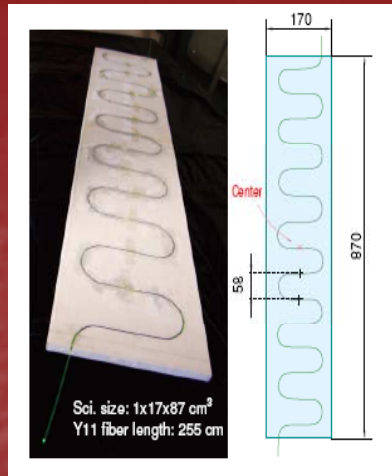




The cosmic trigger for the Large Prototype

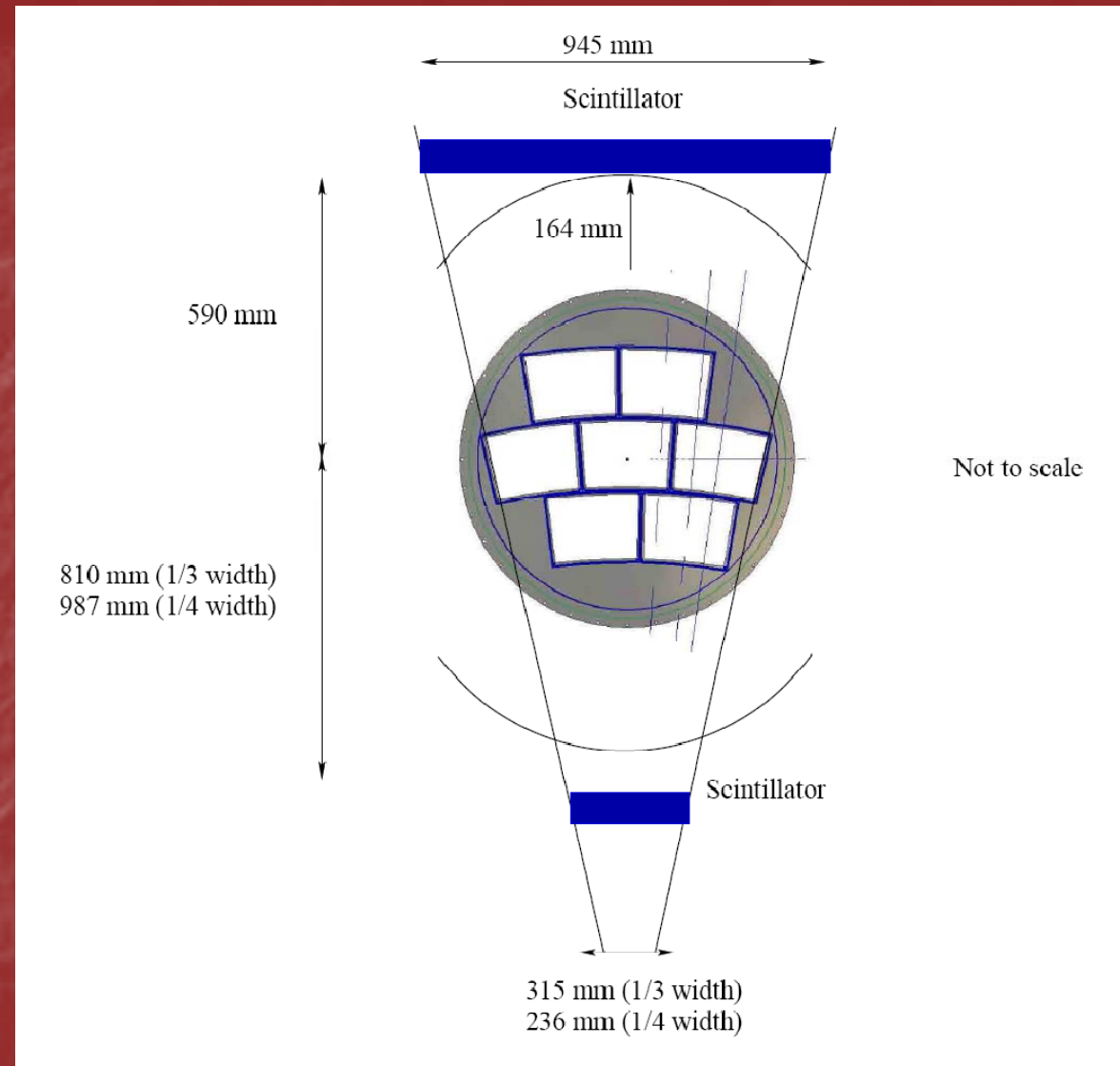
P. Colas, K. Dehmelt, G. De Lentdecker, X. Janssen, Y. Kato,
H. Kuroiwa, Y. Kudenko, T. Matsuda, J.M. Reymond



Suggestion (by Takeshi Matsuda and Dean Karlen)

Use MPPC and scintillating slabs from T2K/SMRD

Face-to-face meeting on October 11 in Orsay allowed revisiting the layout and plans



K. Dehlnet

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

100x100 pixels on 1mm² each is a Photodiode in Geiger mode

Operation voltage :

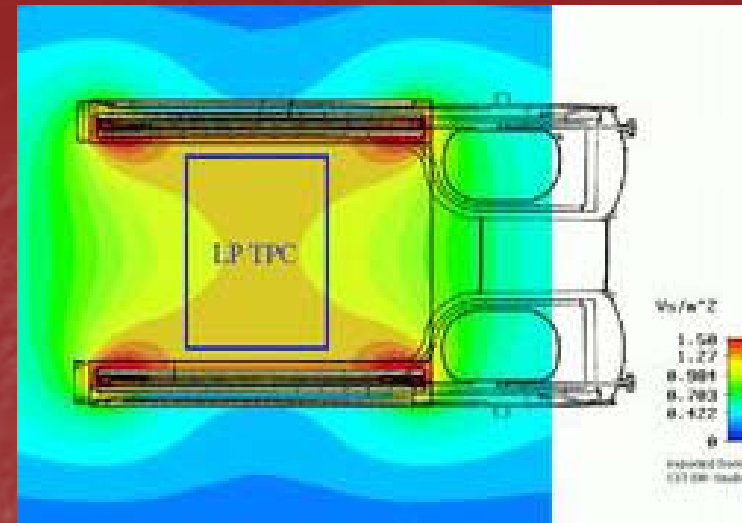
$V_{\text{breakdown}}$ + fraction of a Volt

Requires accurate supplies about 70 V. Need to sort the MPPCs in

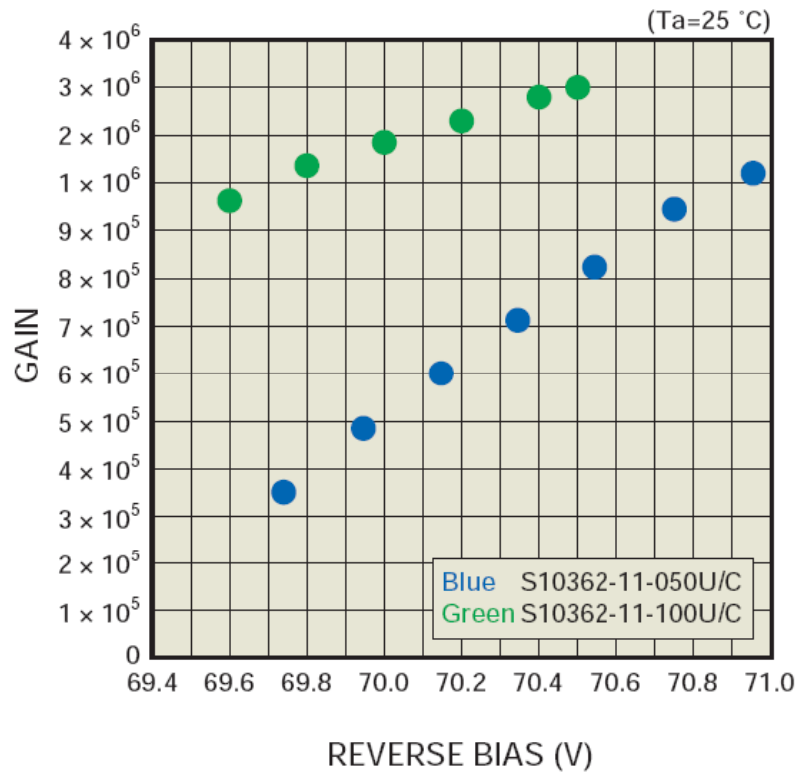
$V_{\text{breakdown}}$ to reduce the number of supplies.

Signal: 3 mV/p.e. (10-20 p.e.)

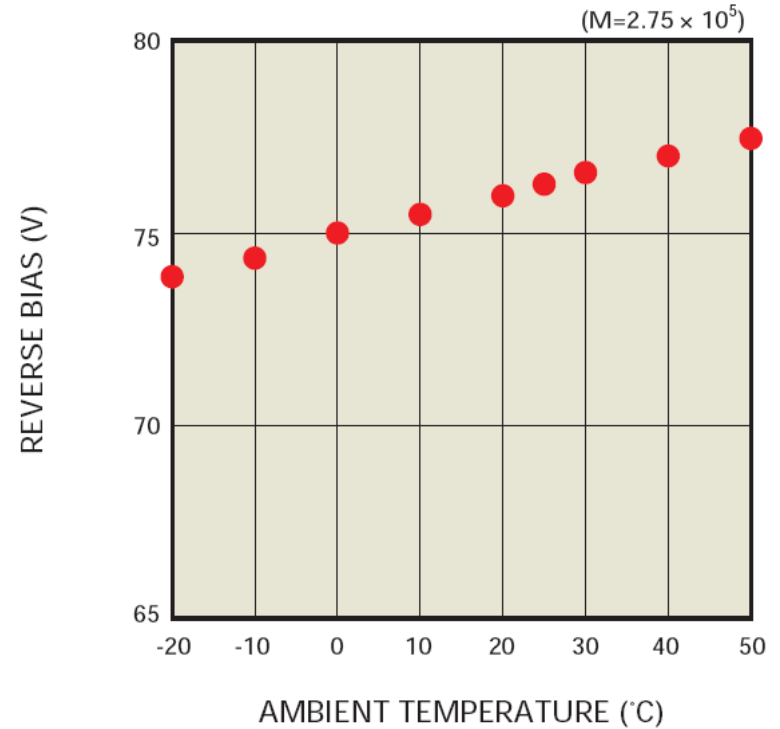
Dark counting rate and V_{bkd} sensitive to temperature : needs good temperature control: Peltier devices + thermo.



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



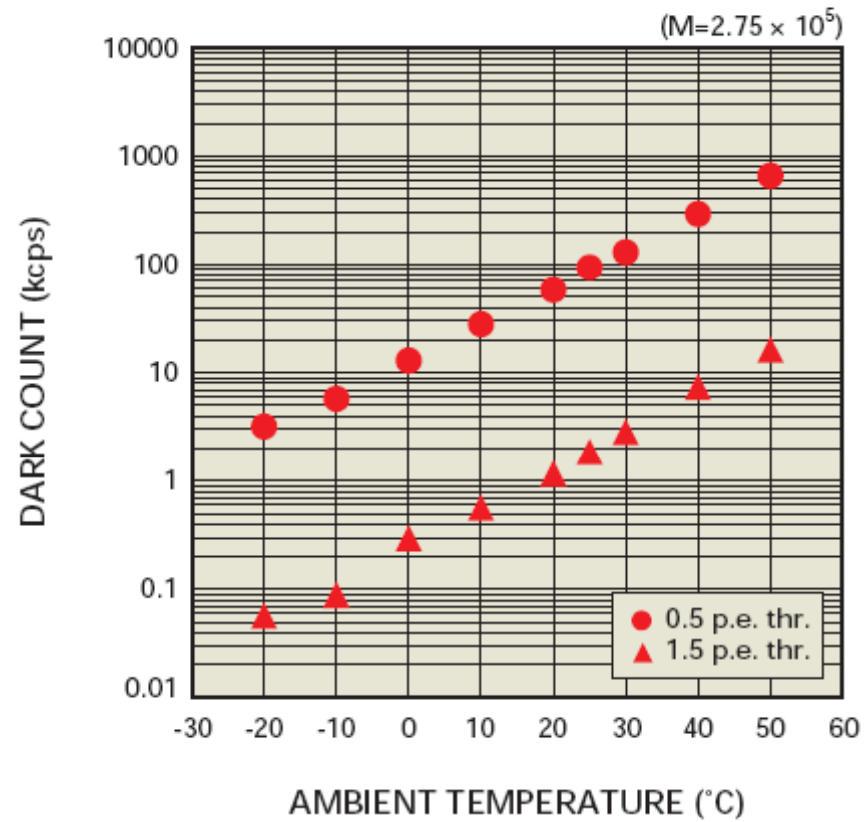
[Figure 7] Reverse bias vs. ambient temperature
(a) S10362-11-025U/C

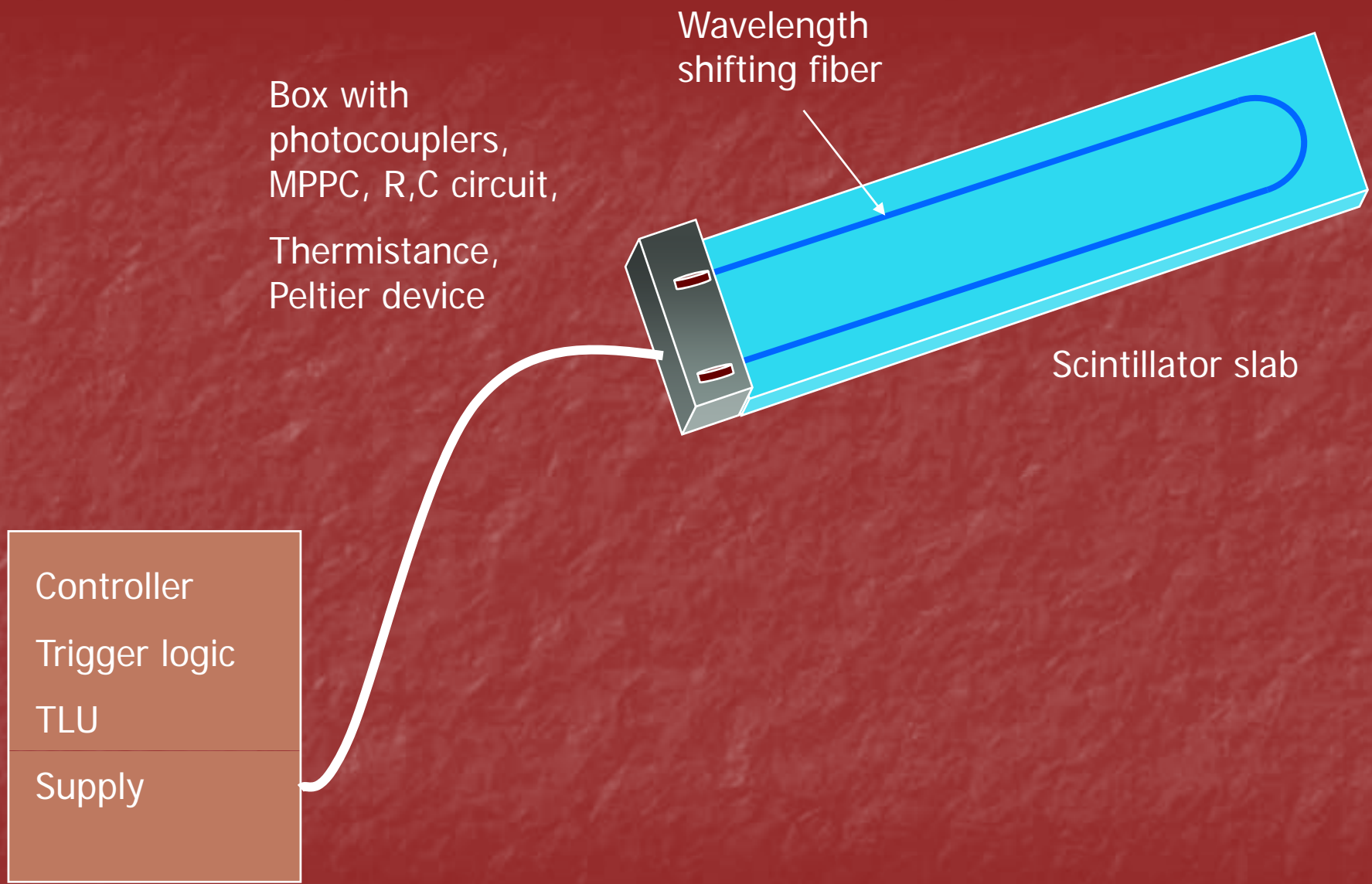


The gain depends on V bias, and $V_{breakdown}$ depends on the temperature

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

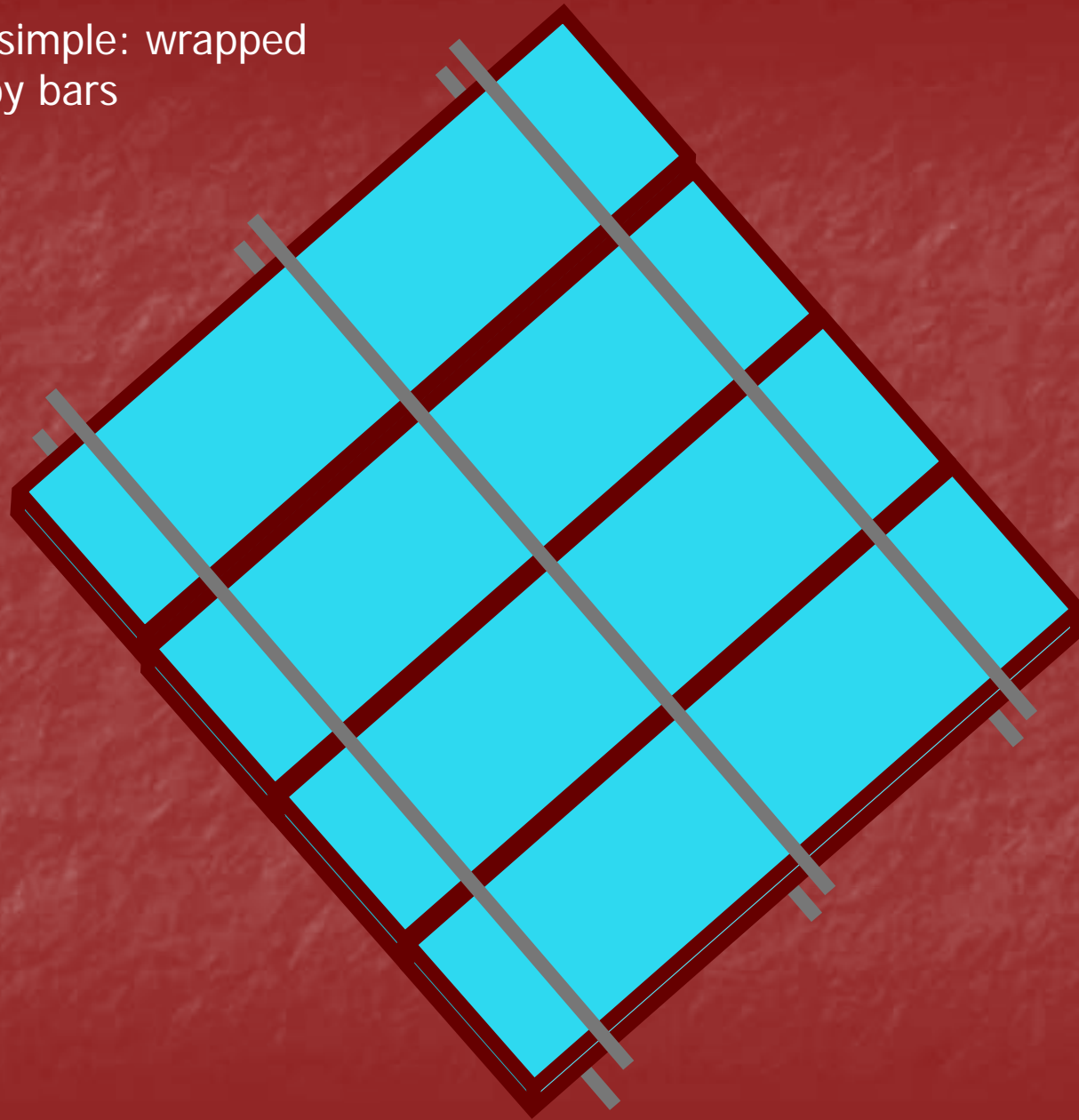
[Figure 11] Dark count vs. ambient temperature –
(a) S10362-11-025U/C





Temperature control: Jean-Marc Reymond

Mechanics can be simple: wrapped
slabs maintained by bars



5 slabs on top

Present layout:

12 slabs (+ 3 spare)

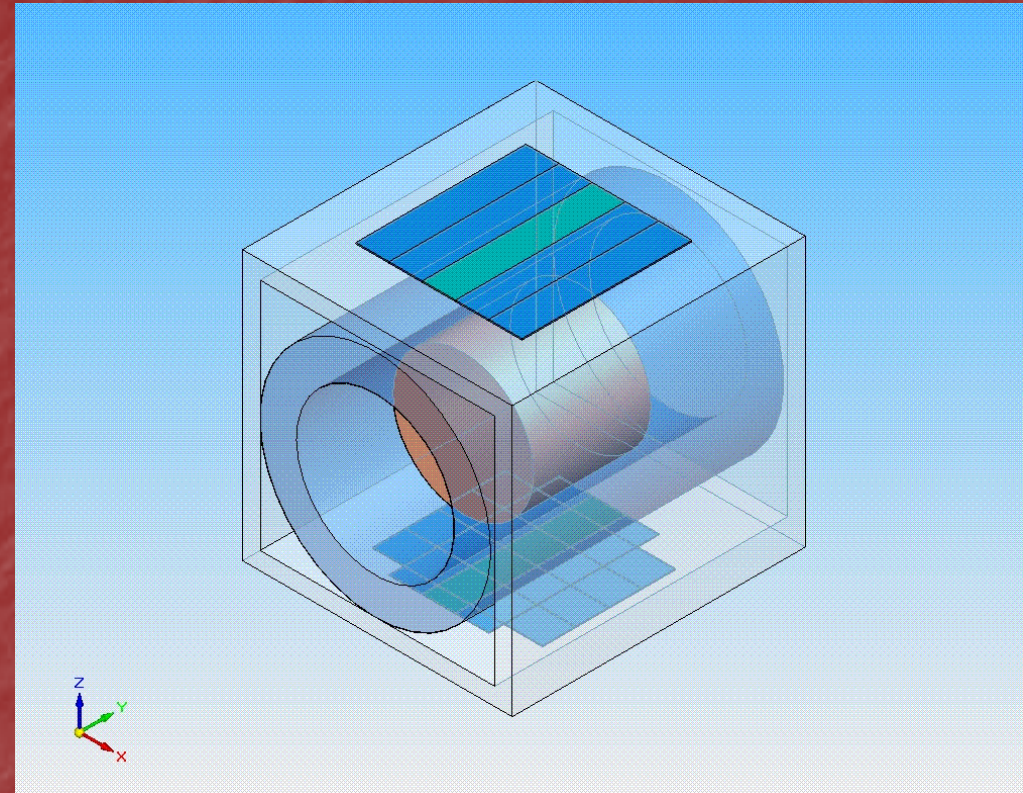
Many possible combinations, for instance:

1 top + 1 bottom : central region of central panel

3 top + 1 bottom : radial tracks on central panels

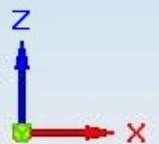
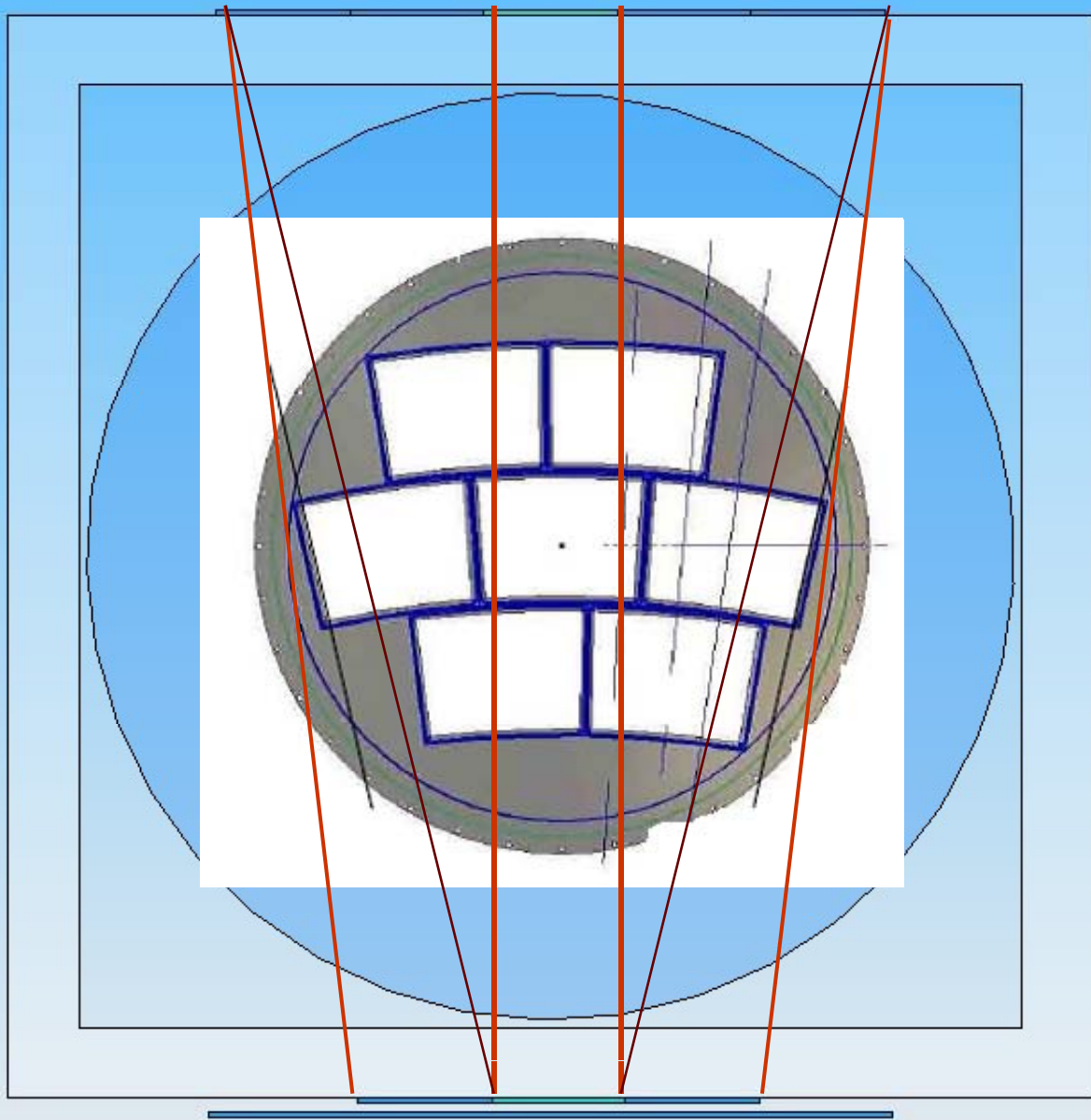
3 top + 3 bottom : vertical tracks on most of the central region

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



3 slabs at bottom

+4 perpendicular to limit the triggers to the detector length



Conclusion and plans

- Need a robust system: temperature control
- Characterize MPPC, study supplies, assess need for amplifiers (KEK, Kinki, Saclay) until mid-November. Finalize design.
- Slabs delivered from mid-December to mid-January
- Wrapping in Saclay 2 weeks after
- Installation in February
- Connexion to DAQ in February