

SCECAL for CALICE

T.Takeshita (Shinshu)

Kobe, Kyungpook, Shinshu

+

Tsukuba

requirements

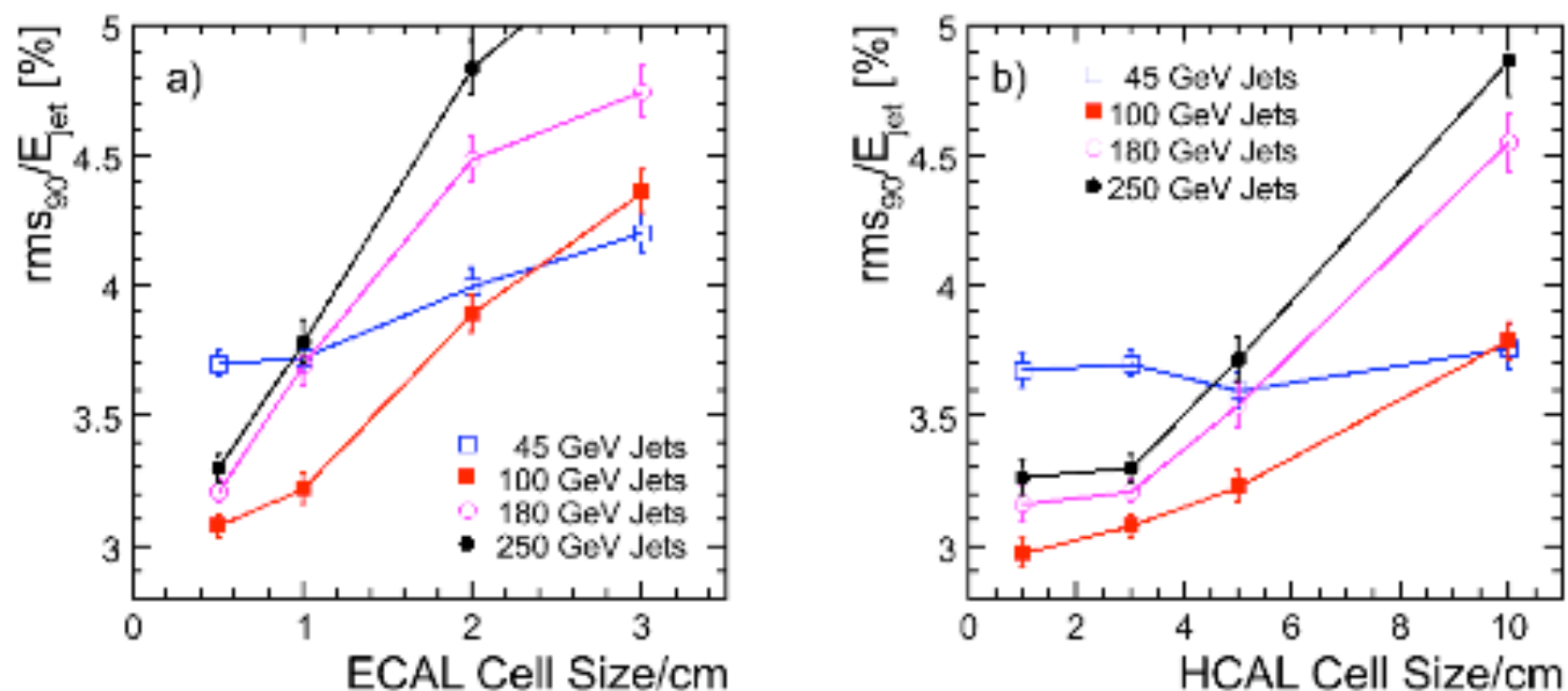
achieved

future

ILC-PFA detector

- PFA requires to reduce confusion term
- very high segmentation necessary
- 10-5 mm/ECAL. 3cm/HCAL for every layer
- Silicon Tungsten ECAL : good segmentation
- Scintillator ECAL : strip structure : less granular but cost effective

Pandora PFA : M. Thomson

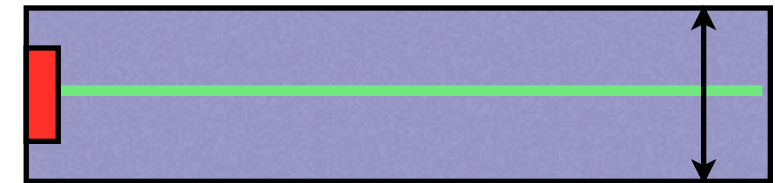


scintillator calorimeter

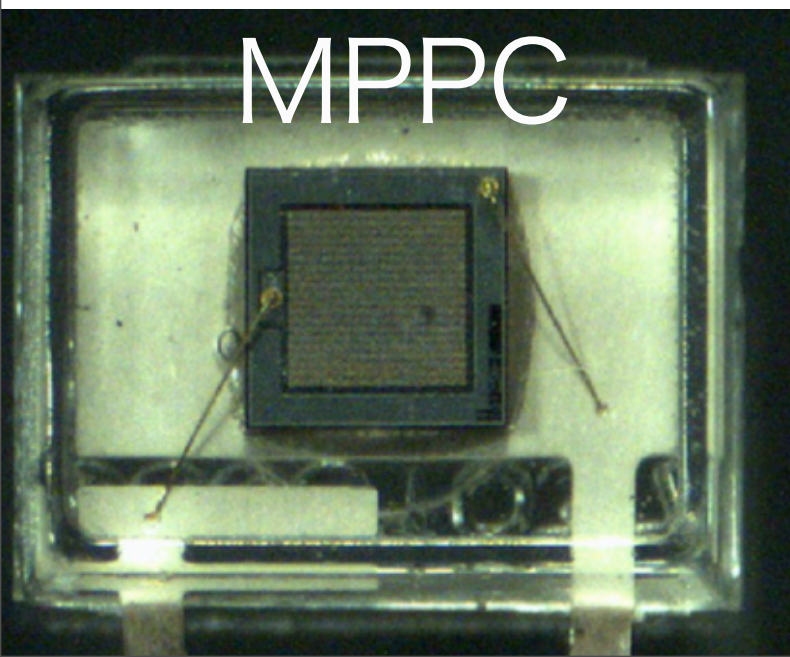
WLSF

- by strip scintillator
- with WLSF : uniform response in fiber direction : freedom of length : to reduce cost. (sensor/scintillator)
- photon sensor : MPPC : small, cheap, easy
- scintillator : extruded, cheap
- calorimeter constructed and tested ecal

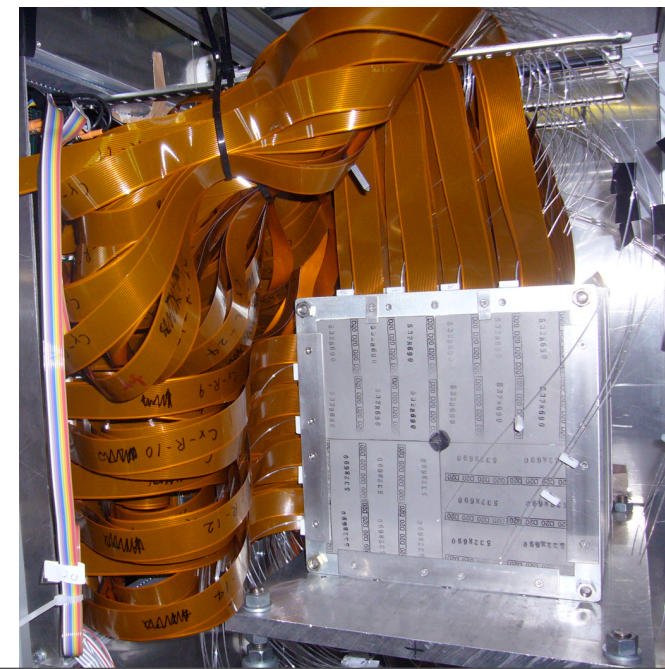
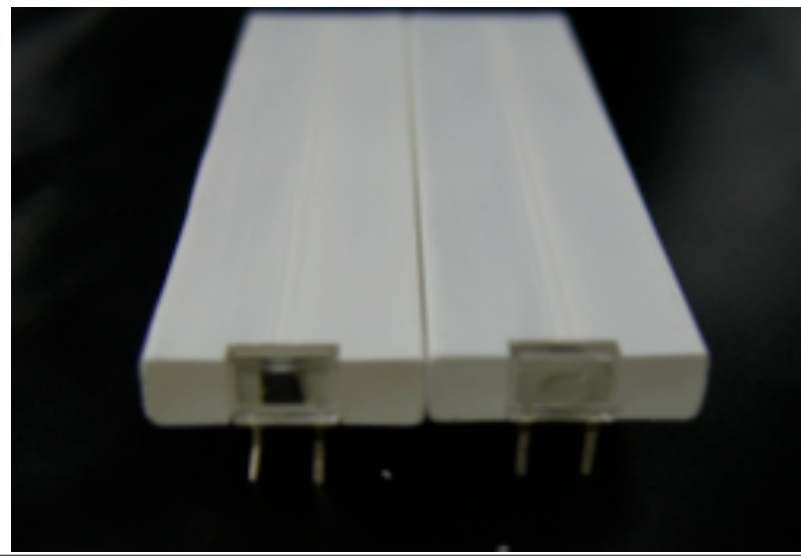
MPPC



MPPC

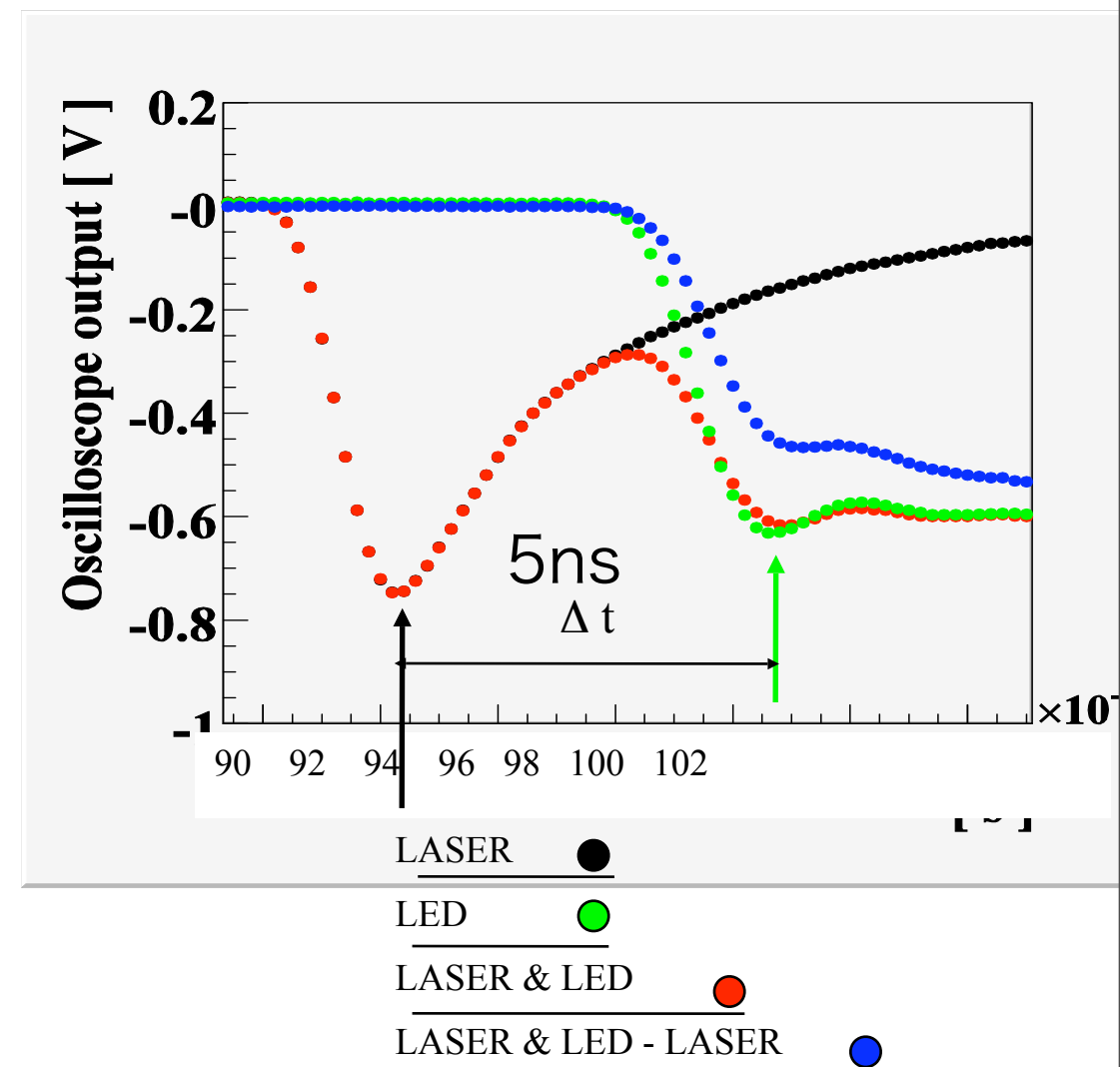
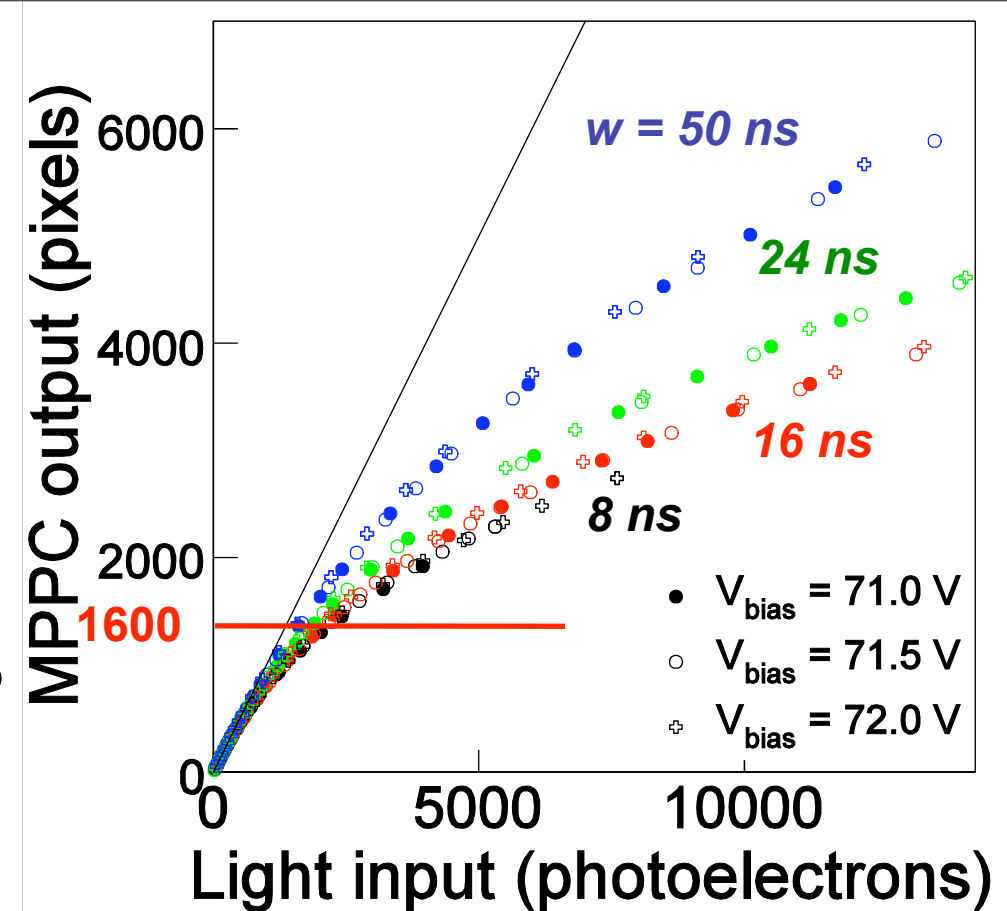


extruded scint.



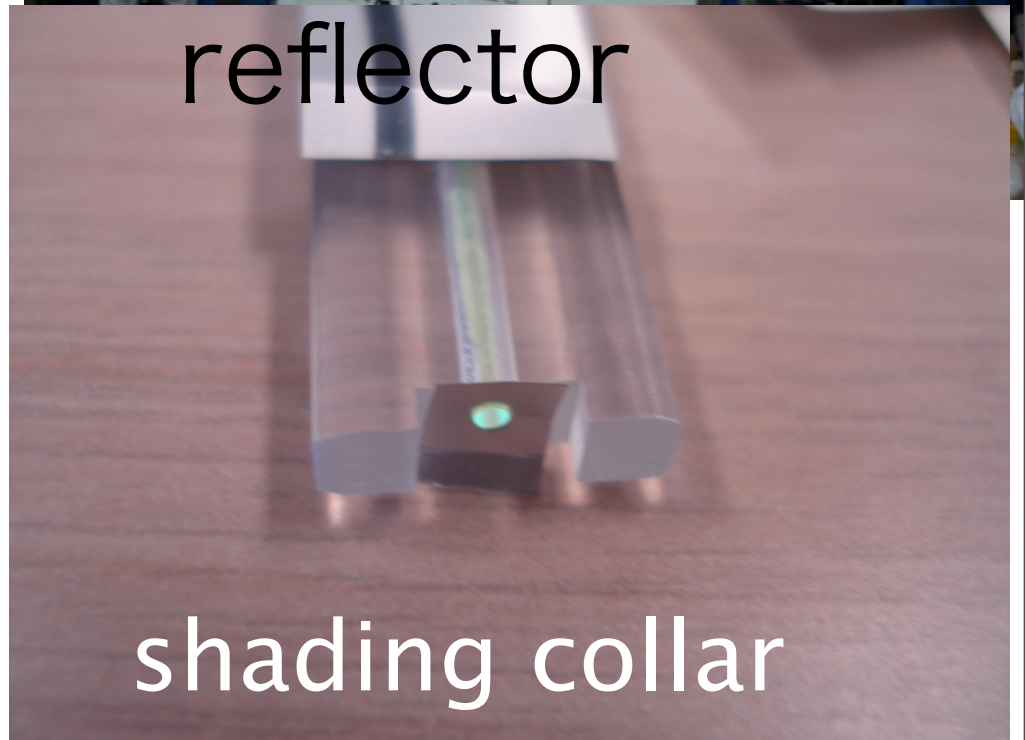
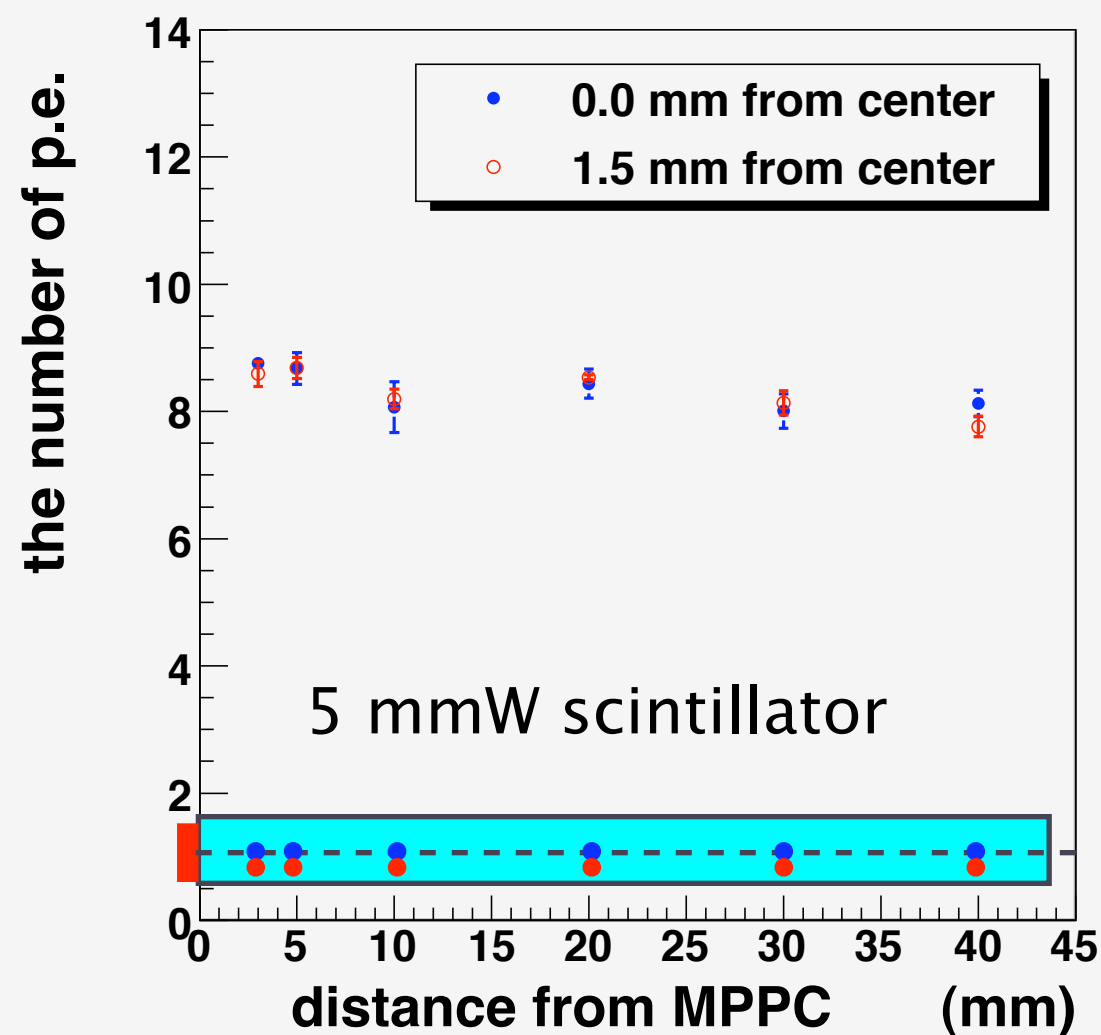
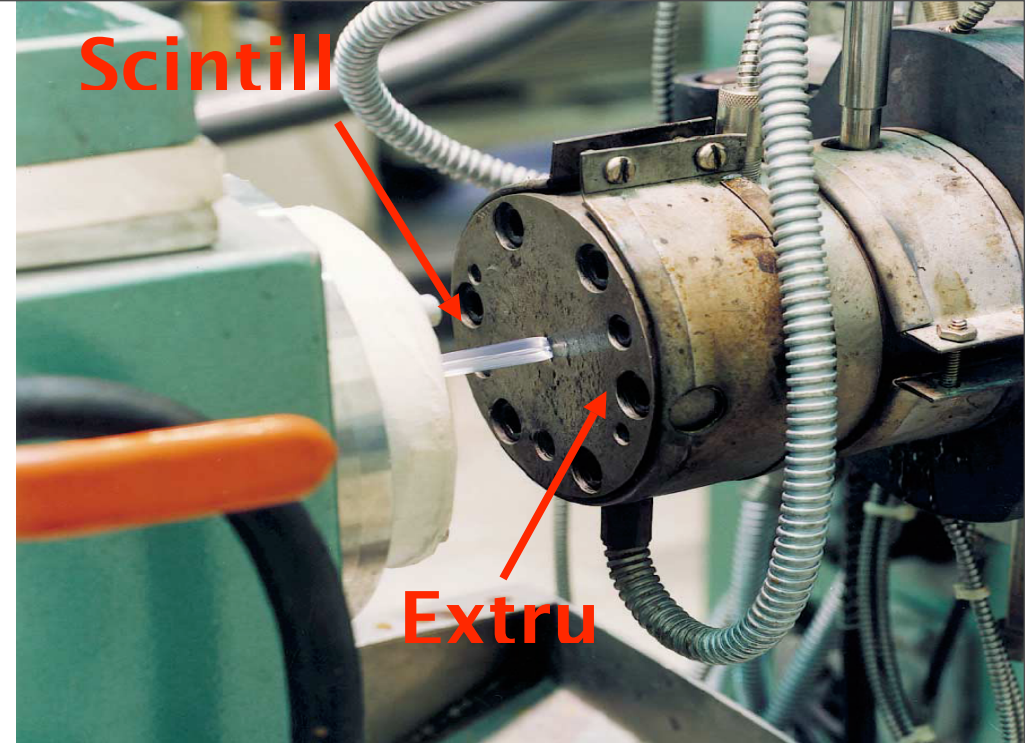
MPPPC

- key issue : linearity
- limited by number of pixels
 - 1600 pix $25\mu\text{m}\times 25\mu\text{m}$
 - 2500 pix $20\mu\text{m}\times 20\mu\text{m}$
- to increase # of pix.
- rapid response



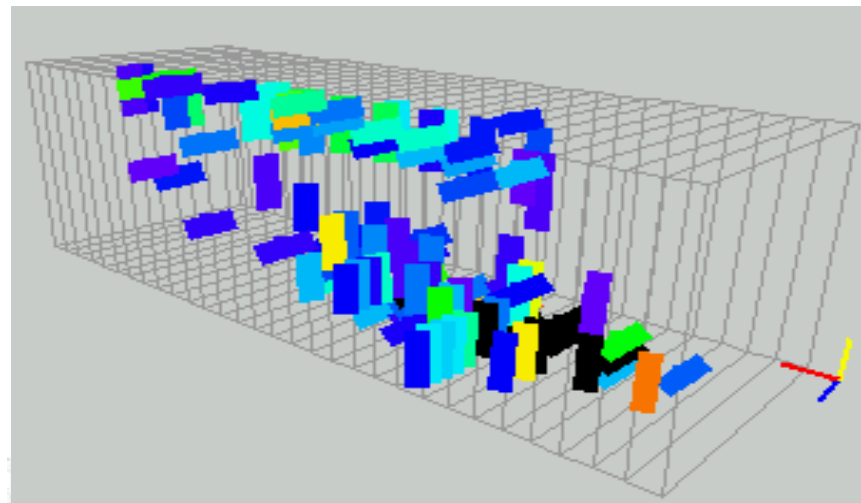
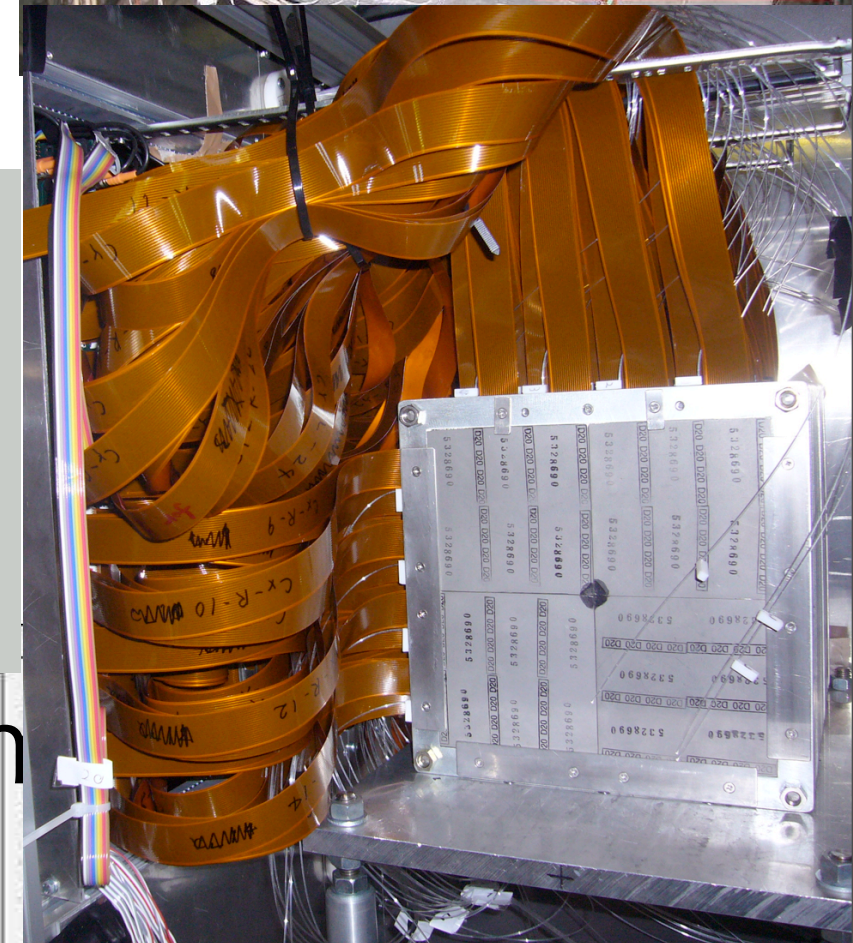
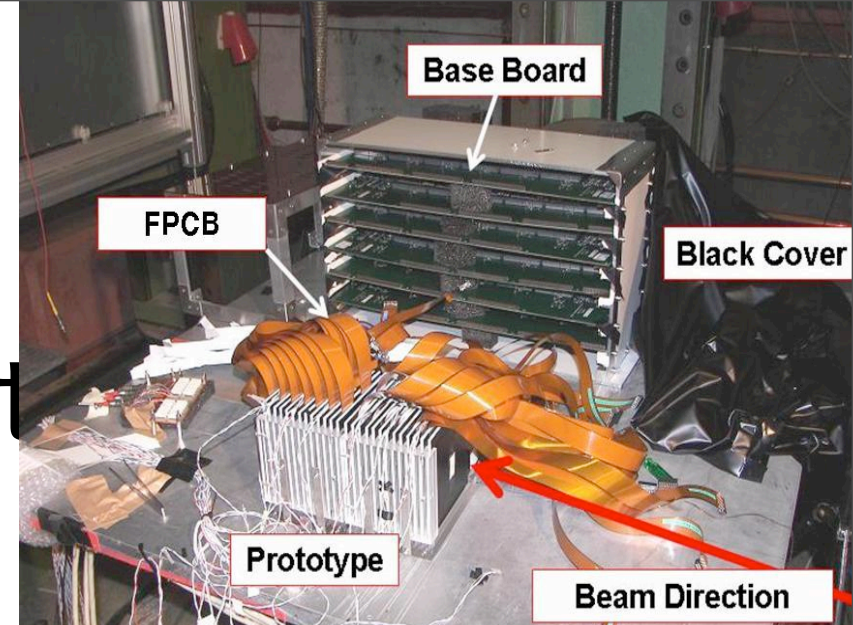
scintillator

- extruded
- suitable for strips
- improve uniformity
- 5mm wide strip

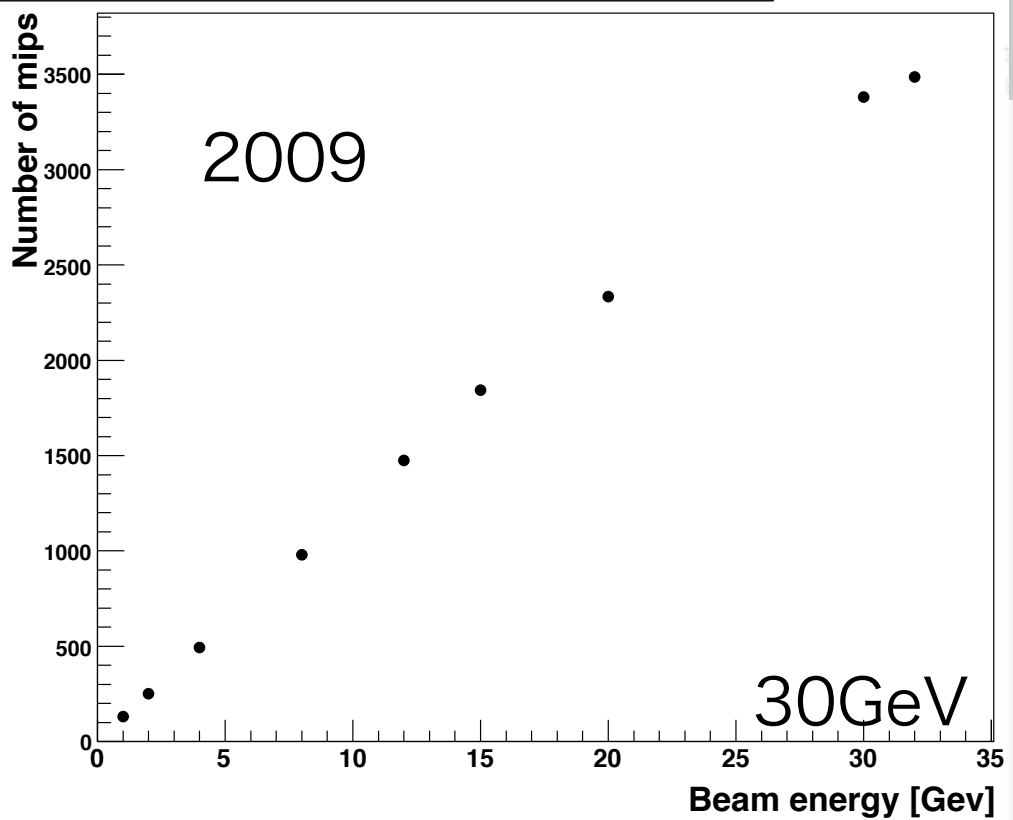


scECAL results

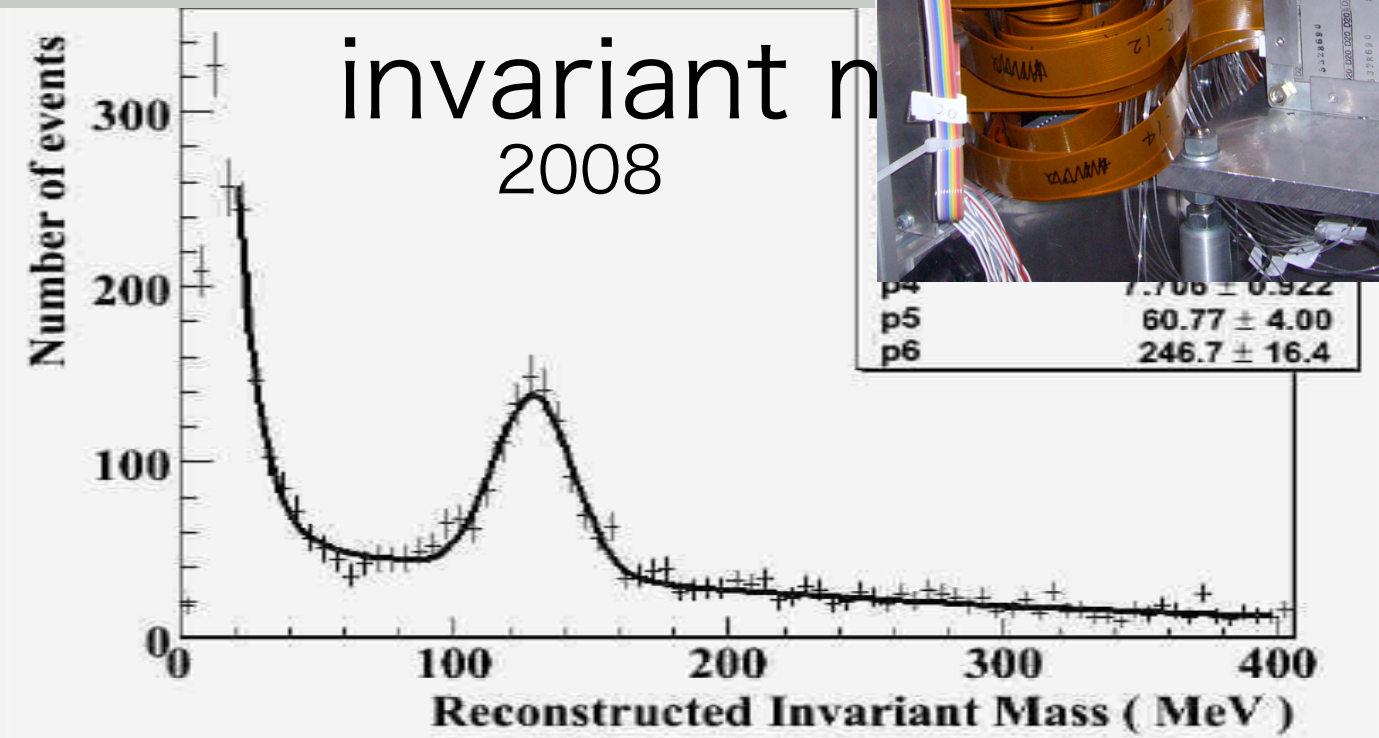
- DESY BT : mega/extruded scint
- FNAL BT : prototype 2160ch



ScECAL::Energy linearity



invariant n



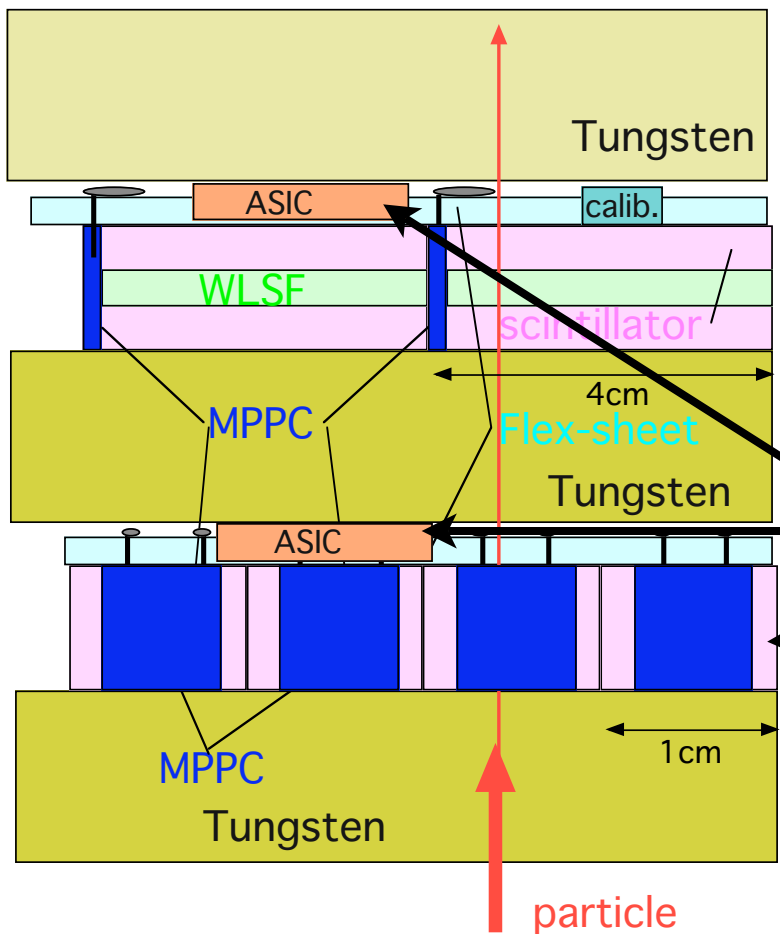
current work

- urgent need of PFA with strip clustering capability : (young) man power
- could be applied to HCAL
- 5mm strip bench test for finer segmentation (students)
- integration in stack structure : engineering work
- analysis of beam test data (students)

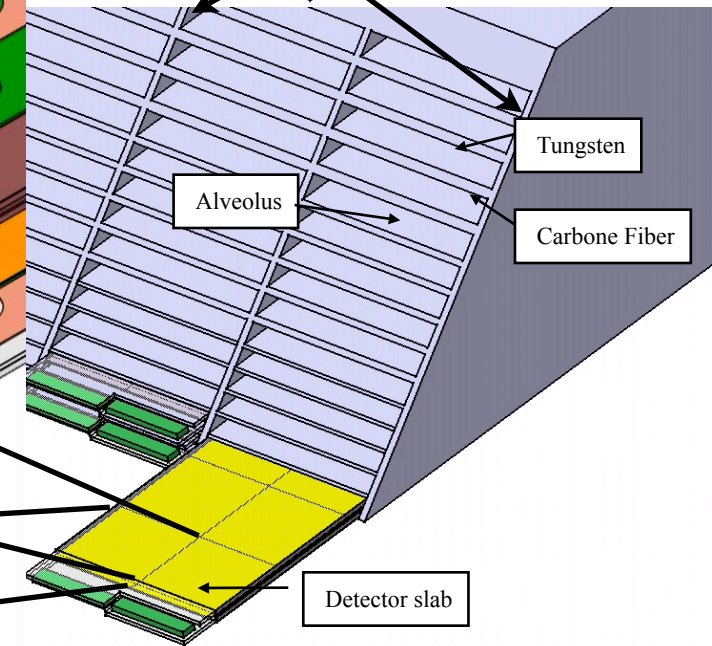
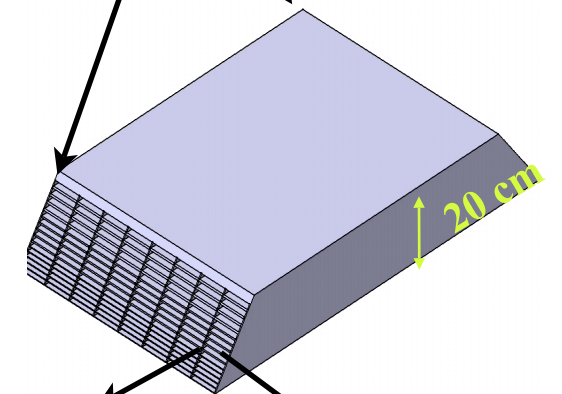
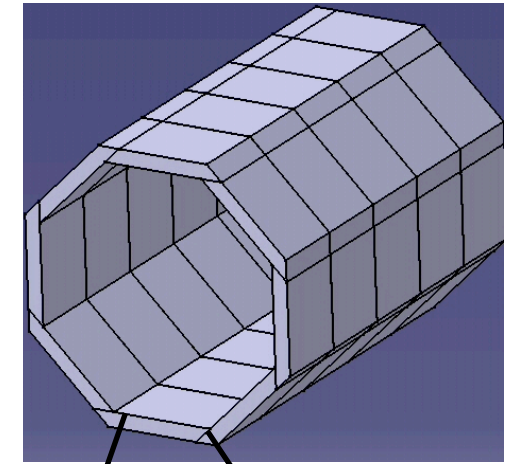
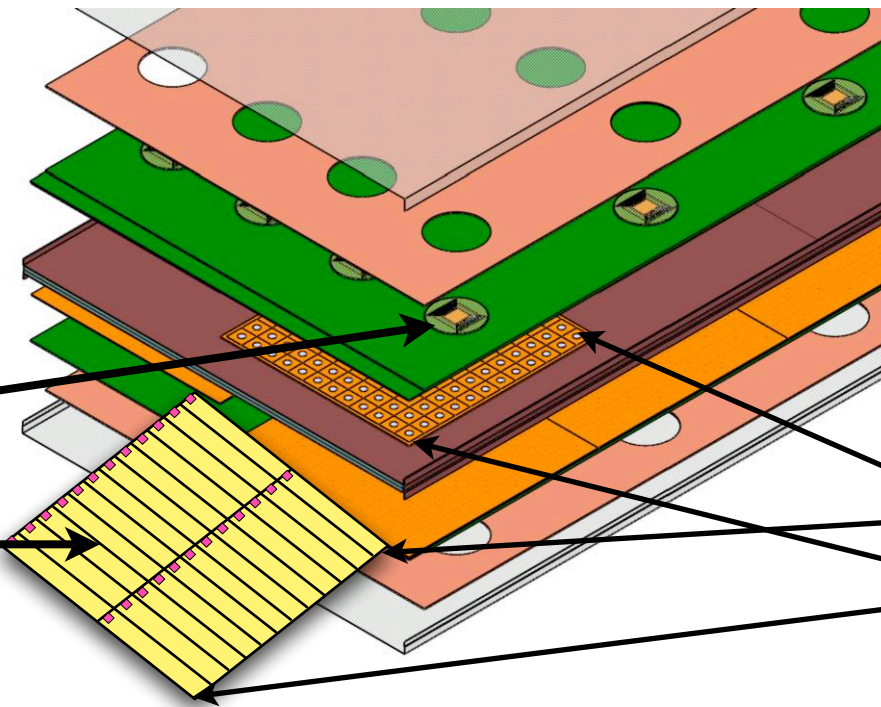
realistic const. model

- ECAL installation with electronics combined
- need **engineers** for this

EM-Scintillator-layer model Cross section TT Oct 07



elec
strip



plan 2009-

- PFA software dev. to match strips
- engineering work to combine electronics in a layer
 - need guys of engineering/or company
 - good communication with Christophe
- feasible to be 5 mm segmentation
 - without WLSF
- improvement of MPPC : increase number of pixels to relax saturation effect

scecal R&D

2009

2010

2011

2012

PFA : strip clustering algorithms dev. & improv.

layer elex. dev.

layer elex, implem.

5mm scinti. dev.

test of 5mm scinti.

MPPC dev. increase # of pixels