

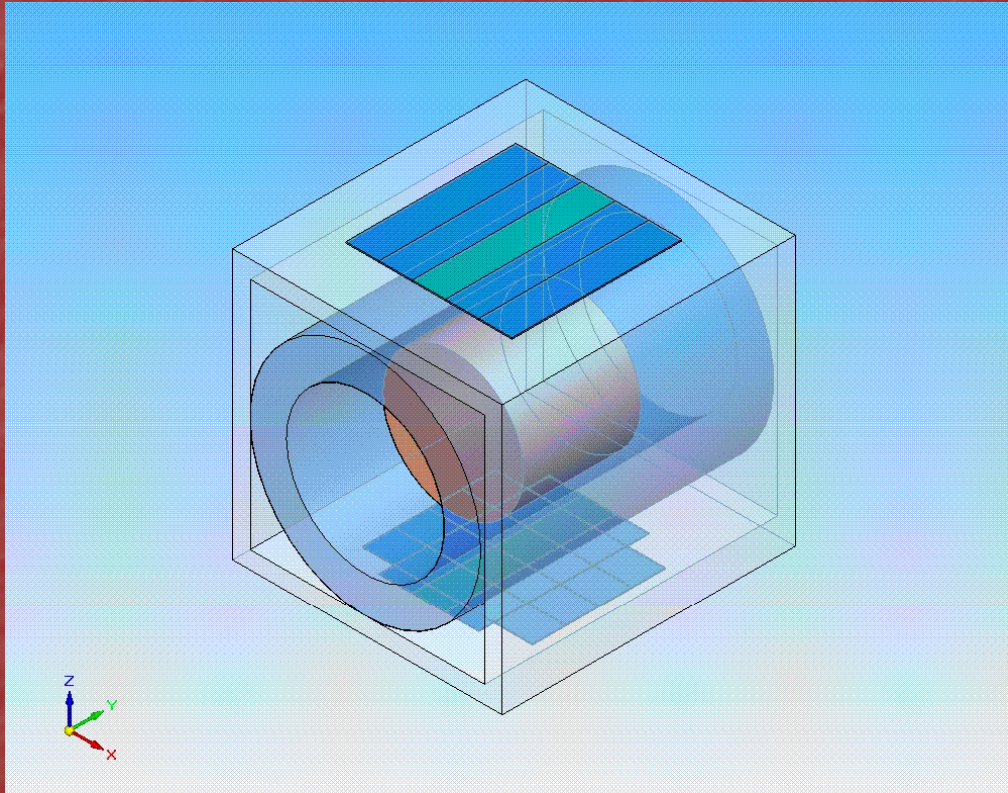


The cosmic trigger for the Large Prototype

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Kudenko, T. Matsuda, F. Pierre, J.M. Reymond, S. Turnbull

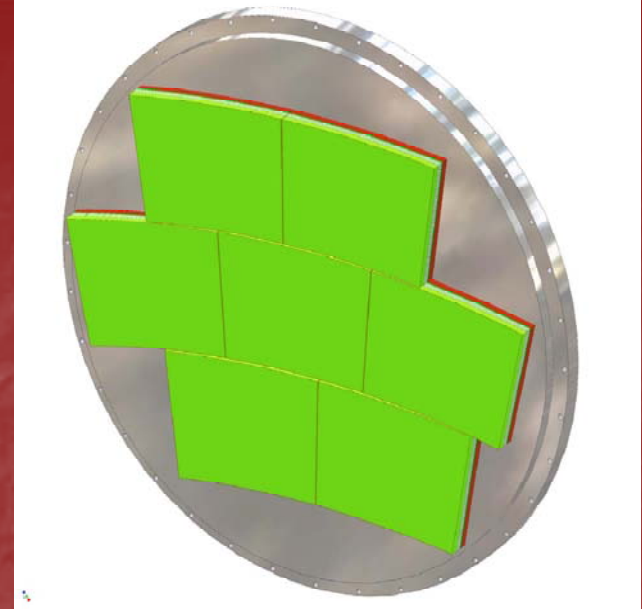
The Large Prototype

5 slabs on top



3 slabs at bottom

+4 perpendicular to limit the triggers to the detector length



Cosmics in March 08
Beam summer 08
7 panels before end 09

Present layout:

12 slabs (+ 3 spare)

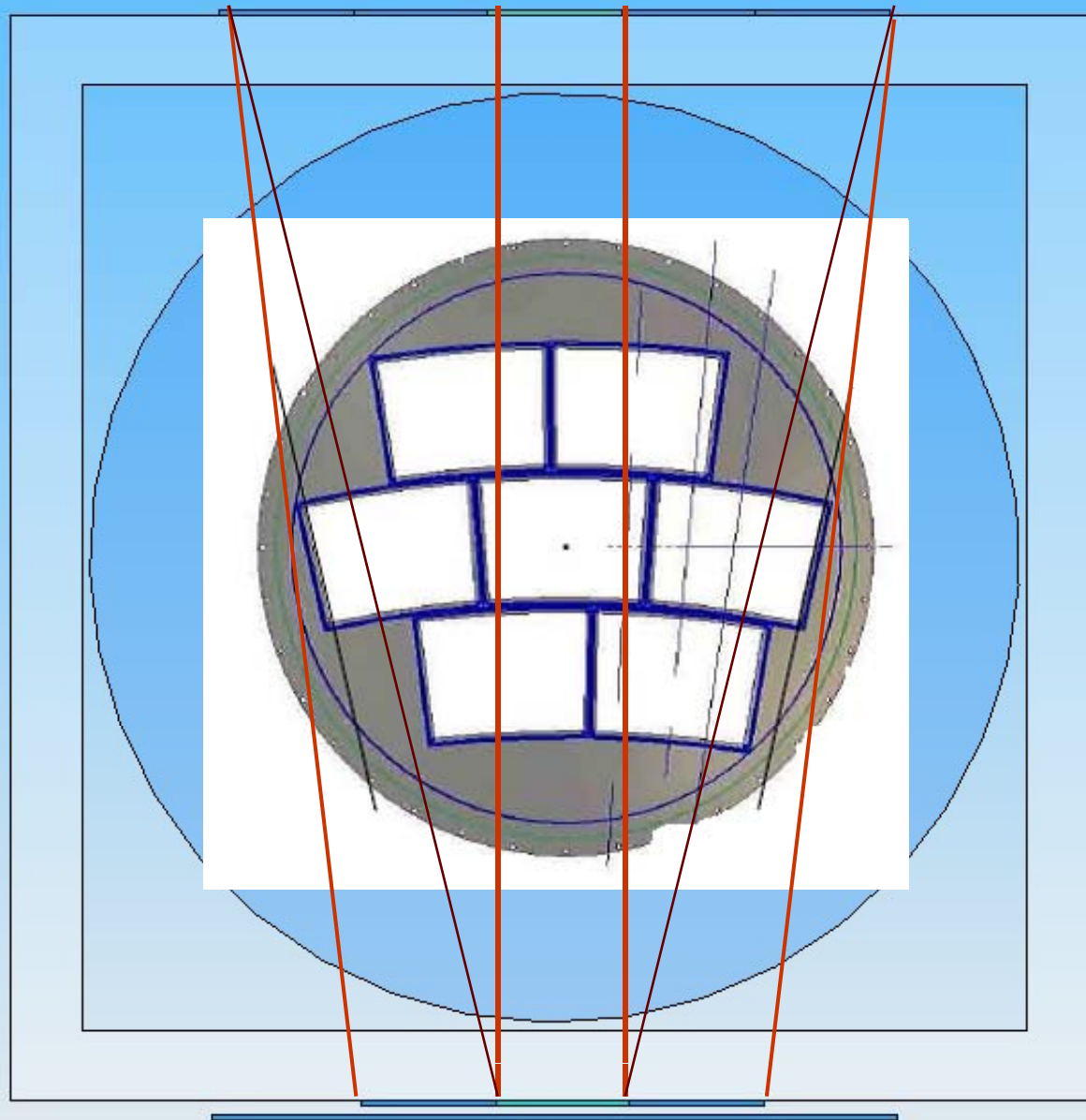
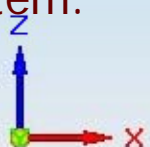
Many possible combinations, for instance:

1 top + 1 bottom
: central region of central panel

3 top + 1 bottom
: radial tracks on central panels

3 top + 3 bottom
: vertical tracks on most of the central region

Requires a 'bridge' to support the magnet and its movement system.



Organization is building-up

- T. Matsuda (KEK) : Coordinator
 - + Y. Kato, H. Kuroiwa : initial tests
- INR Moscow, Y. Kudenko : slab manufacturing
- DESY, K. Dehmelt : on-site installation, crates, trigger logic
- Saclay : readout, wrapping, mechanics
 - PC (scientific coordinator), Th. Chaminade (technical coordinator)
 - J.-M. Reymond (head of the integration lab) : cooling system
 - M. Karolak, M. Riallot, S. Hervé : mechanical design, wrapping
 - S. Turnbull, PC, F. Pierre : tests
- Brussels (G. De Lentdecker, X. Janssen) TLU, logging, interfacing

The trigger has to be in a field of order 0.4 T.

MPPC : multi-pixel photo counters (so-called Silicon PM) produced by Hamamatsu

100 pixels on 1 mm². Each is a Photodiode in Geiger mode

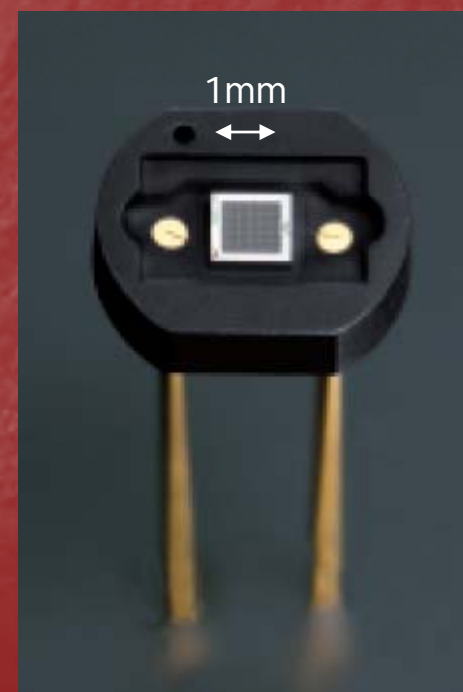
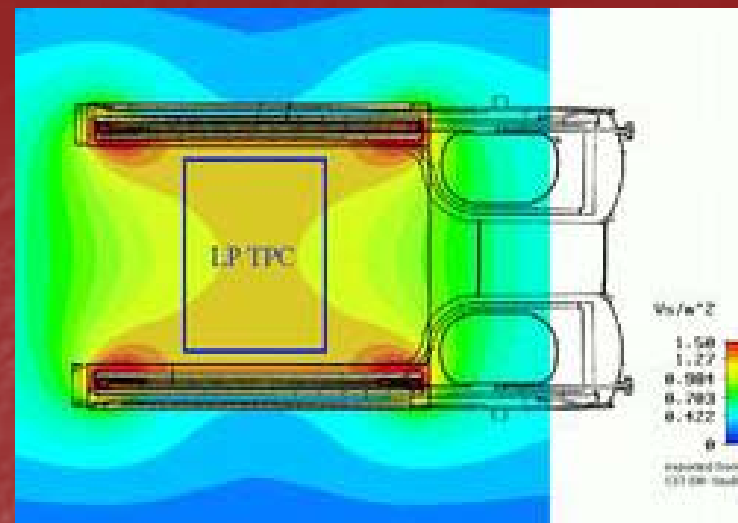
Operation voltage :

$V_{\text{breakdown}}$ + fraction of a Volt

Requires accurate supplies about 70 V. Need to sort the MPPCs in $V_{\text{breakdown}}$ to reduce the number of supplies.

Signal: 3 mV/p.e. (20 p.e. per fiber end, measured by Yuri Kudenko)

Dark counting rate and V_{bkd} sensitive to temperature : needs good temperature control: Peltier devices + thermistances+controler



SLABS (INR MOSCOW)

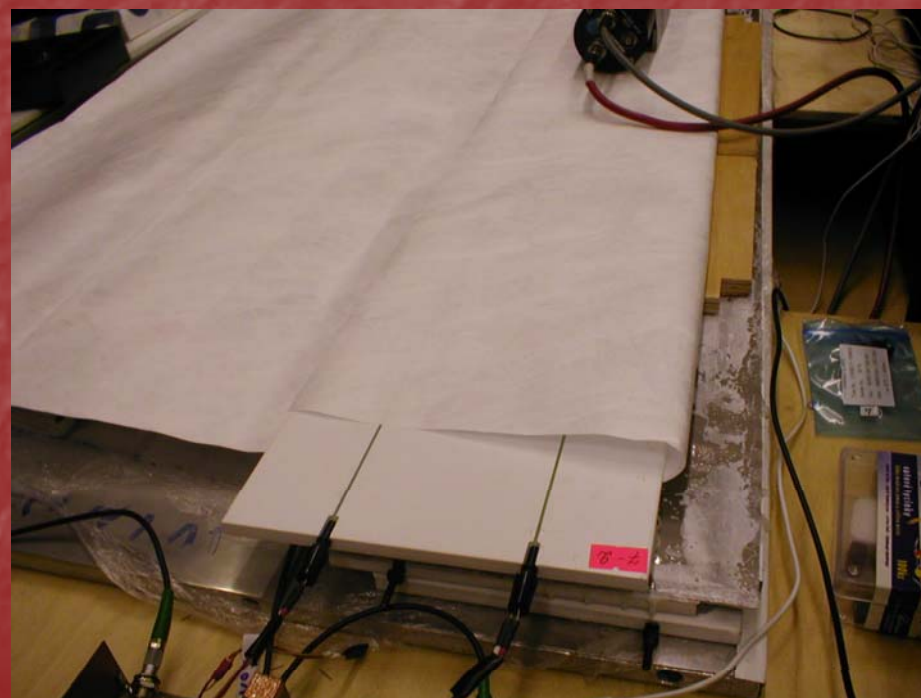


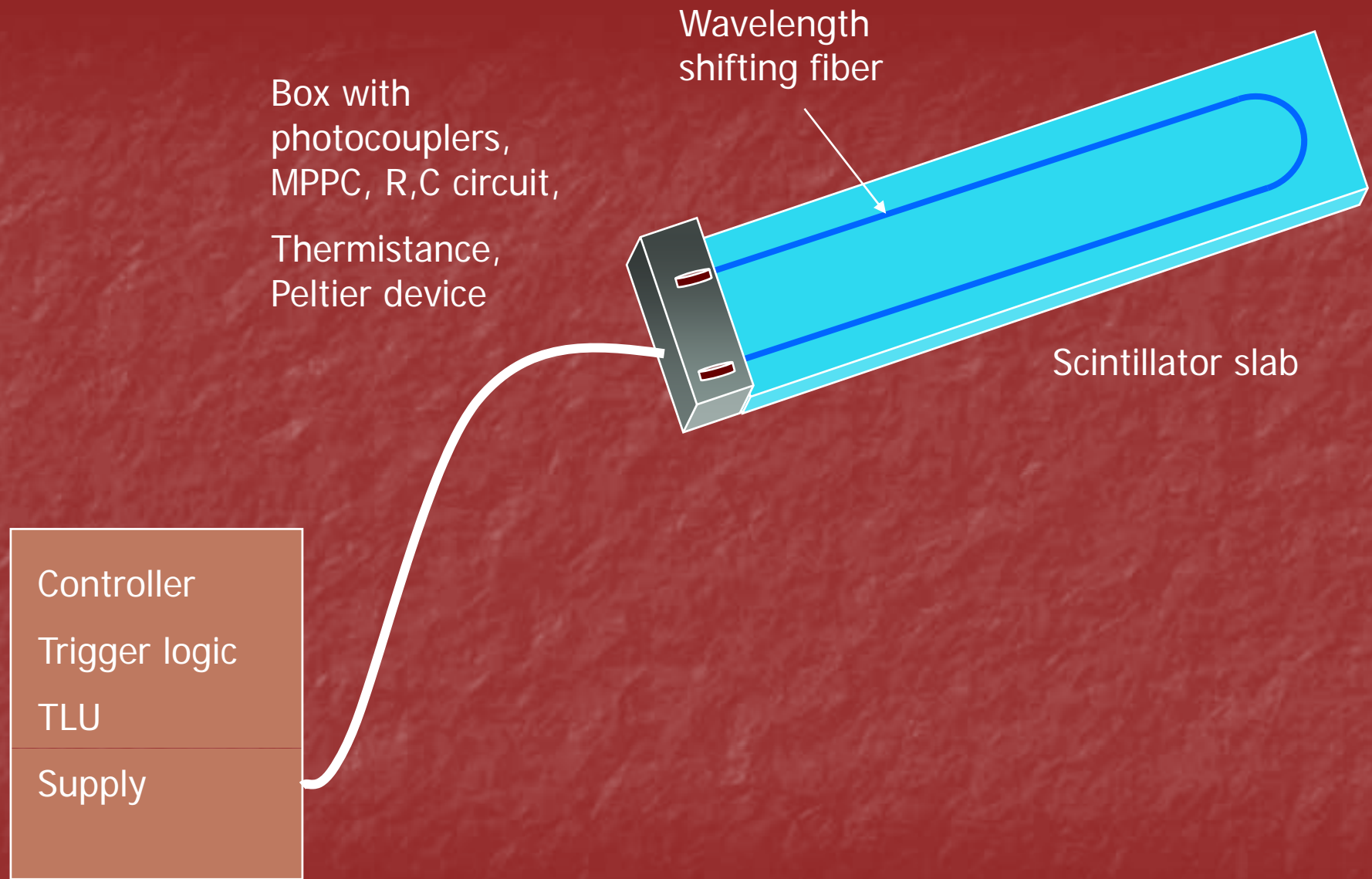
New design (wrt T2K SMRD) : U-shape groove

Extrusion and machining done (width 167mm)

light output measured : 19-20
each end

Shipping to Saclay scheduled for
next week

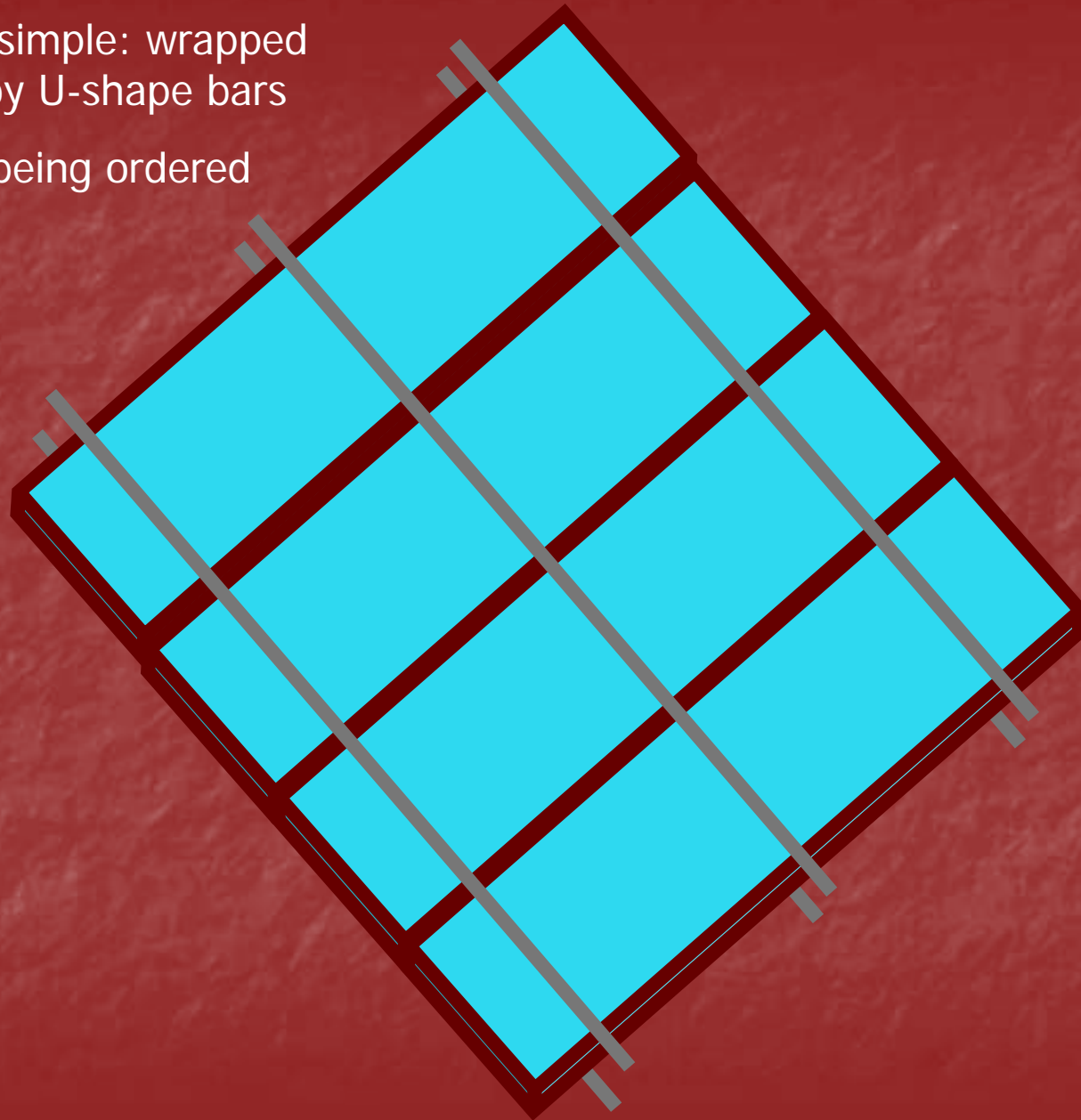




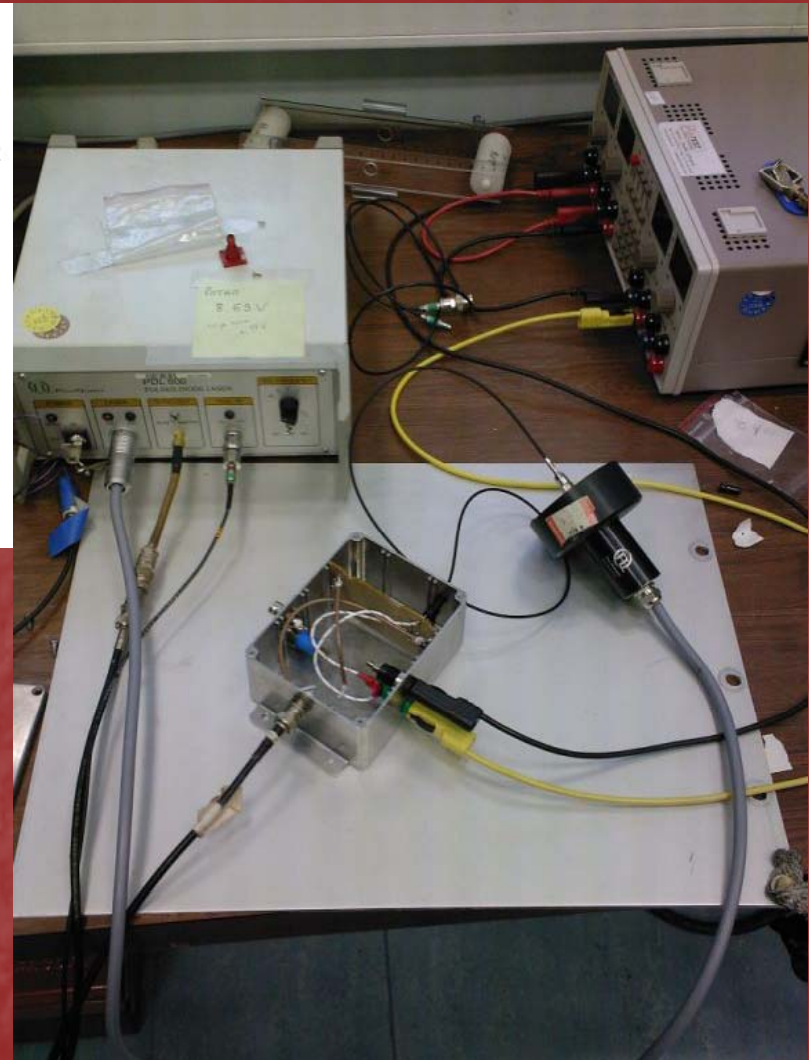
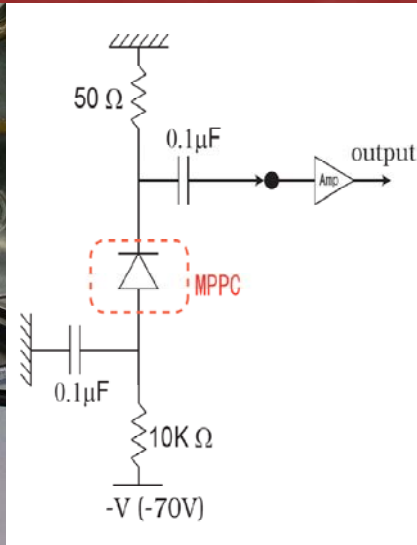
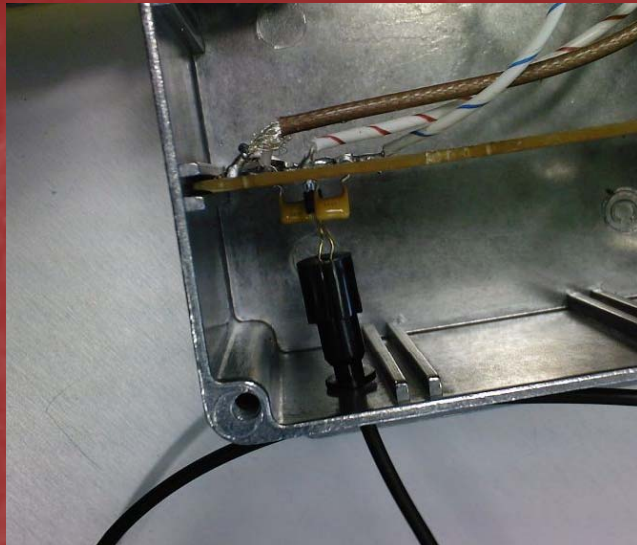
Temperature control: Jean-Marc Reymond

Mechanics can be simple: wrapped
slabs maintained by U-shape bars

Al-mylar reflector being ordered



First step : hands on MPPC



- Testbox assembled
- Amplifiers (phillips?) to be decided
- 100 V Supply selected : Voltcraft precision PS PPS 12008 (400 € each), ready to order 4.
- Thanks to many advices (J-Ch Vannel, Erika Garutti, Japanese)

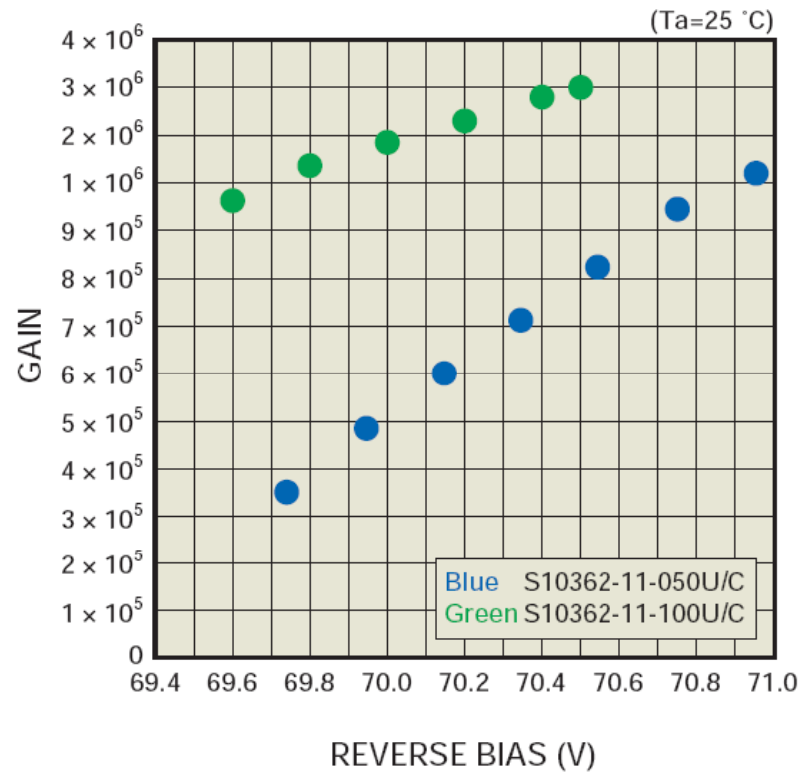
Readout and thermal regulation box design

- 3 parts top, bottom parallel, bottom perpendicular.
- In each box: thermistance, peltier device
- In a central place : controler
- Design mechanics, system, cables
- Light-tightness vs accessibility
- Visit to DESY with Klaus Dehmelt before mid-February

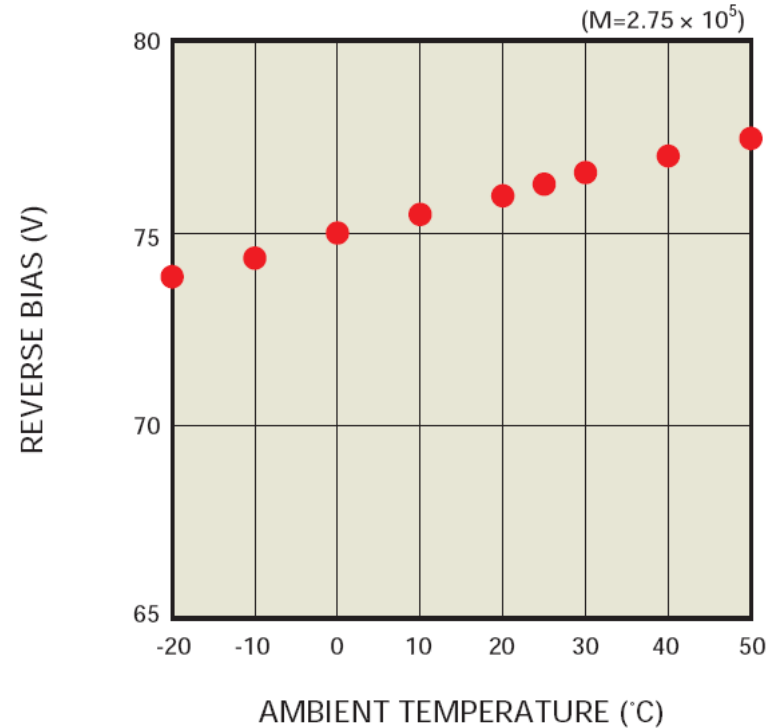
Conclusion and plans

- Need a robust system: temperature control
- Slabs delivered next week (tbc)
- Wrapping in Saclay 2 weeks after
- Installation in March
- Connexion to DAQ in March

(b) S10362-11-050U/C, S10362-11-100U/C



[Figure 7] Reverse bias vs. ambient temperature
(a) S10362-11-025U/C



The gain depends on V_{bias} , and $V_{\text{breakdown}}$ depends on the temperature

Requires both a stable and precise supply and a controlled temperature.

[Figure 11] Dark count vs. ambient temperature
(a) S10362-11-025U/C

