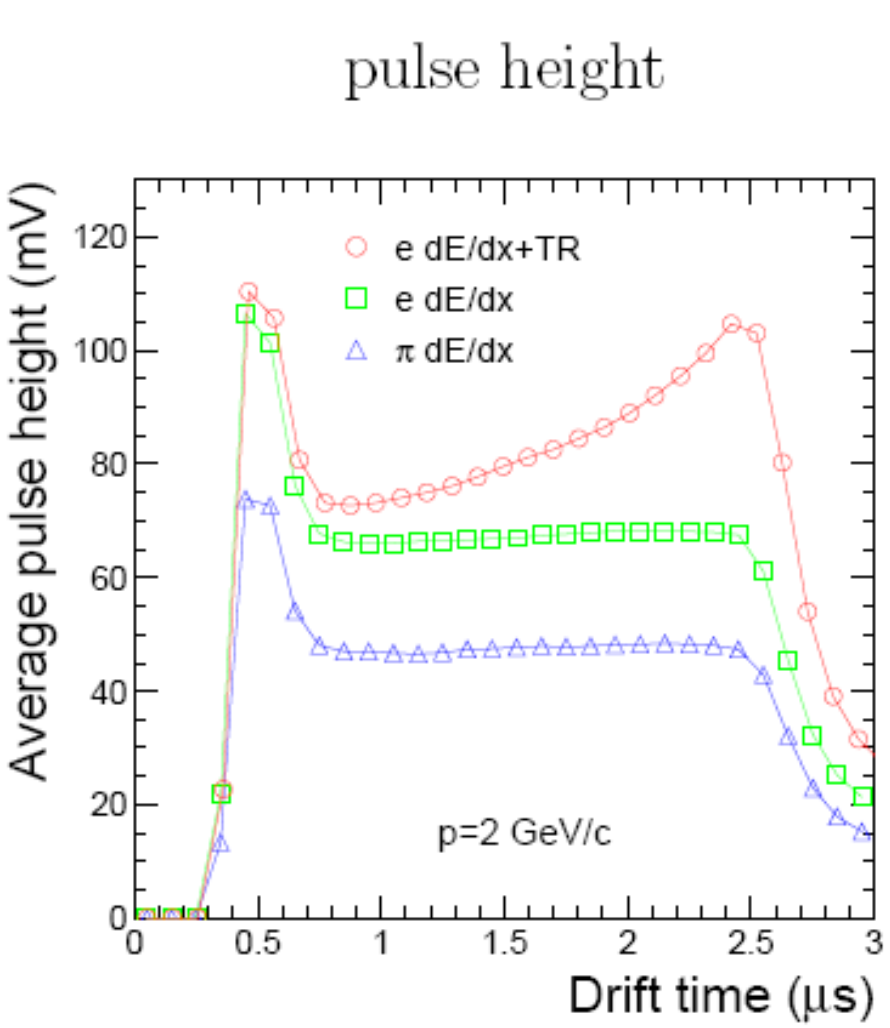
: depends on its Lorentz factor $\gamma = E / mc^2$

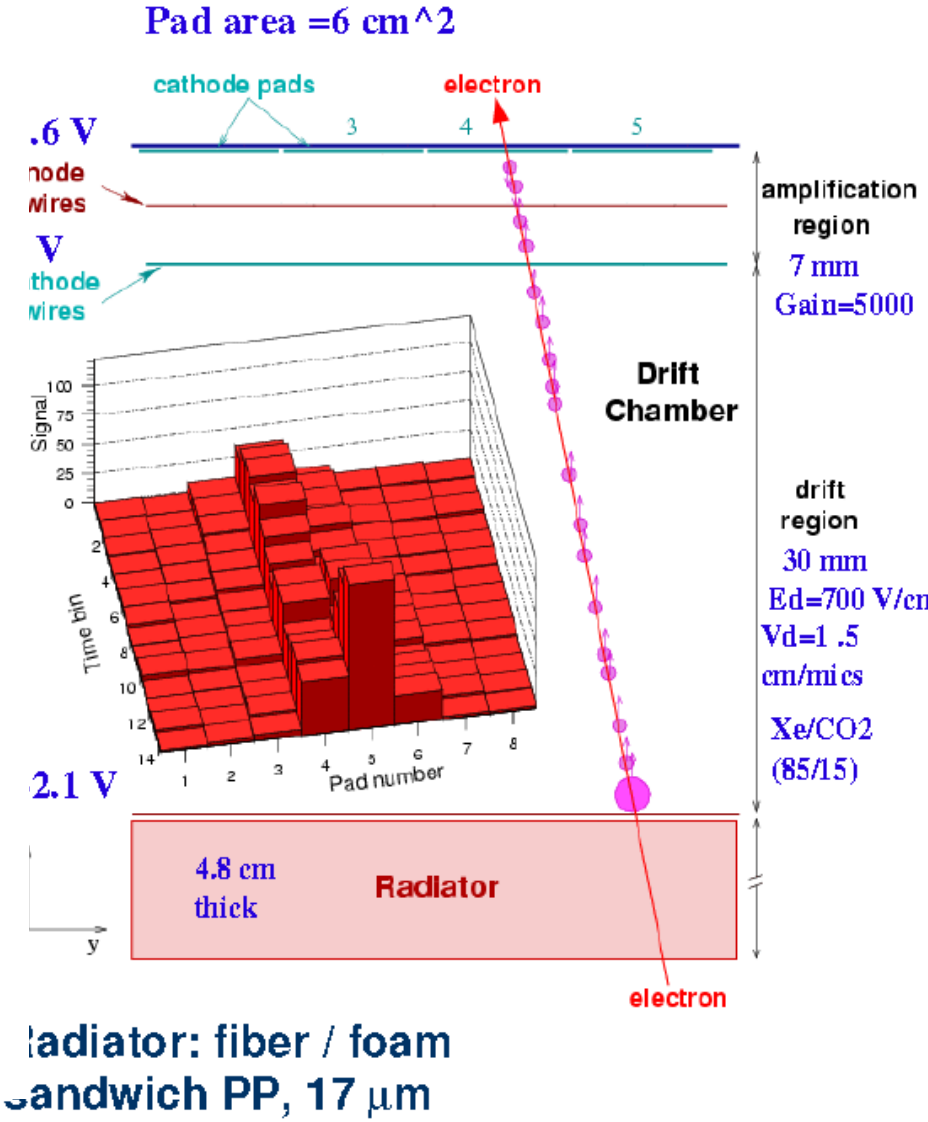
Usefullness of TR

: For discrimination the electron from hardons in the momentum range between $1\,GeV/c$ and $100\,GeV/c$.

FROM P. Shukla -- ICPA-QGP'05, Kolkata, 8-12 February 2005

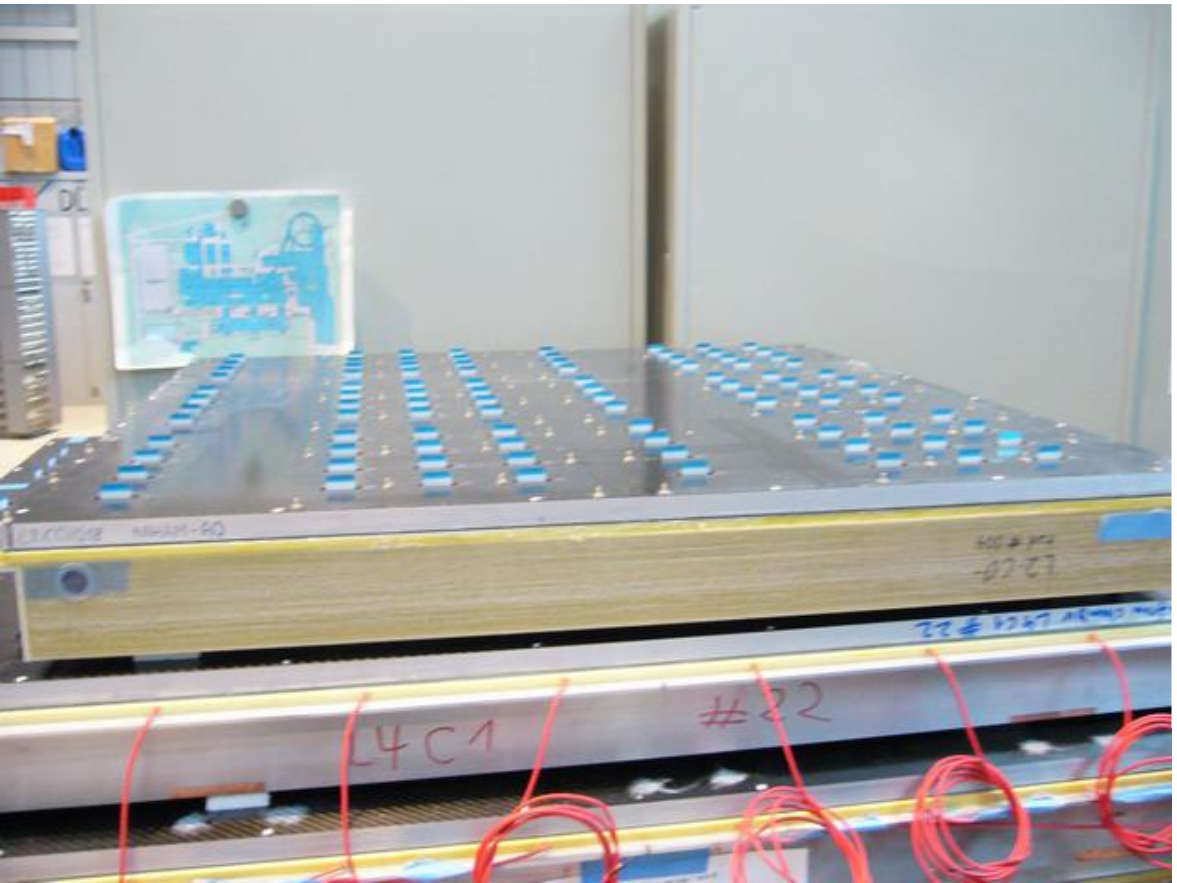
TRD working principle

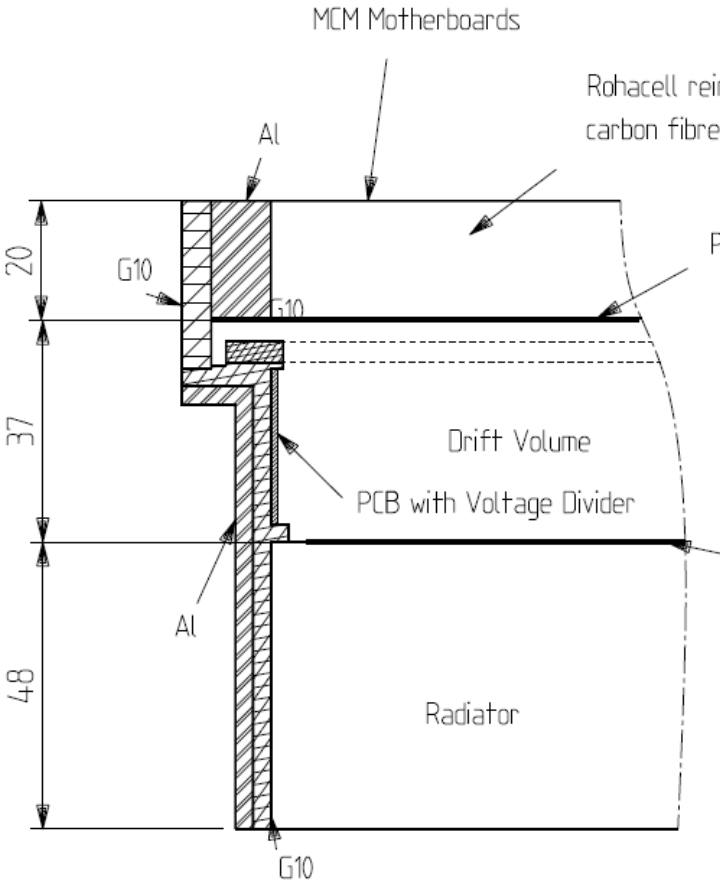




FROM P. Shukla -- ICPA-QGP'05, Kolkata, 8-12 February 2005

TRD
(Mechanical structure)

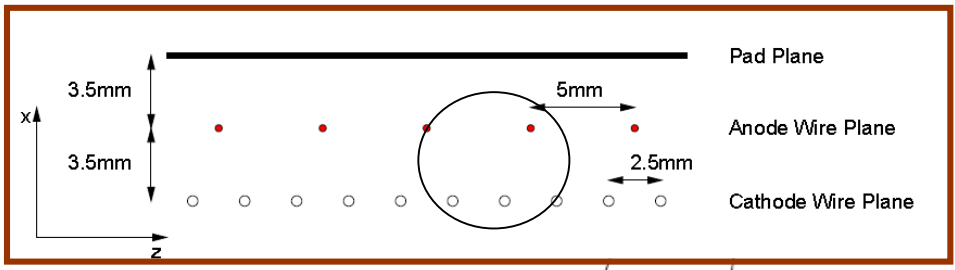


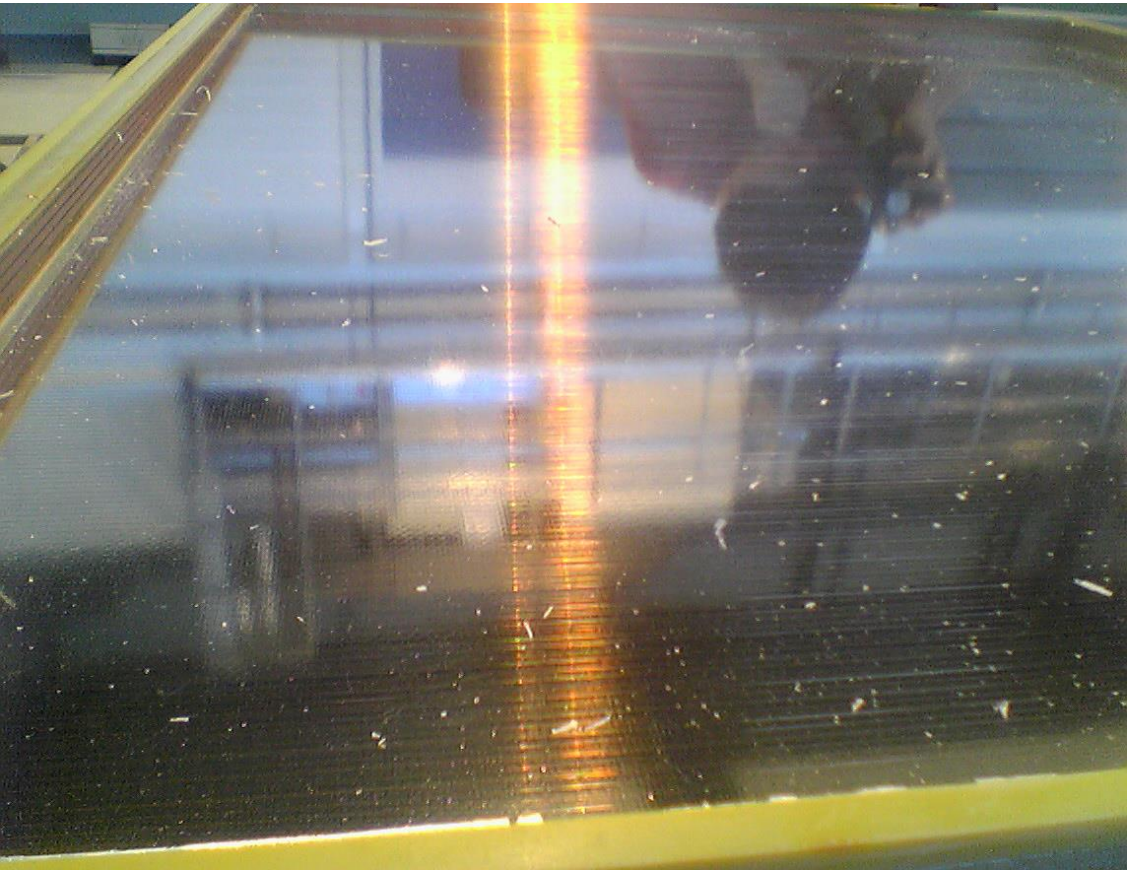


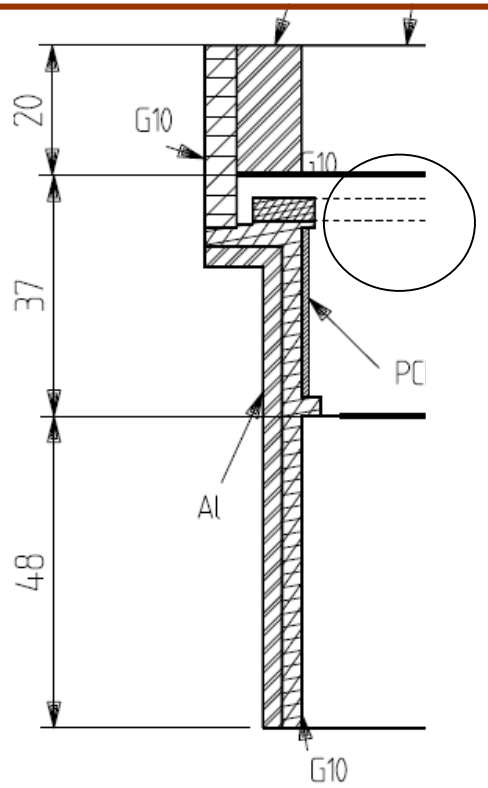
Cut through one side of a TRD chamber

TRD

(Amplification region)

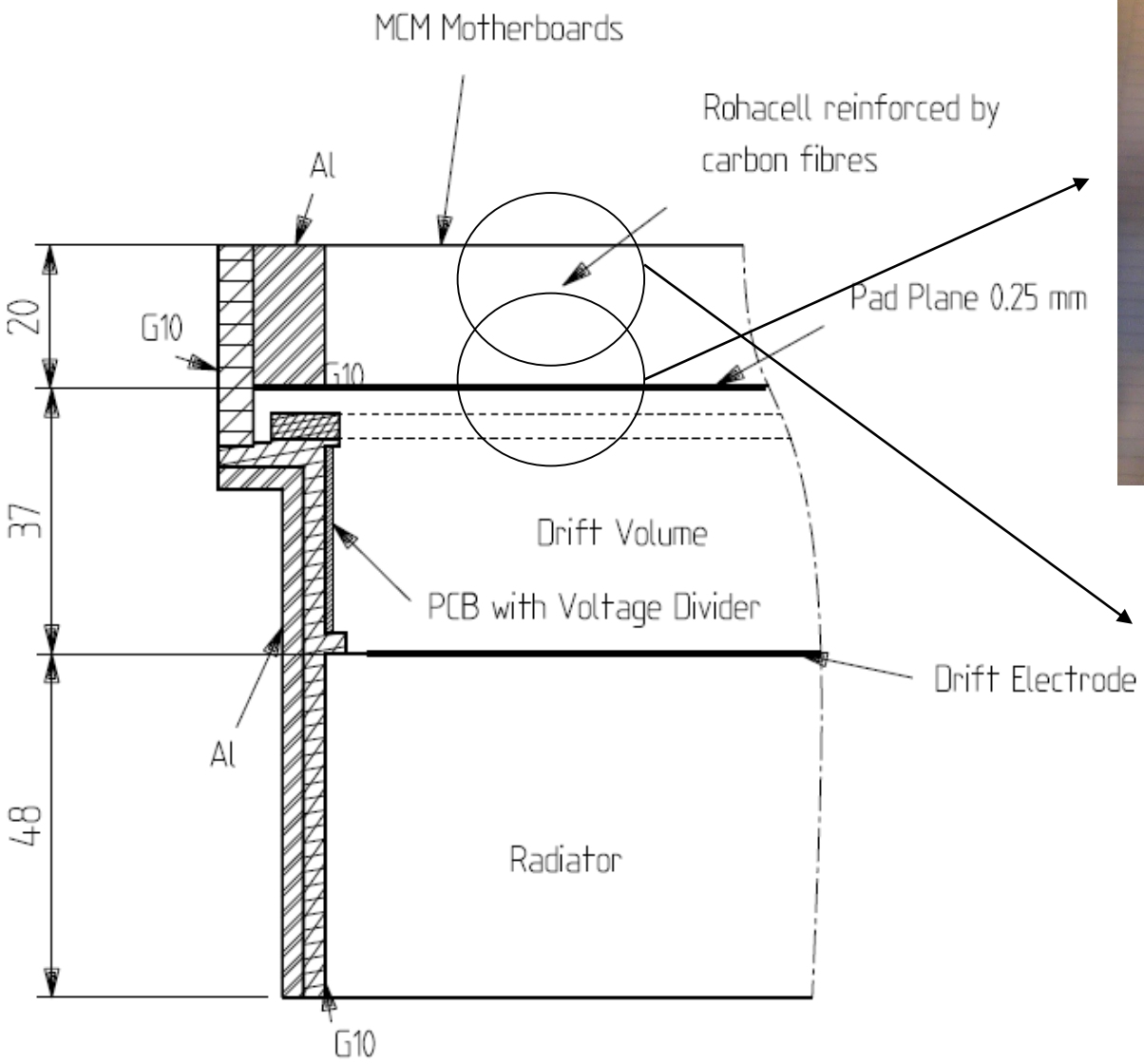


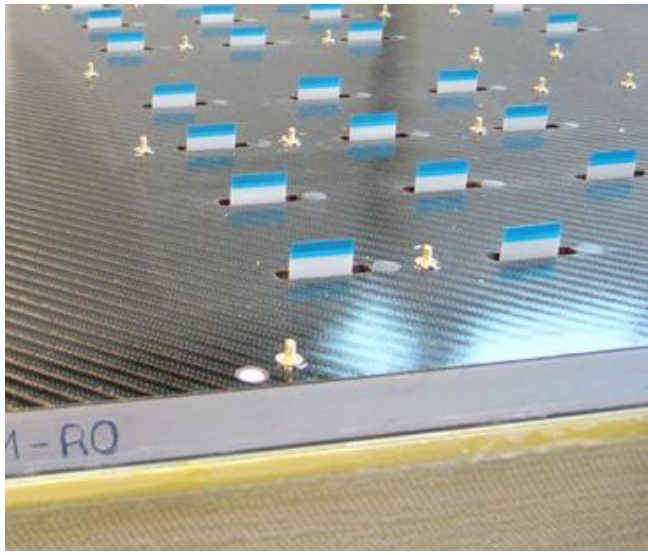




Cut through one side of a TRD

TRD
(Readput chamber)

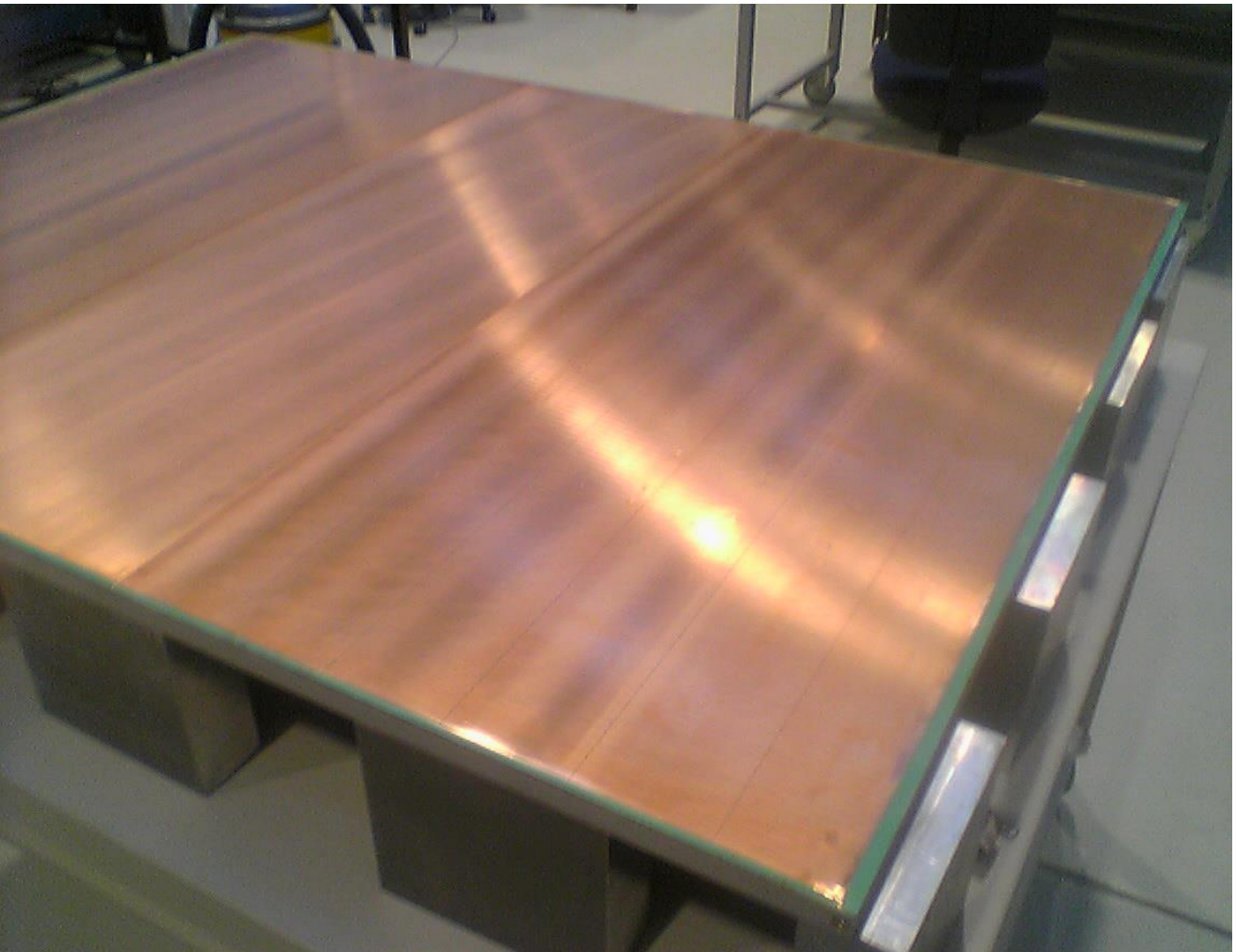


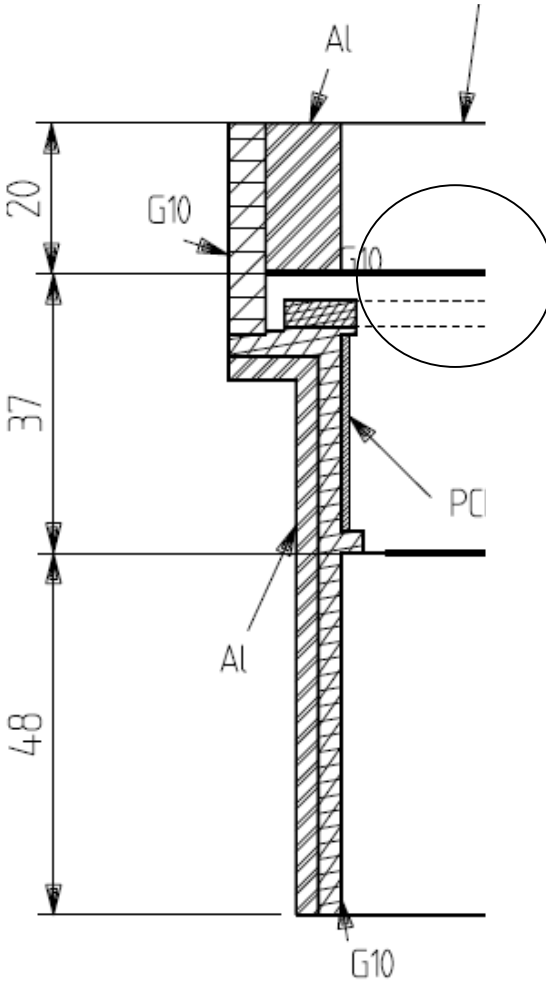


Cross section through a TRD detector module

TRD

(Cathod pad plane)

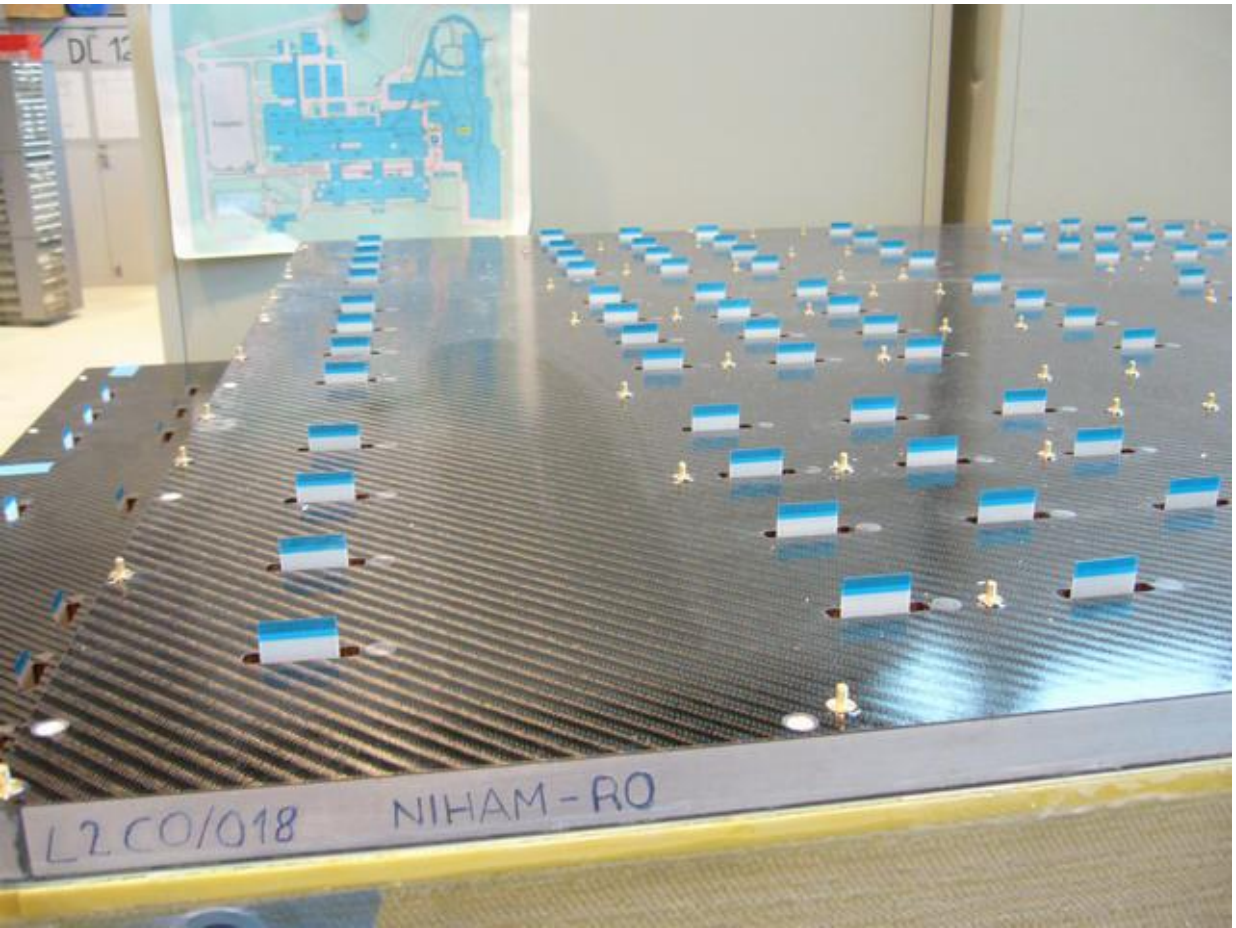


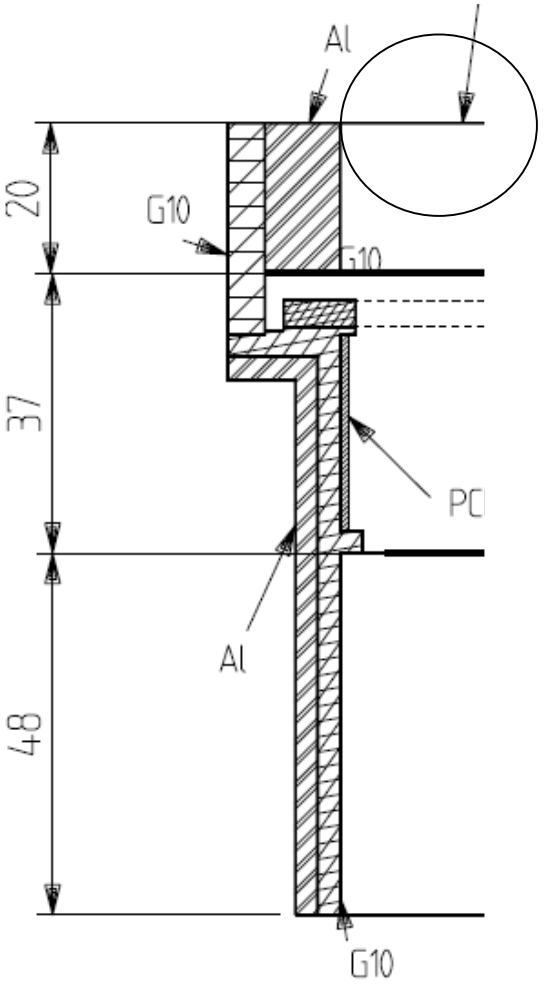


Cut through one side of a TRD

TRD

(Backside of TRD)

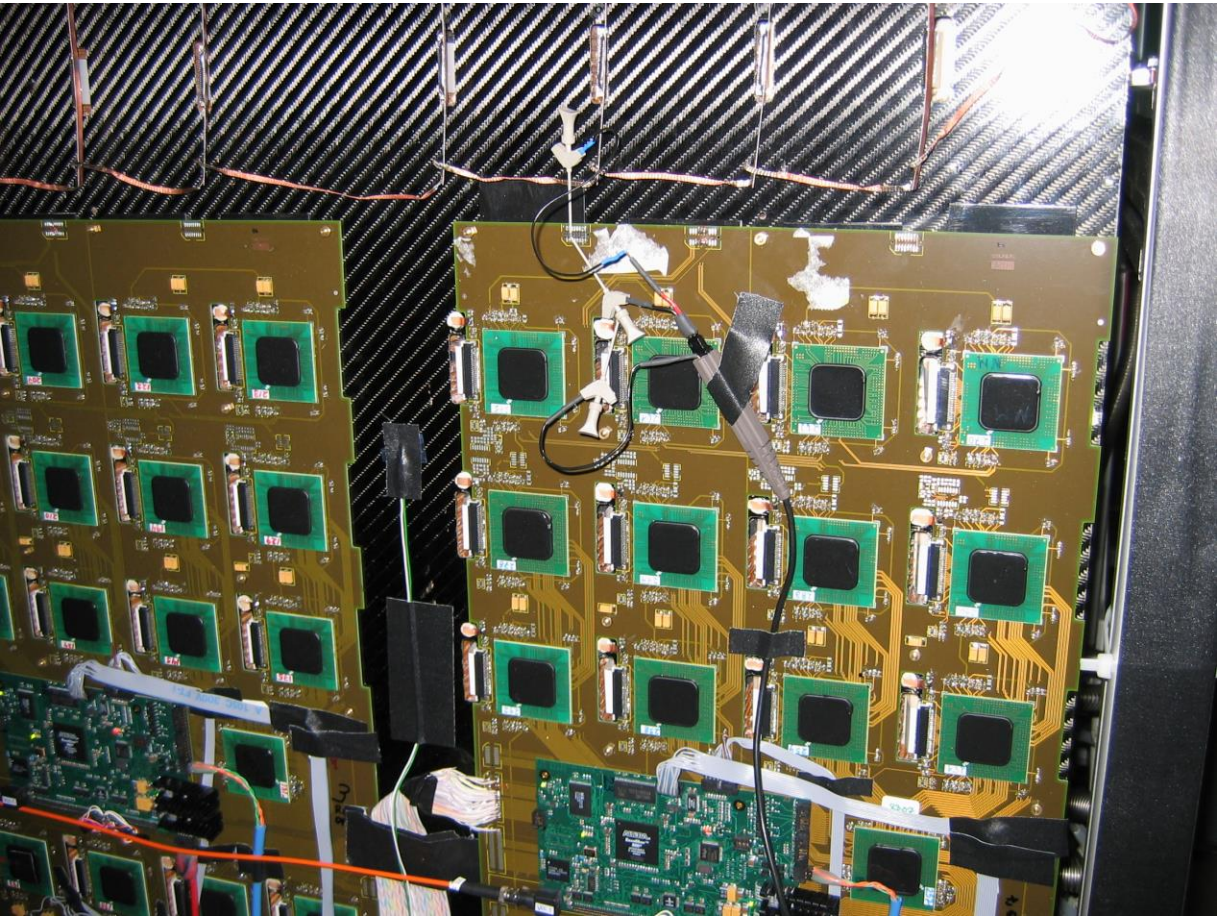


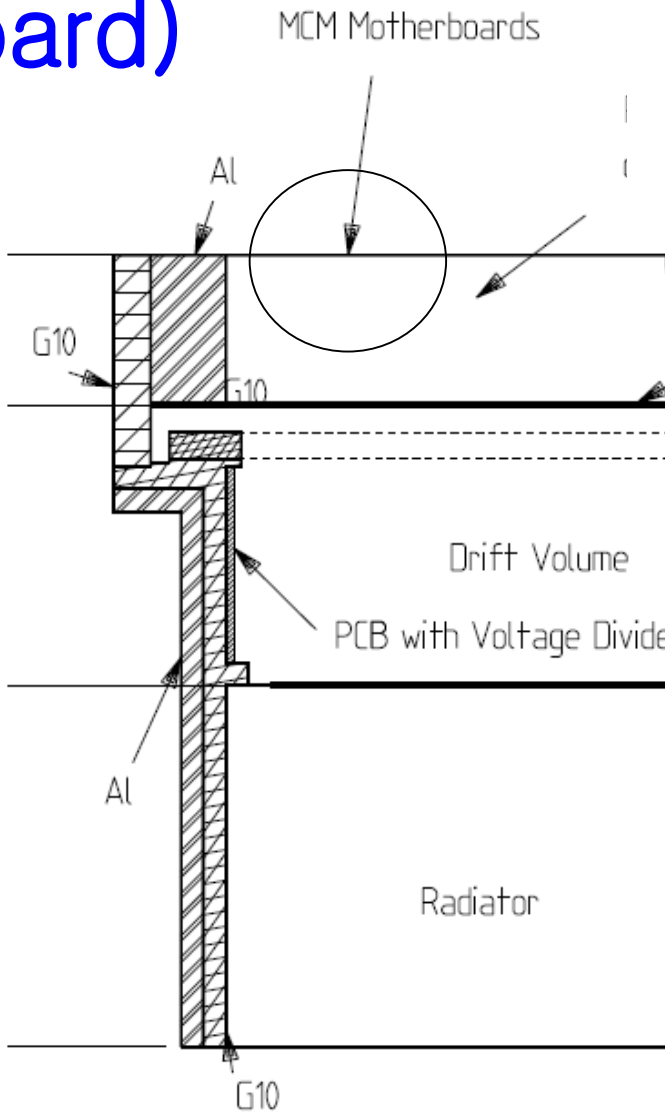


Cut through one side of a TRD

TRD

(MCM motherboard)





Cut through one side of a TRD

Summary