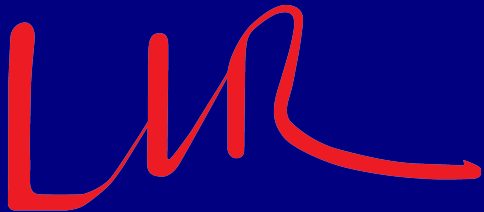


# ECAL technical prototype status

Daniel Jeans  
LLR Ecole polytechnique



# Develop and test technical solutions towards an detector-integrable ECAL

“ILD-like” self supporting structure

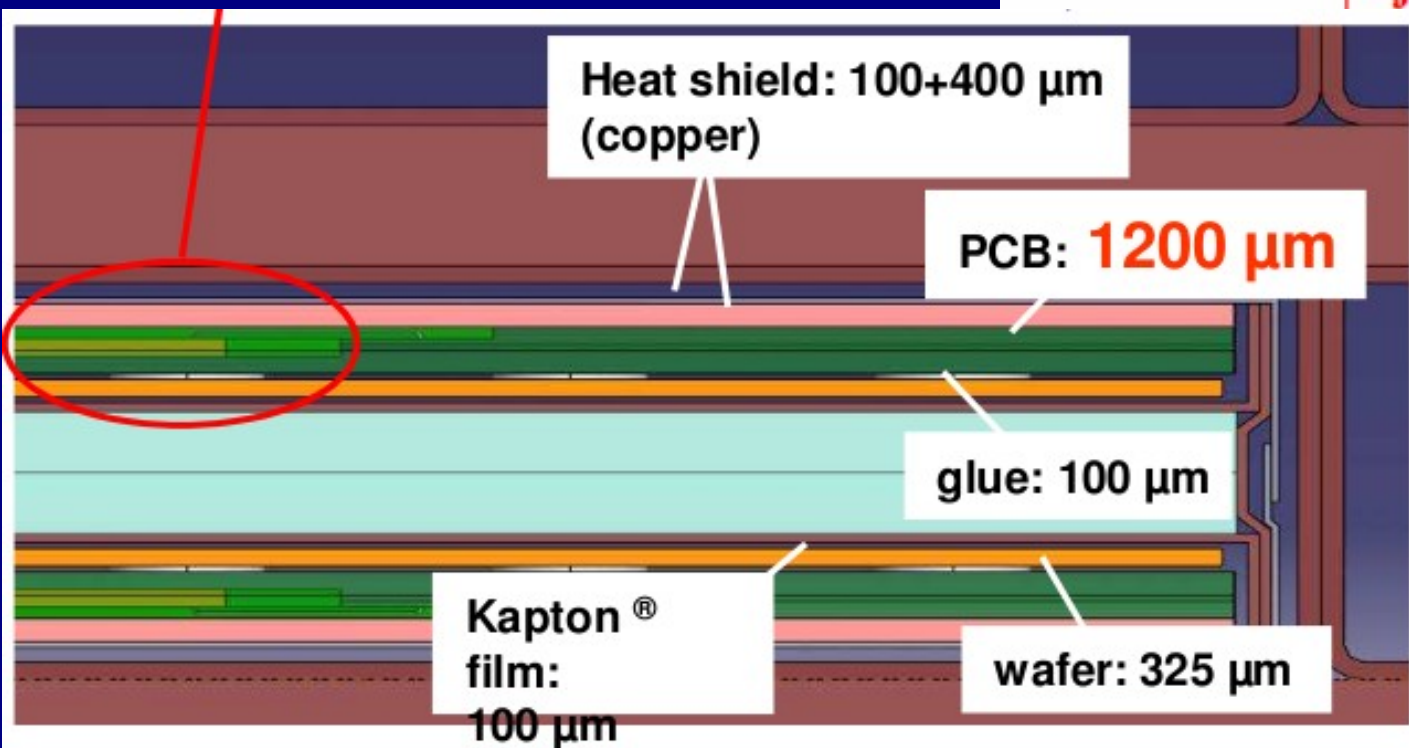
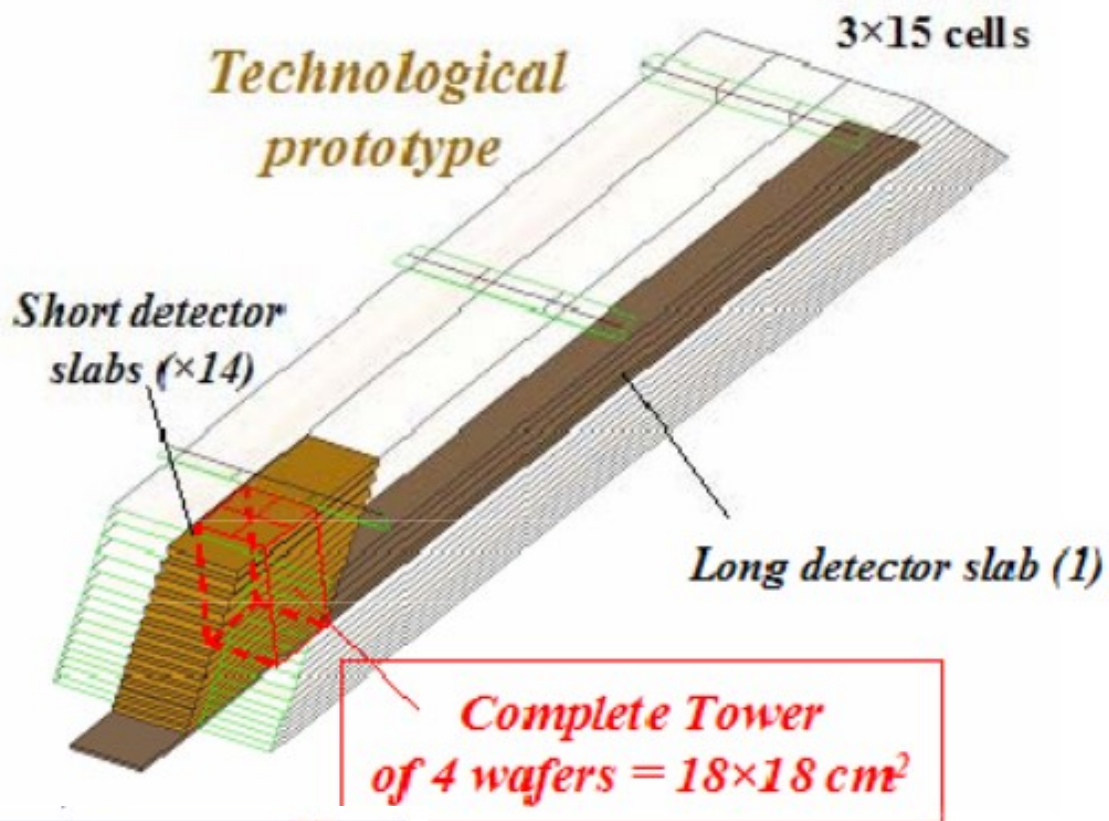
A number of short slabs

18X18cm<sup>2</sup> instrumented area

Test different solutions

One (partially instrumented) 1.5m long slab

Test long distance propagation



Active layers  
Compact  
Low power  
Realistically cooled

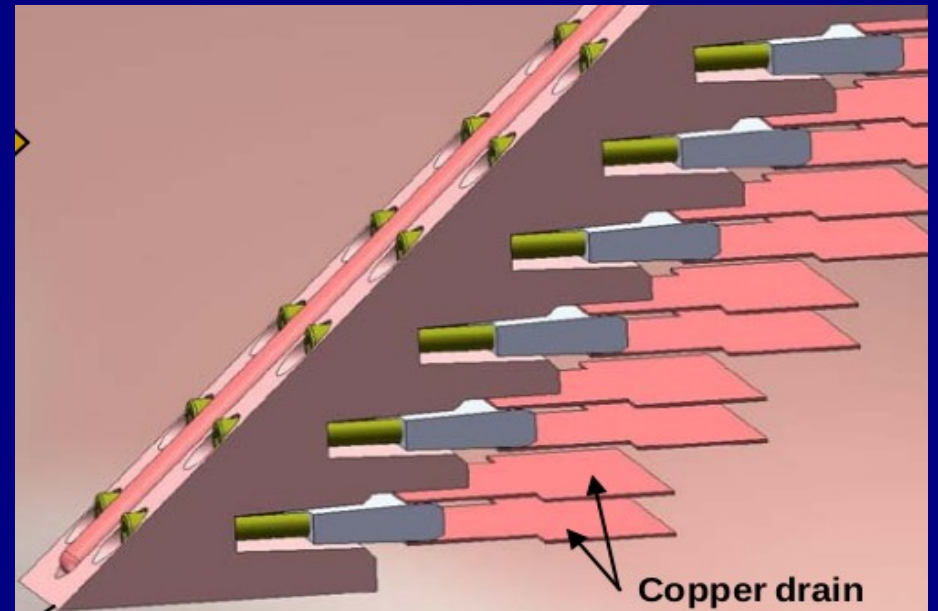
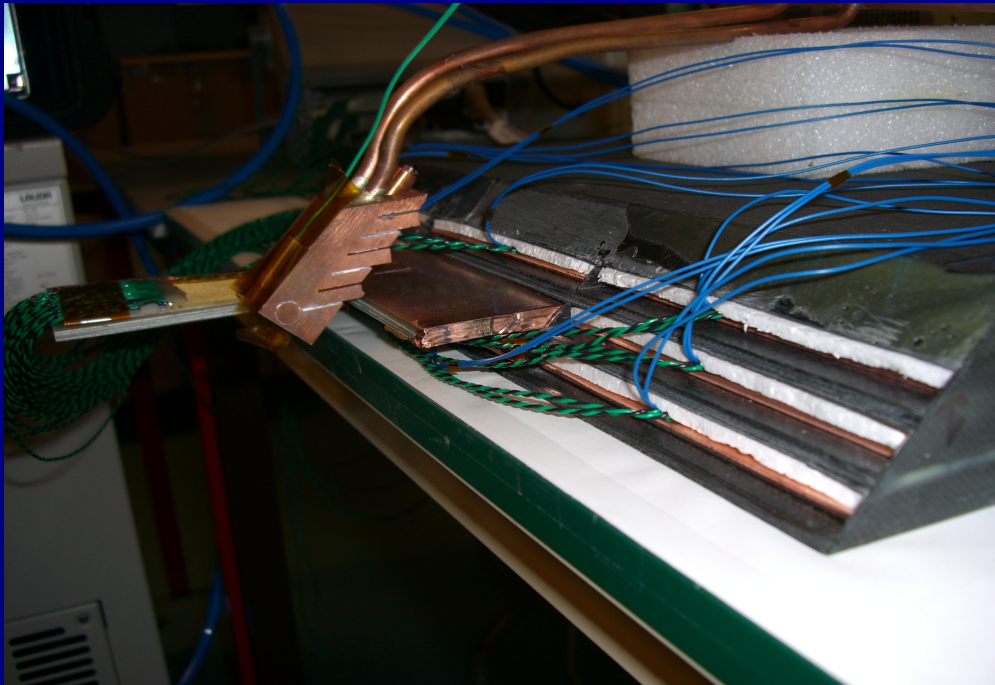
## Mechanics and cooling

ECAL mech. and cooling studies  
– M. Frodin

LLR, LPSC Grenoble

Alveolar structure ready in a few months

Development of cooling system  
for test beam use  
suitable footprint and power for final  
detector



## FE ASICS - OMEGA

SKIROC2 produced last year

Sufficient for technological prototype >1500  
measurements progressing: see T. Frisson's talk

## PCB – FEVx - OMEGA

Complex (many layers, vias...)  
Strong constraints on thickness, planarity  
Not easy to produce

Current prototypes:

Electrically good, bondable  
Satisfy thickness requirements  
main issue is planarity:  
1->3 mm deviations

Collaboration with SKKU (Korea)  
manufacture half of boards in Kr  
2 SKKU students @ OMEGA  
visit to SKKU last week



## Silicon sensors – LLR, LPC, Kyūshu, Shinshu

Have 40 in hand, ~160 required in total

Face-to-face meeting with HPK last september

Investigate ways to understand and reduce sensor cost

Future tests:

- Working from 8" wafers (new production line in preparation)

- Vary thickness within acceptable range

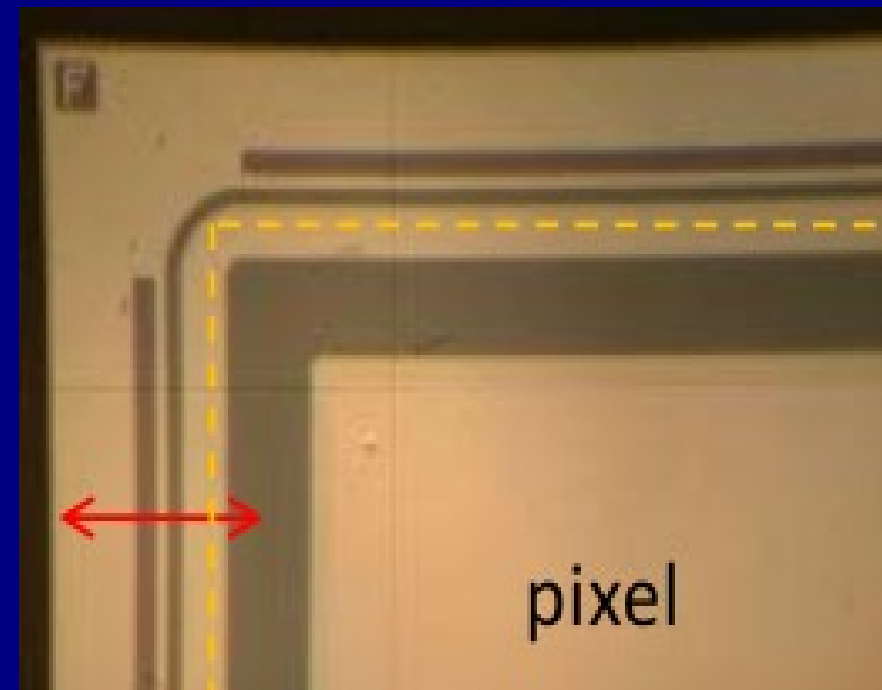
- Laser cutting of sensor edge (reduce edge area)

  - First order passed: trim 0.0, 0.1, 0.25, 0.4mm around edge

- Relaxed quality control requirements

  - Small number of single dead pixels,

  - Larger leakage current



# Detector integration

ASIC wire bonding to PCB – CERN

Sensor gluing to PCB

LPNHE (Paris/Jussieu) joins ECAL group

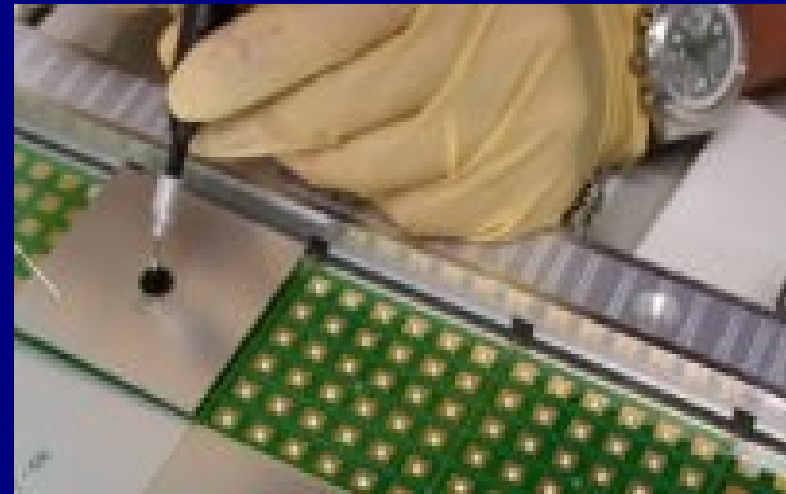
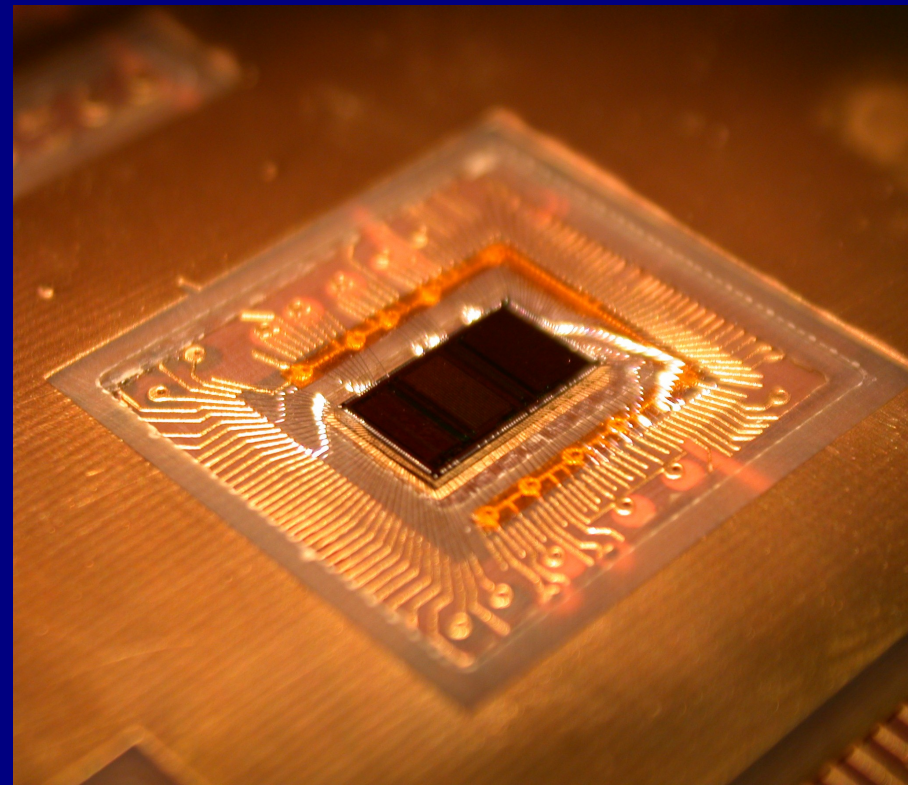
Previous experience from SILC

Adapt gluing station

Development of alternative techniques

ASU interconnects, HV Kapton etc – LAL

More details in Roman's talk



## Detector powering - LLR

See talk by JF Roig

SWEAT adapter board to test different powering schemes  
e.g. compact storage capacitors

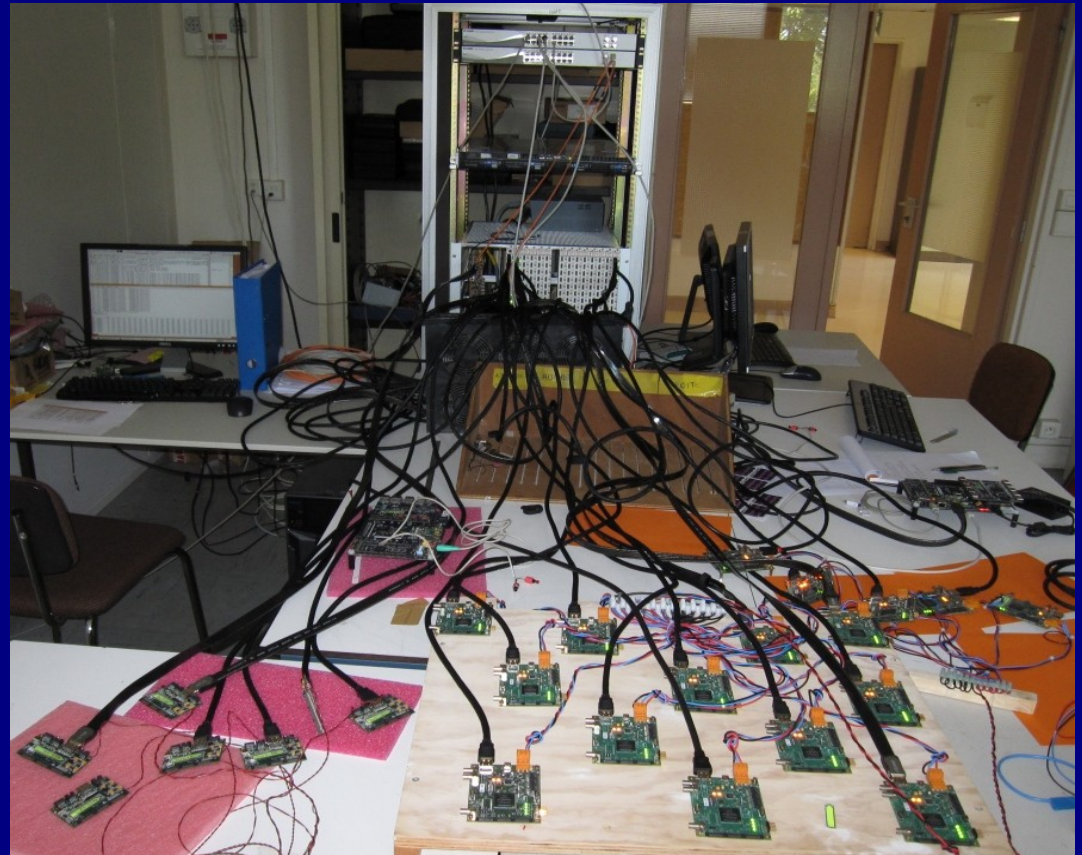
## DAQ, – LLR

See talk by V Boudry

Hardware all available

Firmware now working

More work needed on software side



## Short term plans

First test beam of tech proto

Packaged SPIROC2 chips  
One sensor on FEV7 CIP board  
CALICE DAQ v2

Parasitic running behind SDHCAL this summer

More serious tests @ DESY towards end of this year



## Summary

Mechanical structure well advanced

SKIROC2 available, being tested

Next batch of Hamamatsu sensors expected soon

Front end PCB: planarity issues

Detector integration on track

DAQ (finally!) looks usable

Happy to welcome new collaborators

SKKU, CALICE-JP colleagues, LPNHE/Jussieu