



second generation ECAL

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Shinshu / Kobe / KNU

Overview

Silicon & Scintillator slabs

FE ASICs – *Ch. de la Taille*

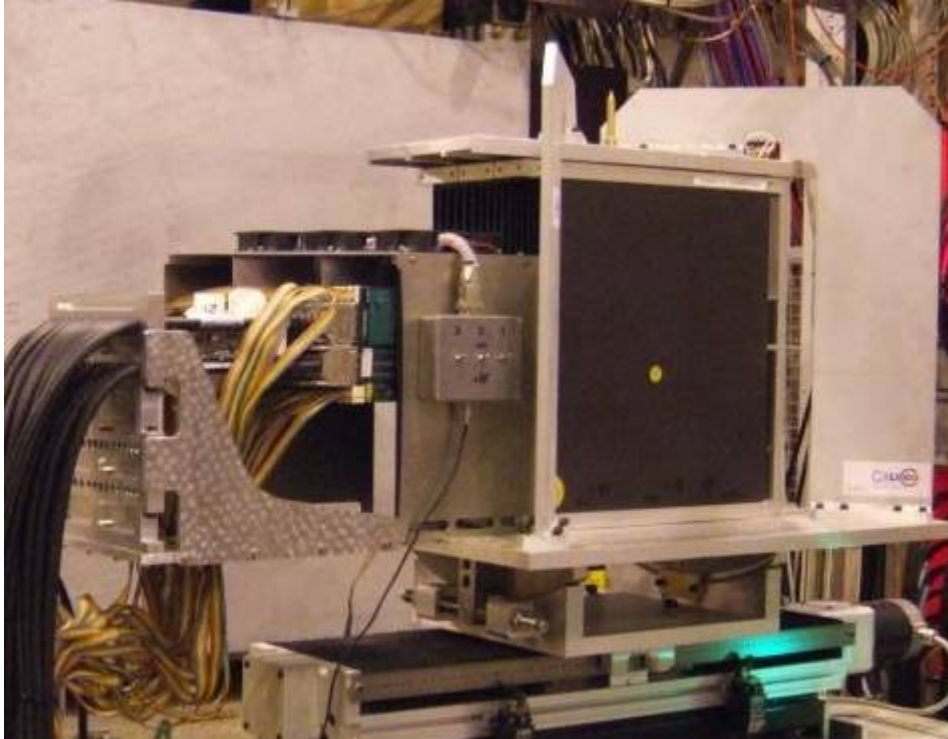
PCBs

Slab integration

DAQ commissioning

Mechanics & thermal studies – *Denis Grondin*

1st generation SiW prototype



30 silicon – tungsten layers

10x10 mm² PIN diodes
High resistivity silicon

S/N @ MIP ~ 7 → 8

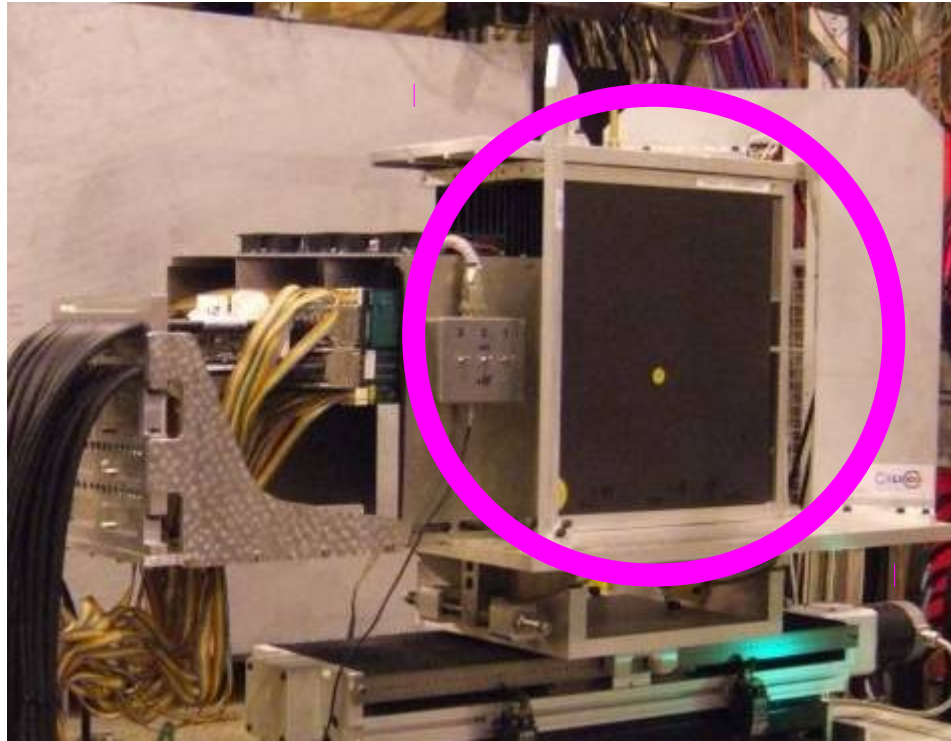
Carbon fibre composite structure

3 year testbeam campaign

Proved physics capabilities

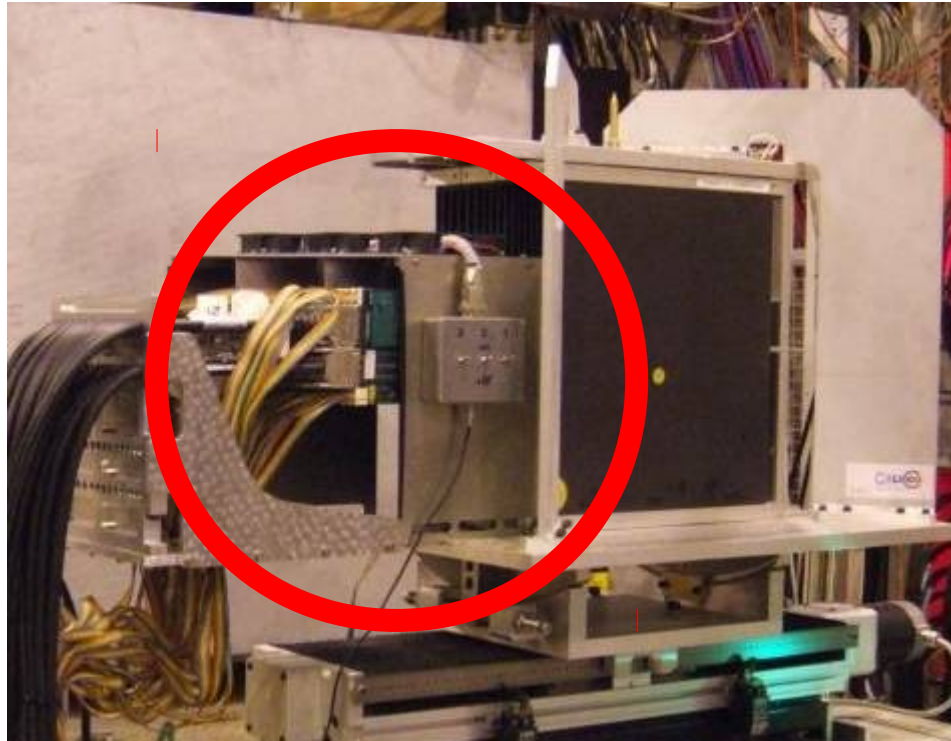
See talk by Michele Faucci-Gianelli

1st → 2nd generation



mechanical shape
and size close to
detector barrel
module

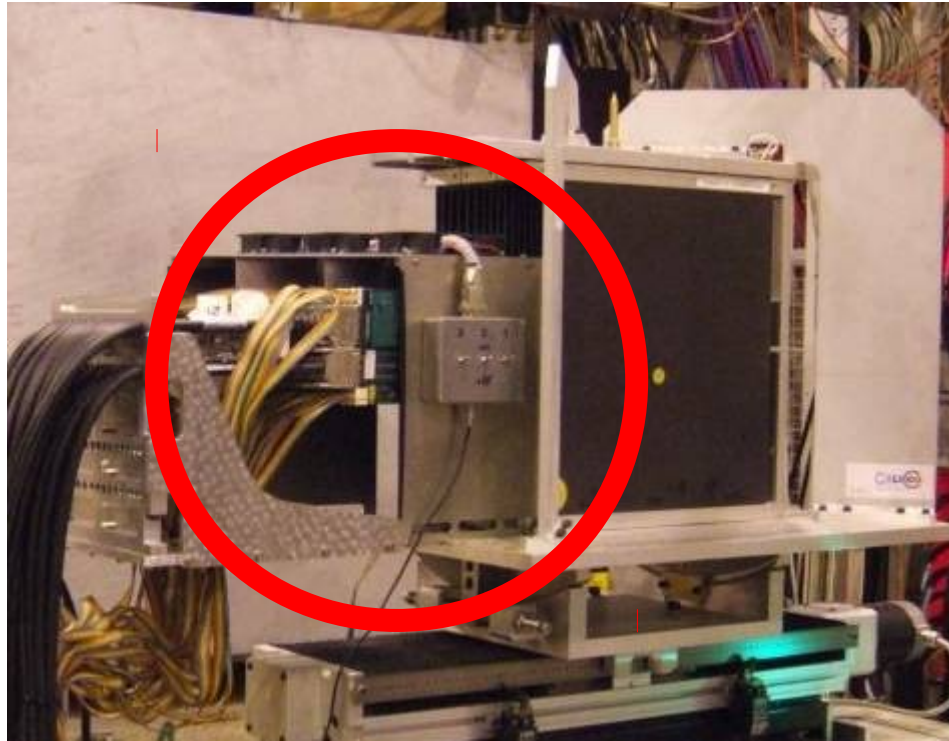
1st → 2nd generation



mechanical shape
and size close to
detector barrel
module

FE electronics inside detector

1st → 2nd generation

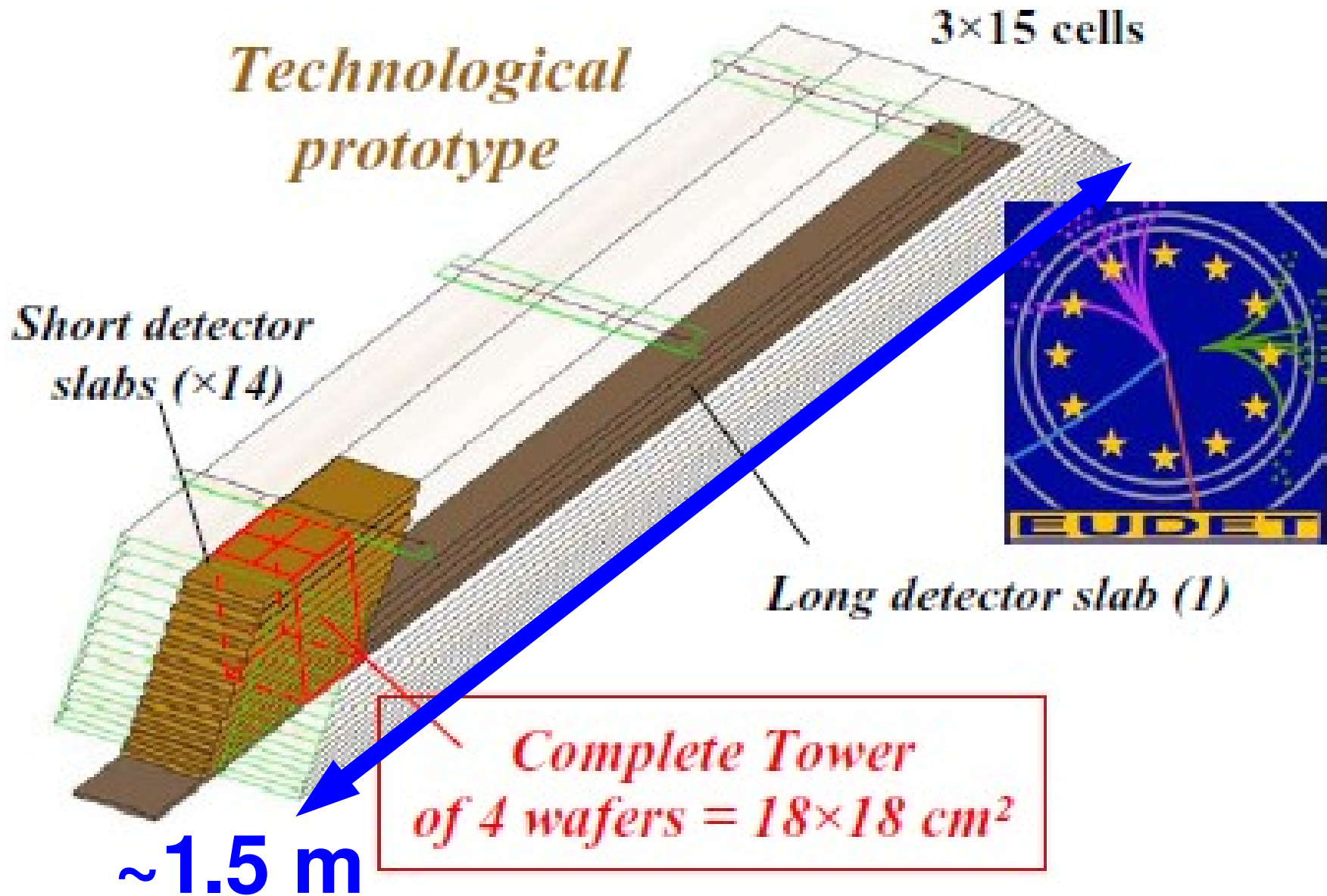


mechanical shape
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FE electronics inside detector

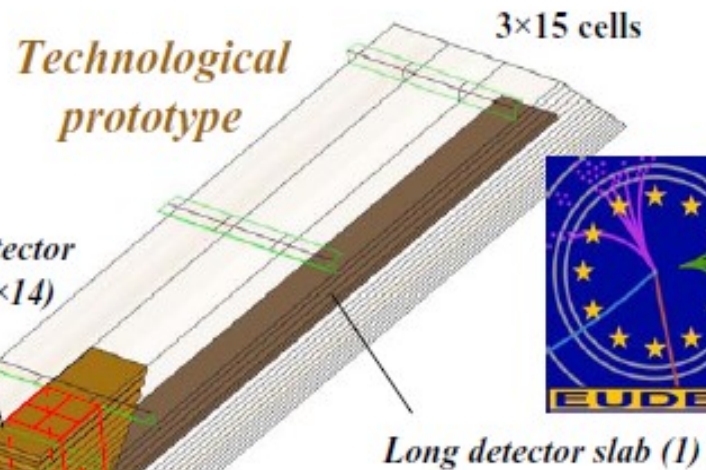
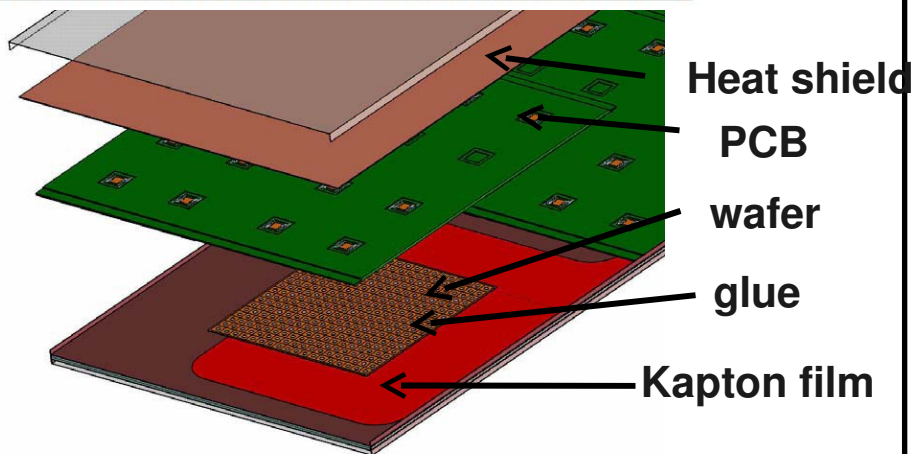
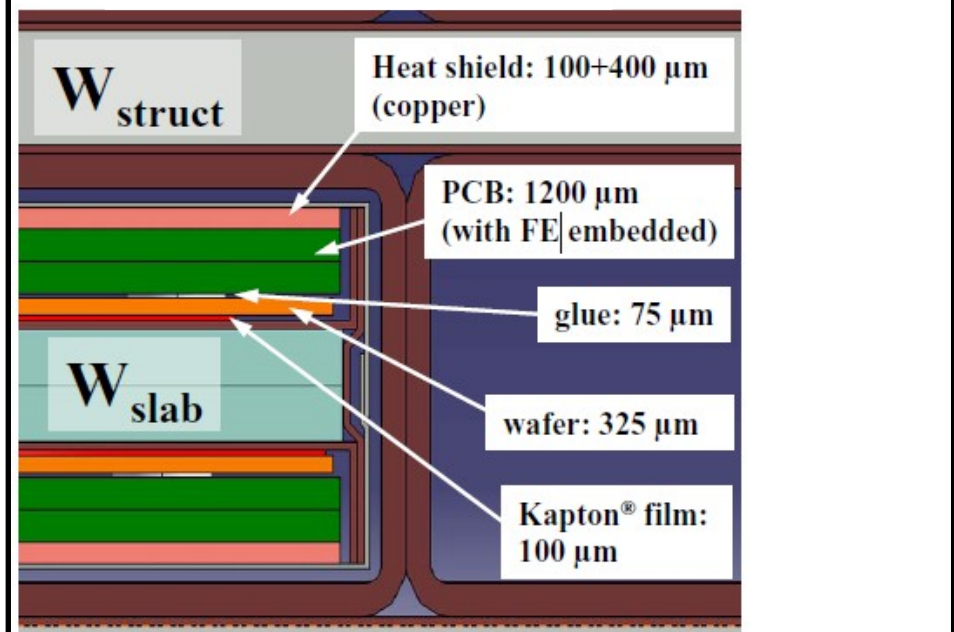
Power-pulse electronics

The EUDET prototype

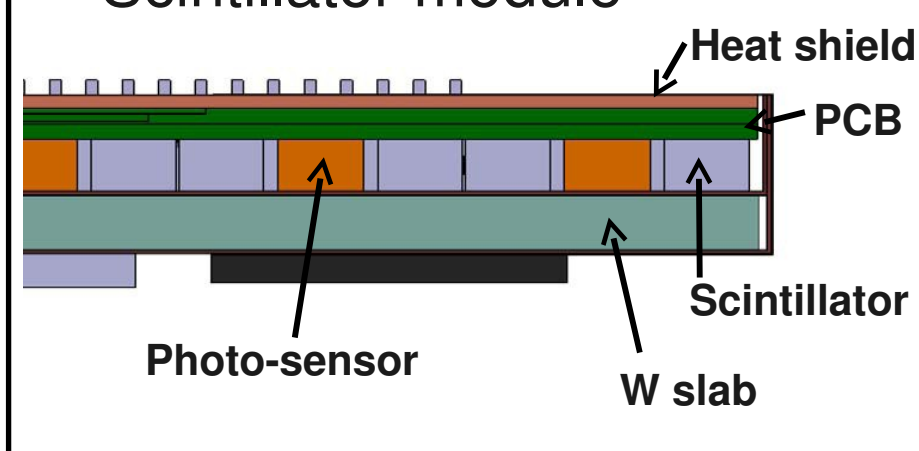


The EUDET prototype

Silicon module



Scintillator module

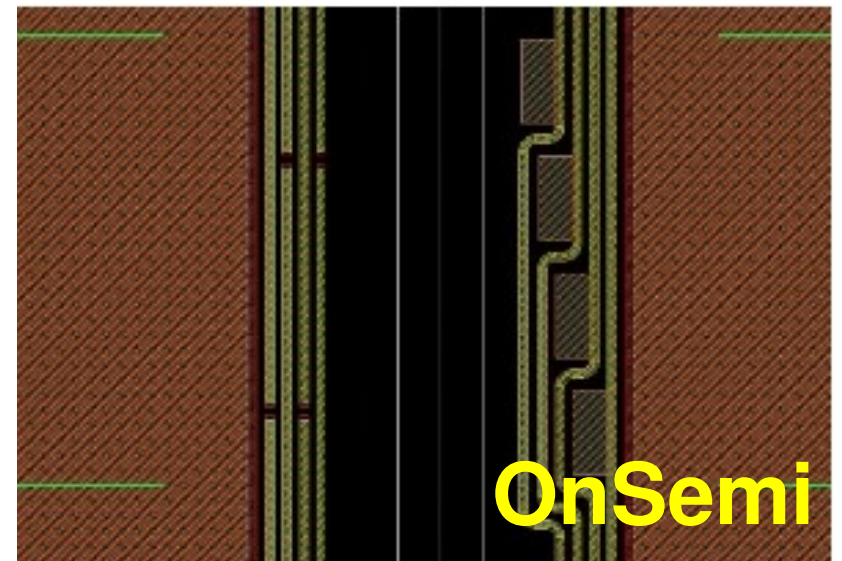
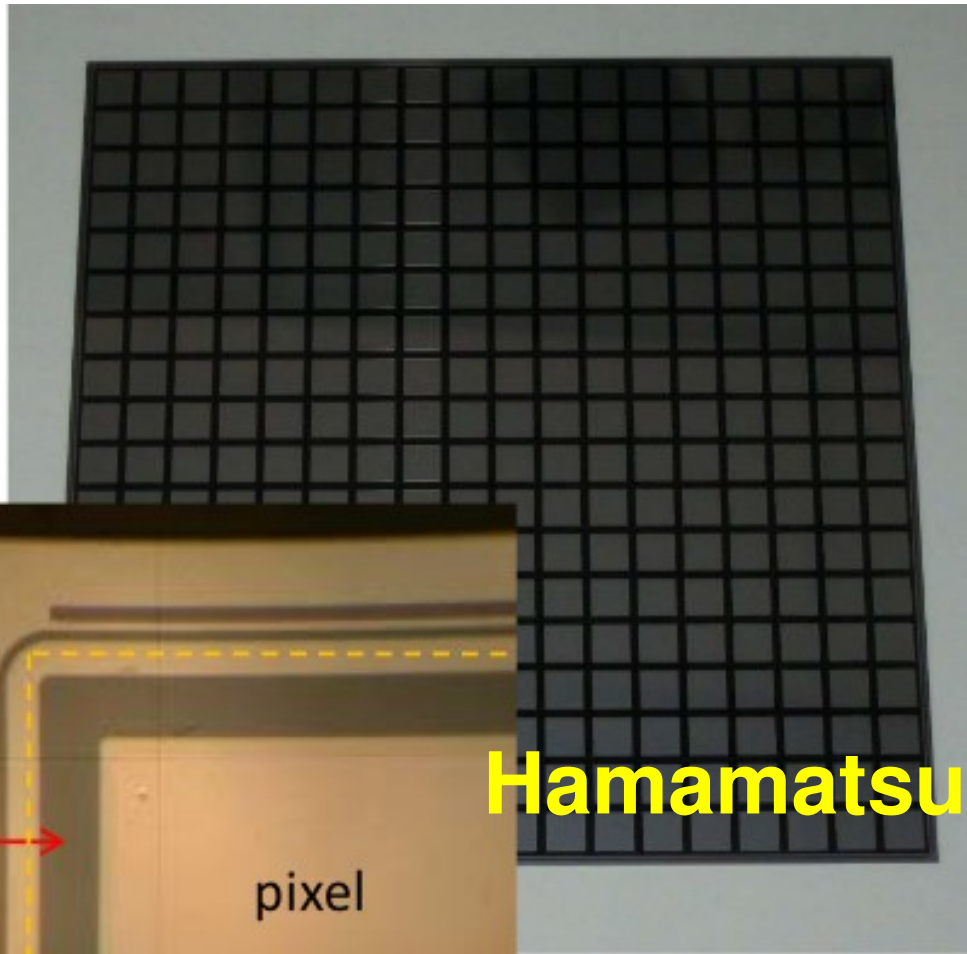
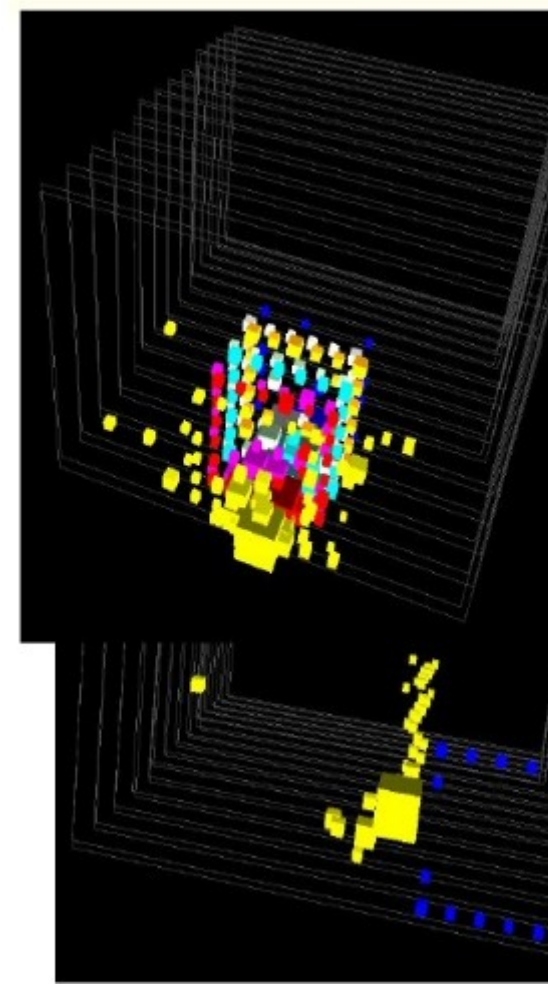


Silicon sensors

Larger sensors – less dead edges

Smaller ($5 \times 5 \text{mm}^2$) cells – better PFA performance

Segmented guard rings – reduce guard-ring X-talk
(square events)



Silicon sensors

Need to focus on cost reduction / industrialisation

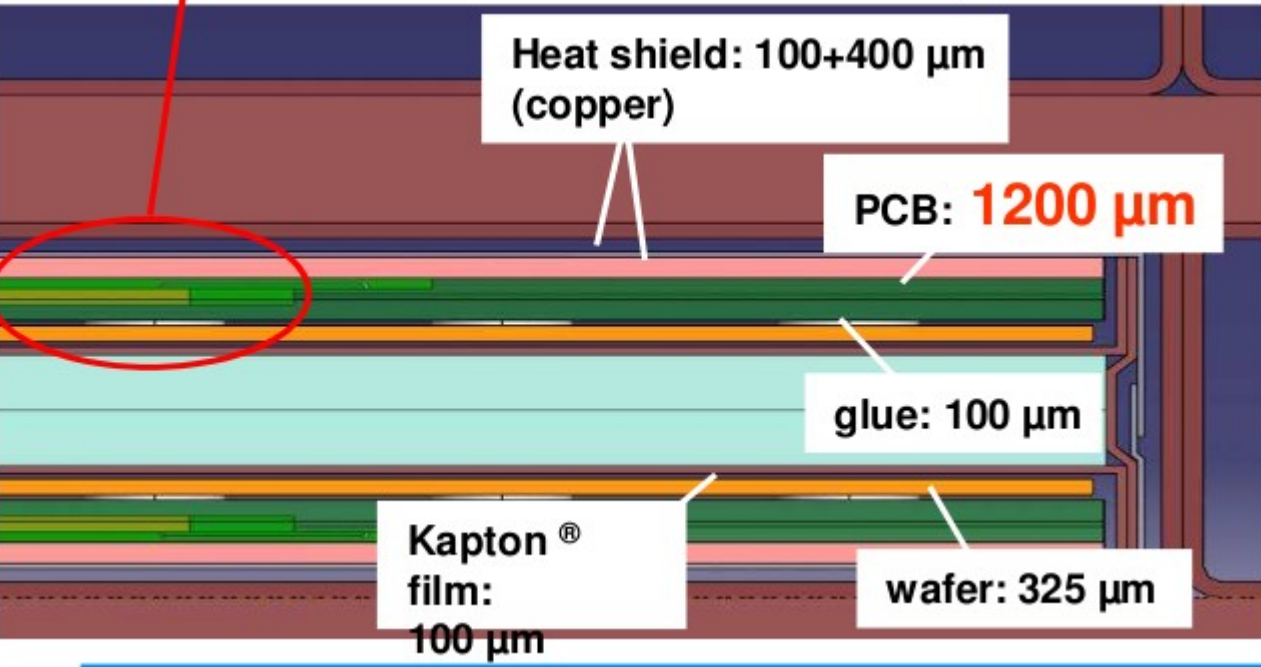
Contacts with:

Hamamatsu

OnSemi

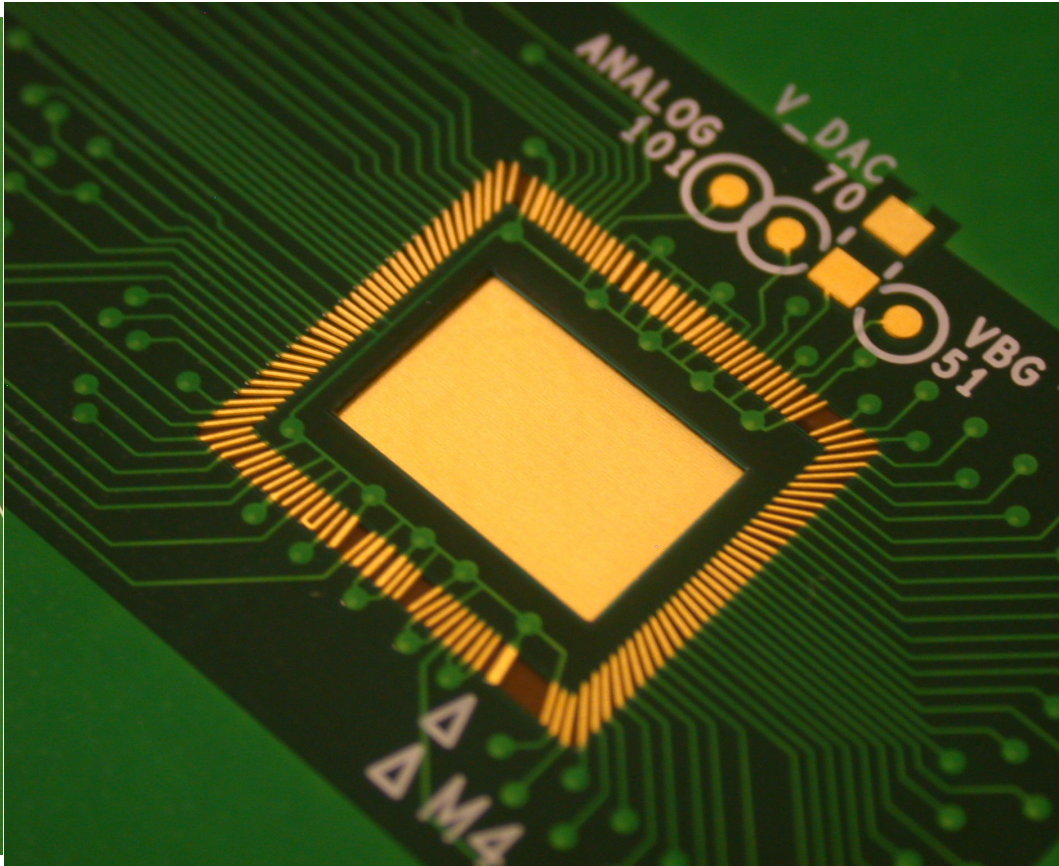
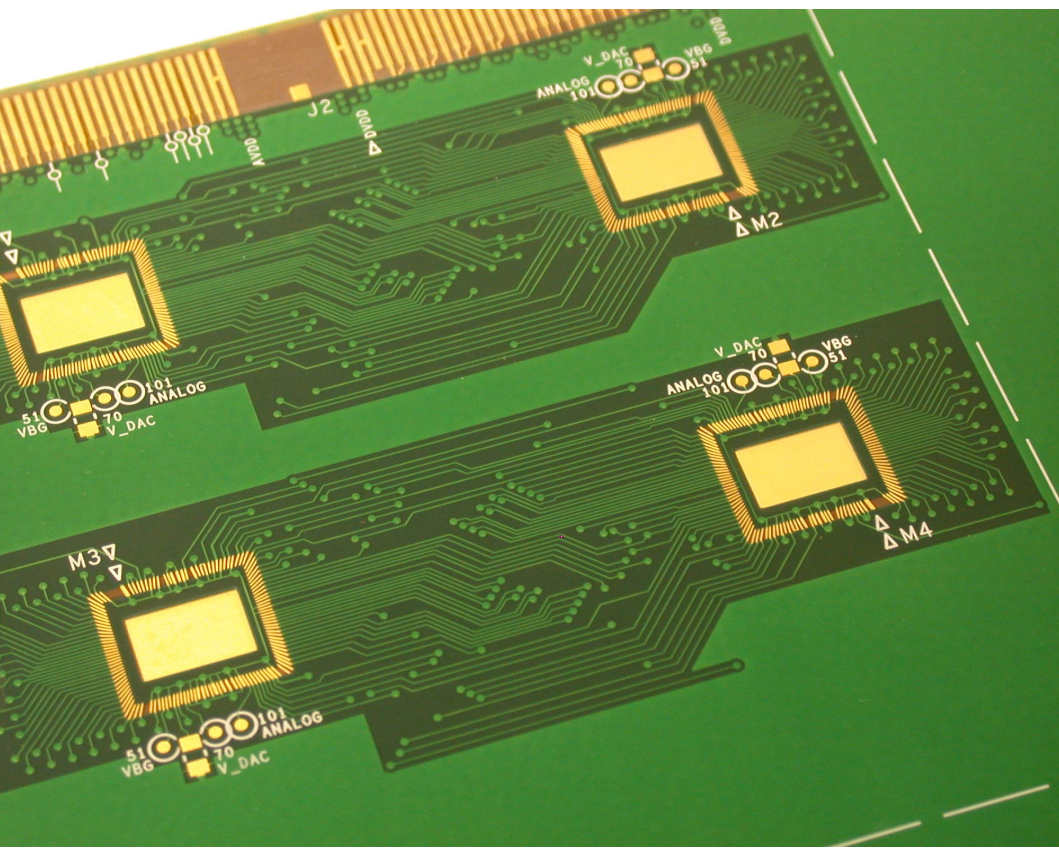
Bhabha ARC-Mumbai

Korean groups

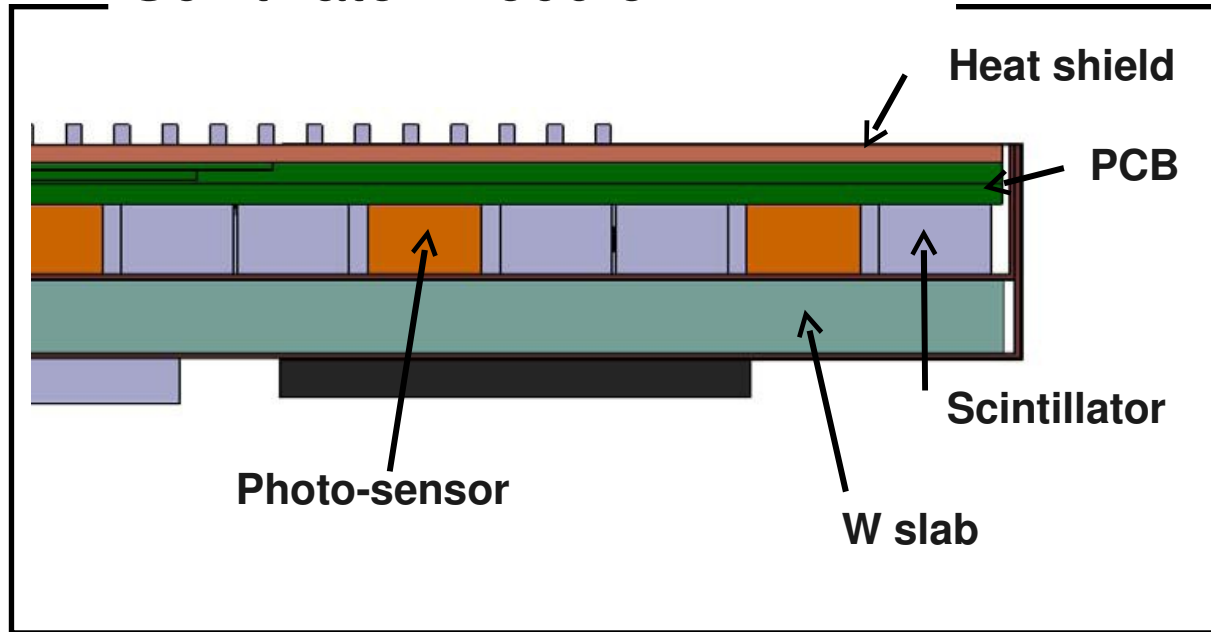


PCB (Si)

- Support Si sensors
- Incorporate FE ASICs
- Route signals/power
- ~1 mm thickness
- Under development



Scintillator module



Scintillator module

Single-sided slabs to fit into EUDET structure

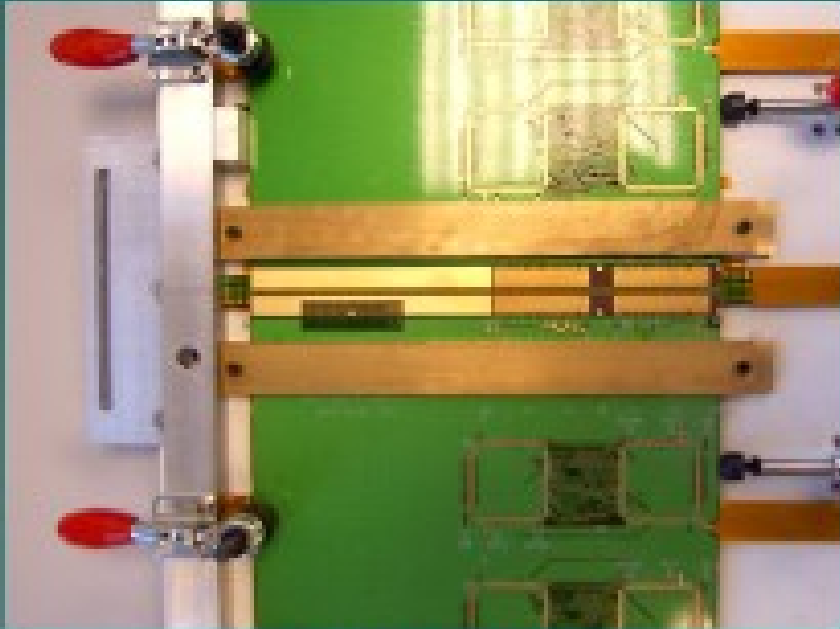
~45x5 mm² strips, MPPC readout

PCB: Similar requirements to AHCAL → work with DESY
MPPC mounting/readout
Gain monitoring system

Detector slab integration

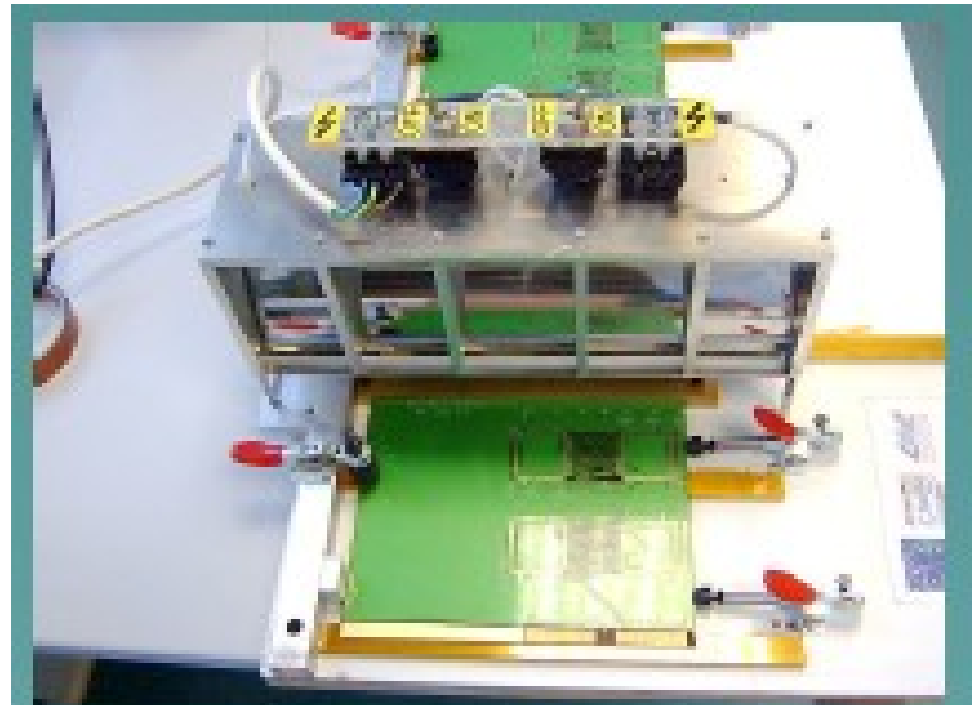
Gluing of wafer to PCB

Soldering together of PCBs



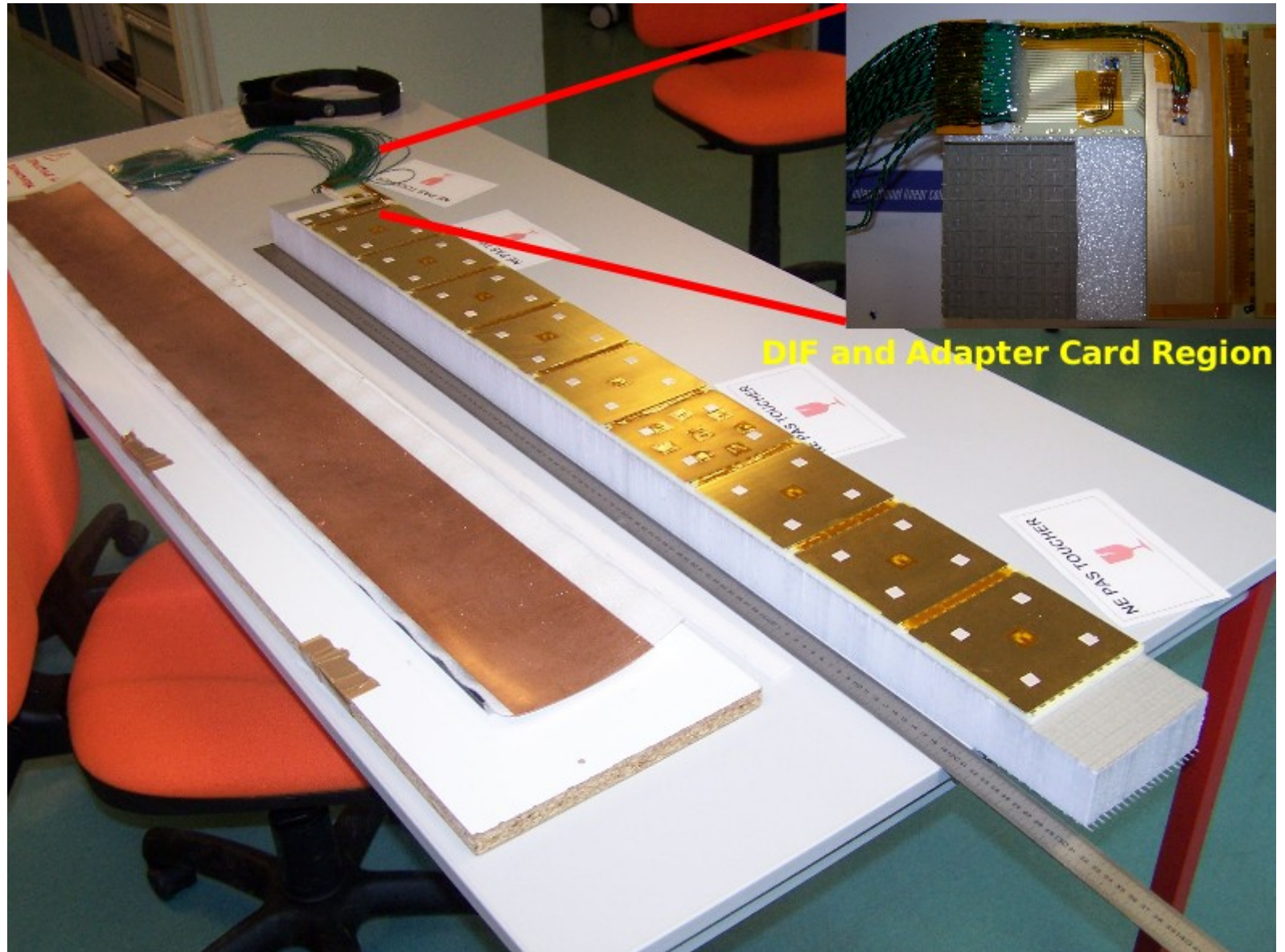
2 cards FEV7 CIP
on soldering bench

Wire bonding of FE ASIC
still to be done



Set up for the lamp

Long slab (>1m) for demonstrator module

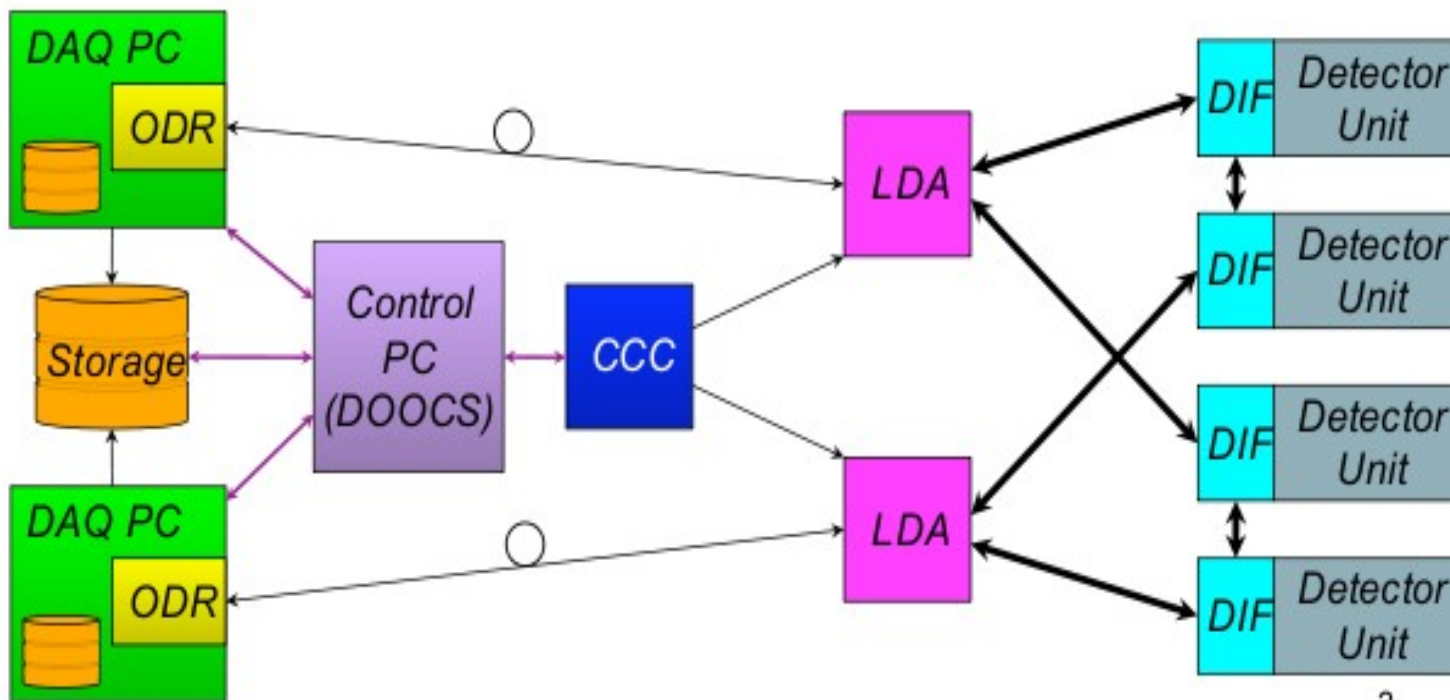


CALICE DAQ system

Scalable system, ~off-the-shelf components
slow control, data acquisition

All hardware components produced
firmware under development

Basic communication established along chain
usable by ~ autumn



Now pass to mechanical and thermal aspects....