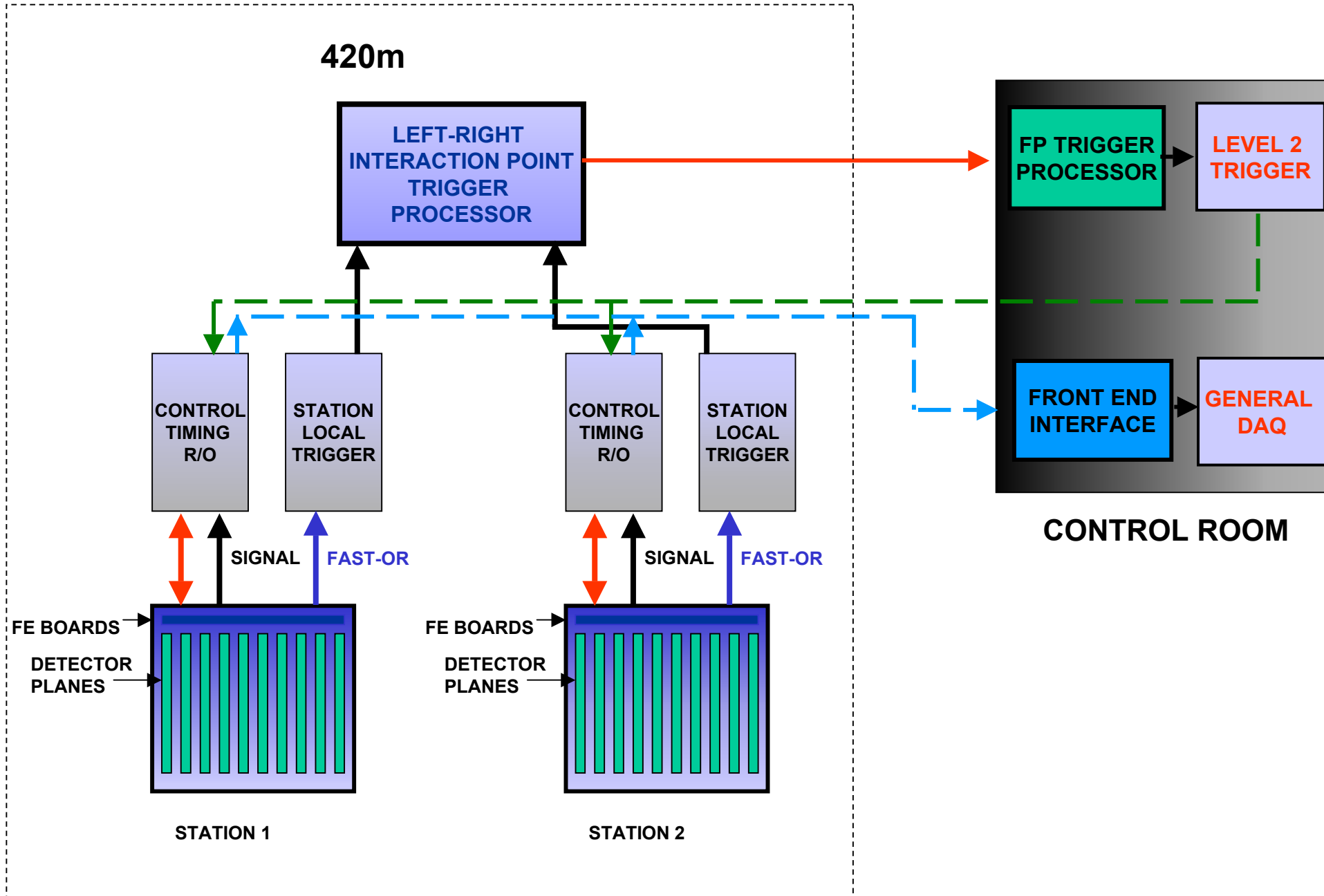
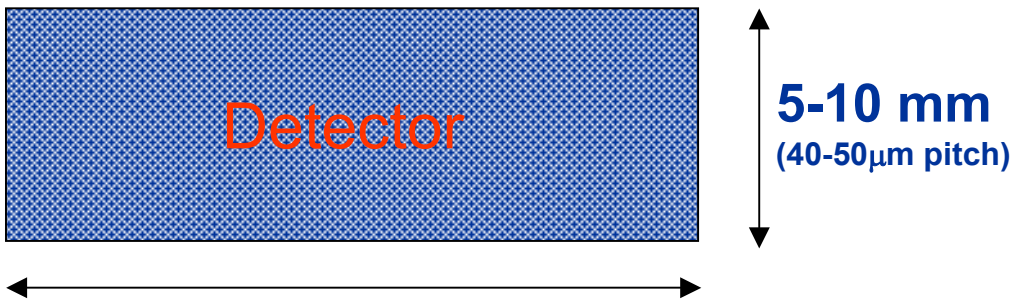
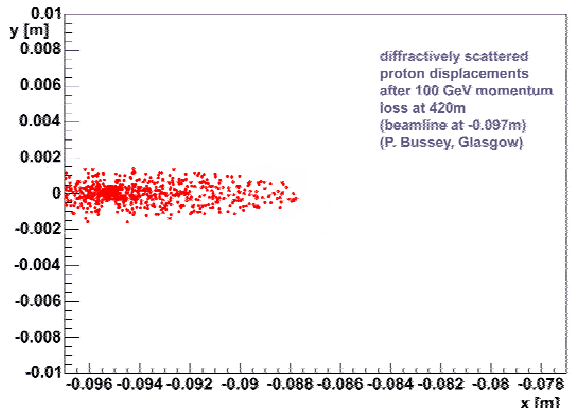
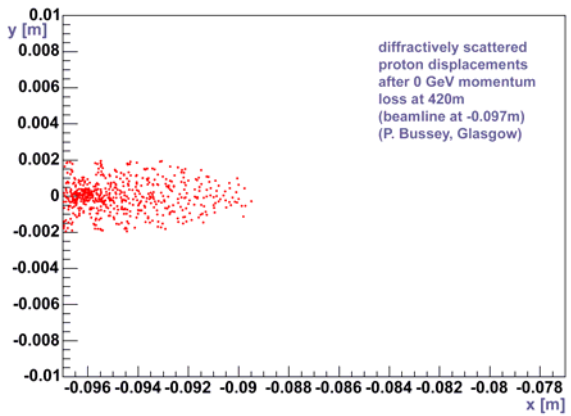
Electronics layout at 420m

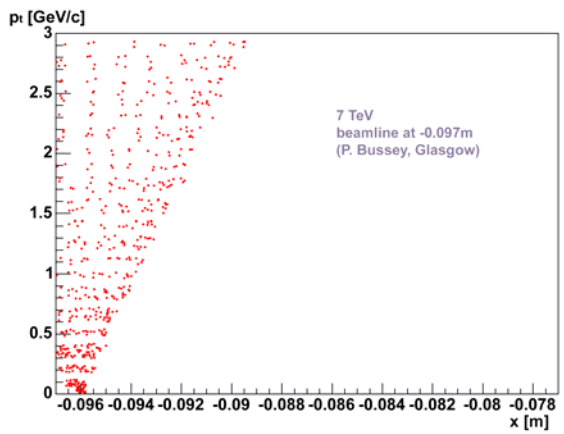


Detector size and layout for best resolution (10-15 μm in x and y)





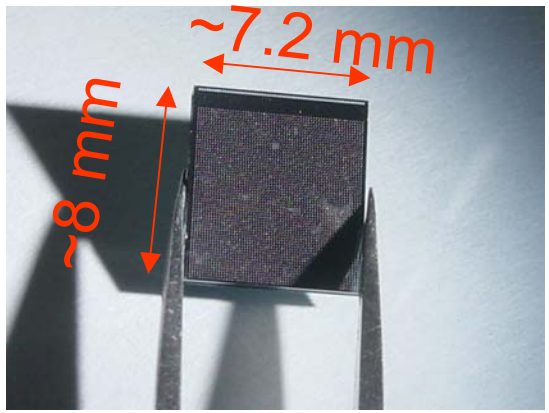


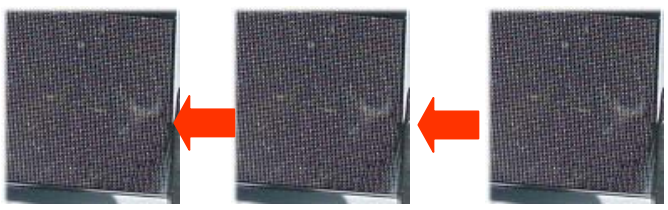


Needs detailed event simulation
See P. Bussey talk

Leading diffractive protons seen at 420m ($\beta^* = 0.5$m)

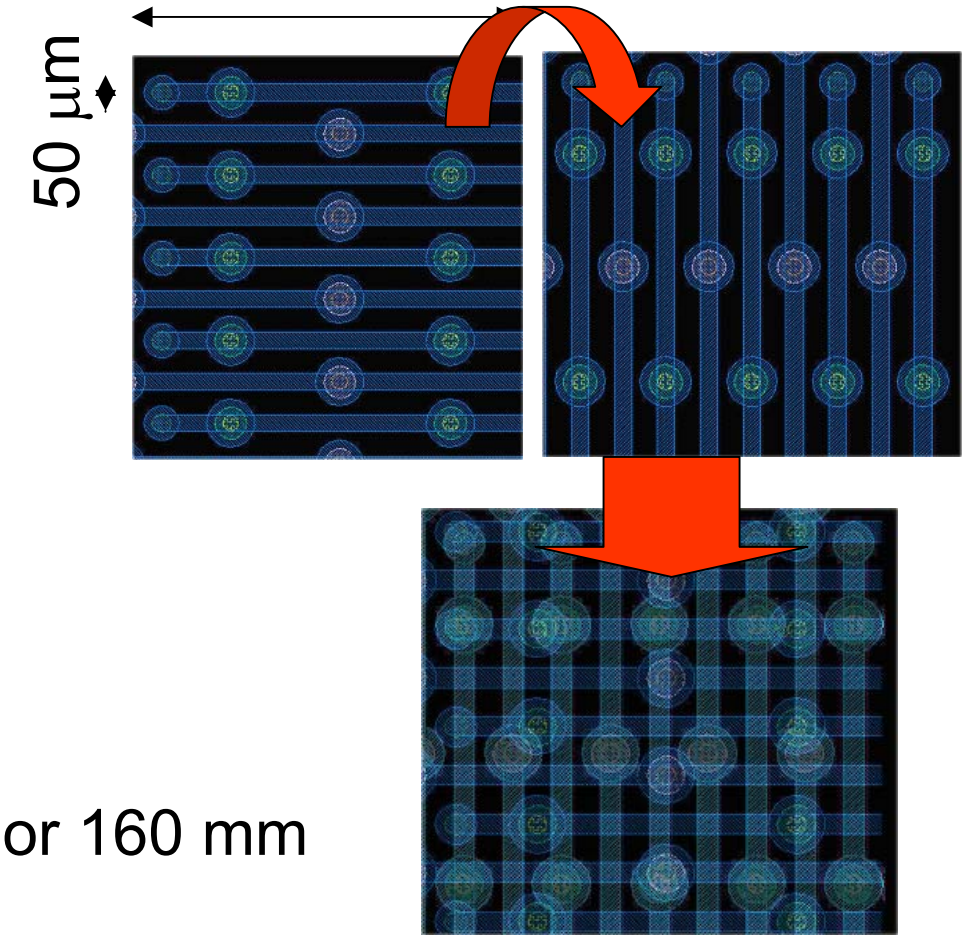
A possible starting layout:
7.2x8 mm² 3D edgeless
ATLAS pixel compatible





80 or 160 mm

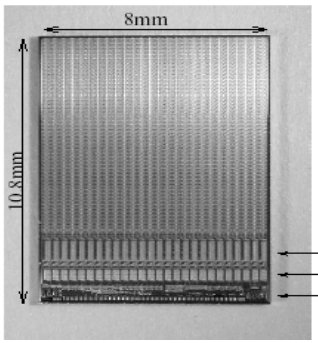
216 mm



$$\sigma_{x,y} = \frac{50\,\mu m}{\sqrt{12}} = 14.4\,\mu m$$

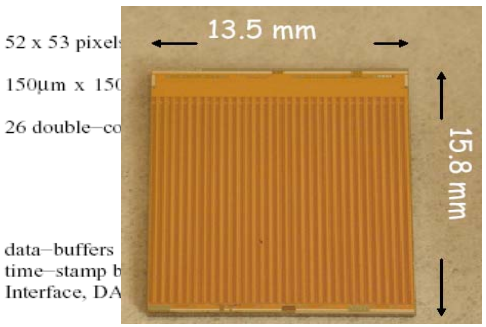
Existing LHC Rad-Hard pixel readout electronics chips

CMS



From pixel 2002 W. Erdmann

ALICE+LHCB 22x60 mm^2)

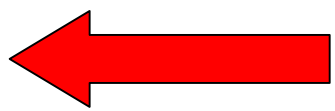


From vertex 2004 – A. kluge

ATLAS

From pixel 2002 R. Beccherle

LHC EXPERIMENT	DIMENSIONS	RO SIGNAL	TRIGGER	BUFFER
ATLAS	50x400 µm^2 7.2x8mm^2	binary and time over threshold	Internal fast-OR	2 - 6.4µs 40 MHz
CMS	125x125µm^2 8x8mm^2 ?	analogue	---	---
ALICE	50x425 µm^2 13.5 x15.8 mm^2	binary	Internal fast-OR	51.2 µs 10 MHz
LHC-B	62.5 X 500 22X60mm	binary	Fast-Or +analogue signal	51.2 µs 40 MHz



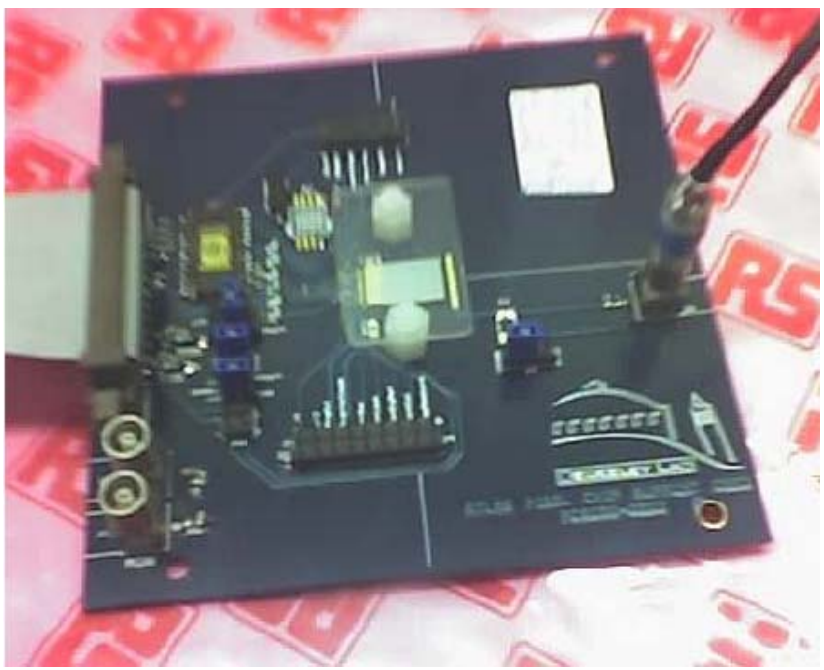
Modifications:
1 year +190kChF

Atlas pixel electronics +3D

Single chip cards: presently available for lab tests
MCC : needs to be developed

We are getting help from the Atlas pixel colleagues who Are interested in the upgrade (mainly LBL)

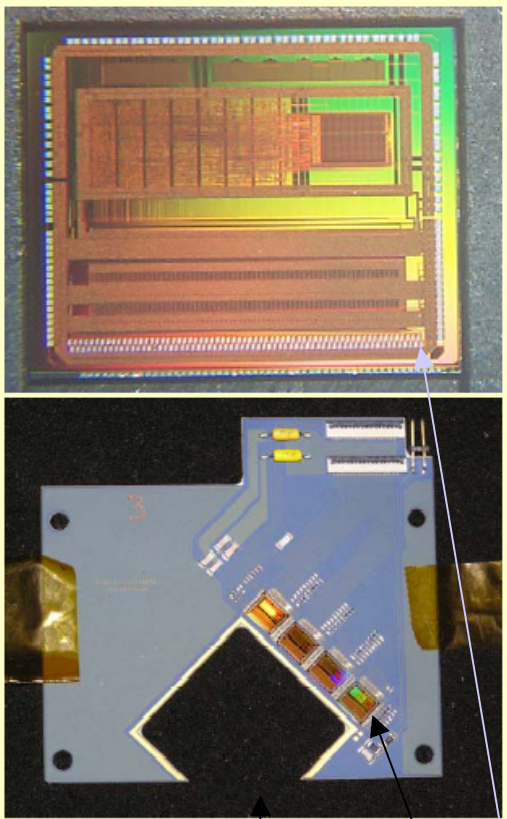
We need to access a setup (very difficult at the moment, will be better Next year!)



See talk
By C. Kenney

Example: what is being done for TOTEM.

TOTEM Total Cross Section, Elastic Scattering and Diffraction Dissociation at the LHC

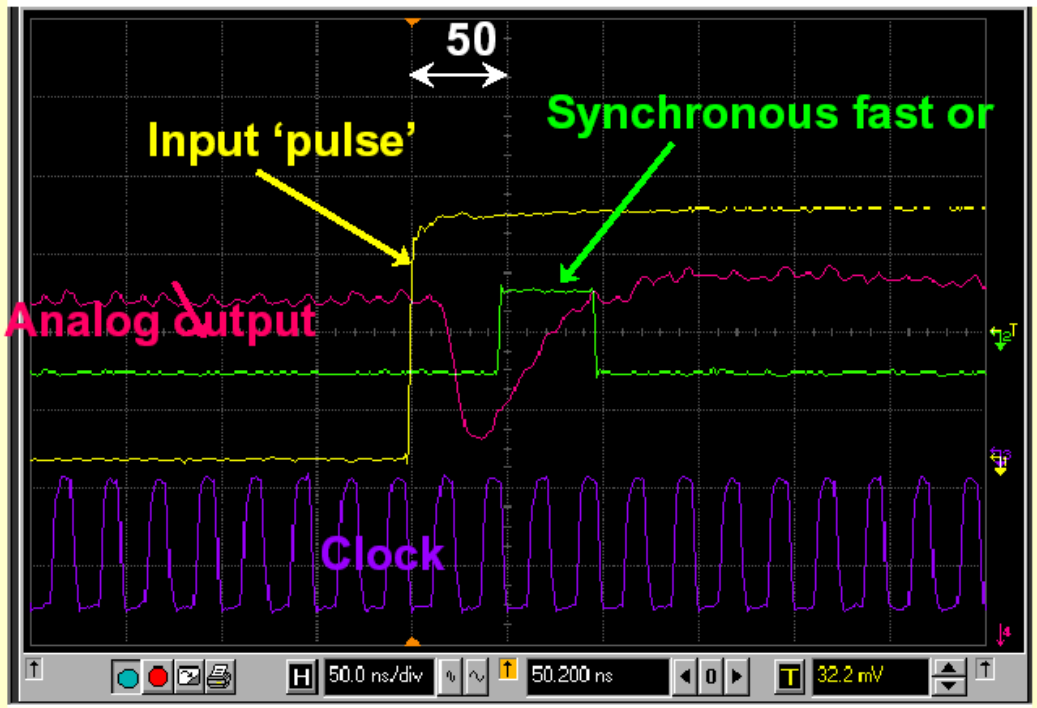


Hybrid card

detector

VFAT

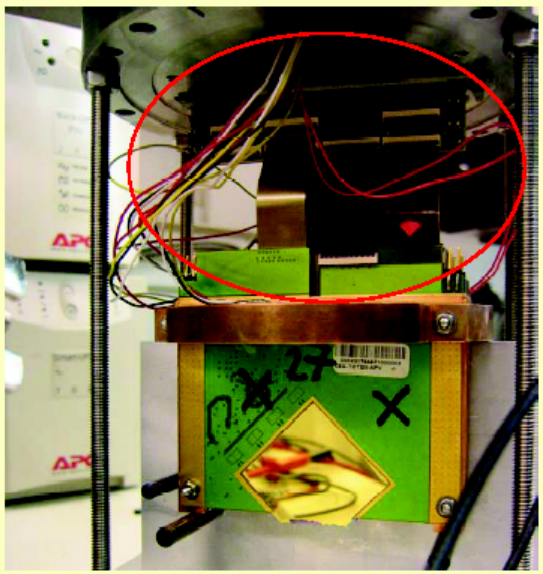
VFAT 1st generation

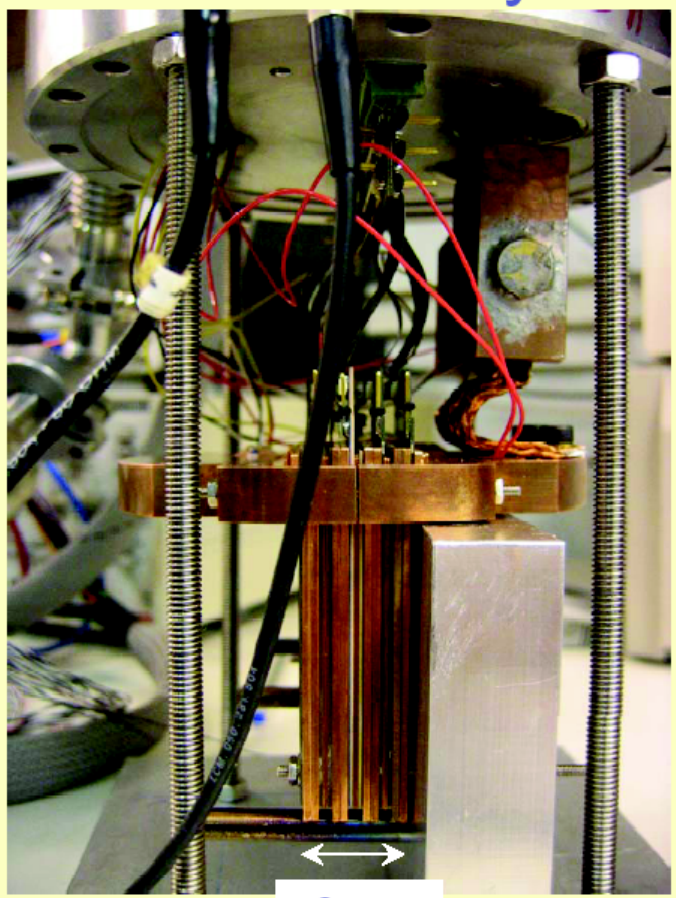


The interconnection

TOTEM Total Cross Section, Elastic Scattering and Diffraction Dissociation at the LHC

Roman Pot Detector assembly

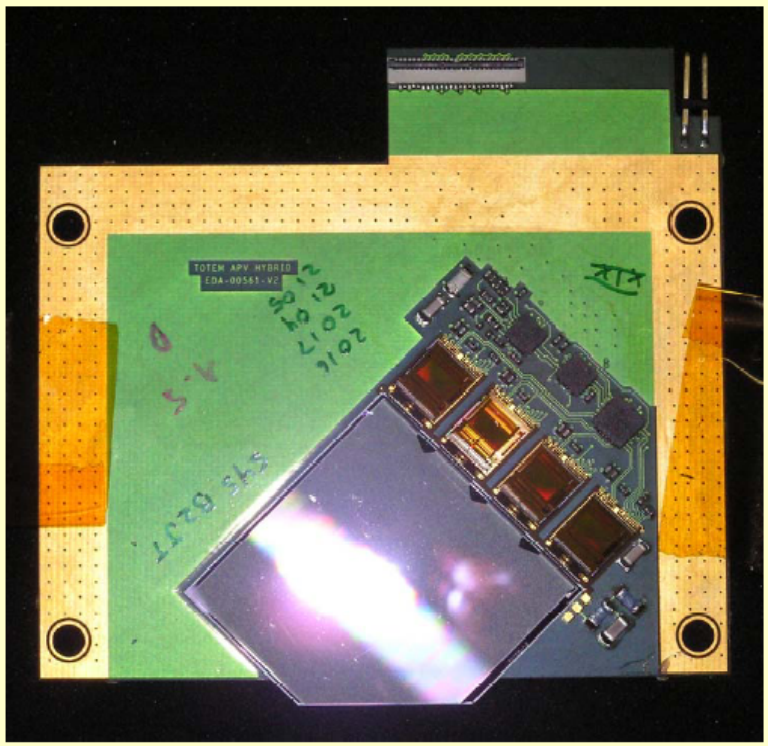




Very compact assembly, issues:

- Kapton
- T measurement & control
- Heat evacuation path
- Frame-card mounting

RP detector plane



- Compactness by only occupying half the space with electronics and mounting face-to-face
- Pitch adapter on detector
- Will use flat cable instead of kapton
- Will use DCU and heater resistor for T monitoring and control
- Will change mounting of card within frame

Roman Pot system

- Slow control standard CMS tracker & ecal
- Trigger generation:
  - 16 sectors of 32 strips on each detector are selected by trigger programming on the VFAT yielding 160 trigger bits per pot.
  - Only 2 CC chips/pot + a few more per RP station to generate less than 20 trigger signals per Roman Pot Station to the counting room for a processing time of 2 BCs.
- Data sent serially from VFAT to GOH (need three GOHs per pot) fed into ECAL Data Concentrator Card in counting room
- Need 8 FRL's for the RP system

Roman Pot Station