TB update from June TB and organization for 2010

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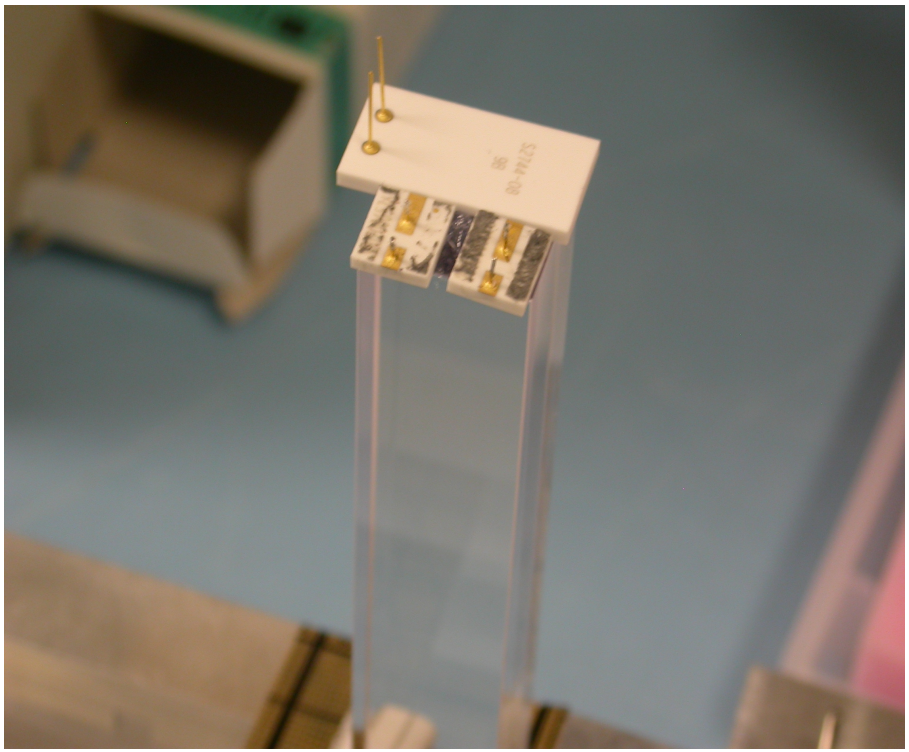
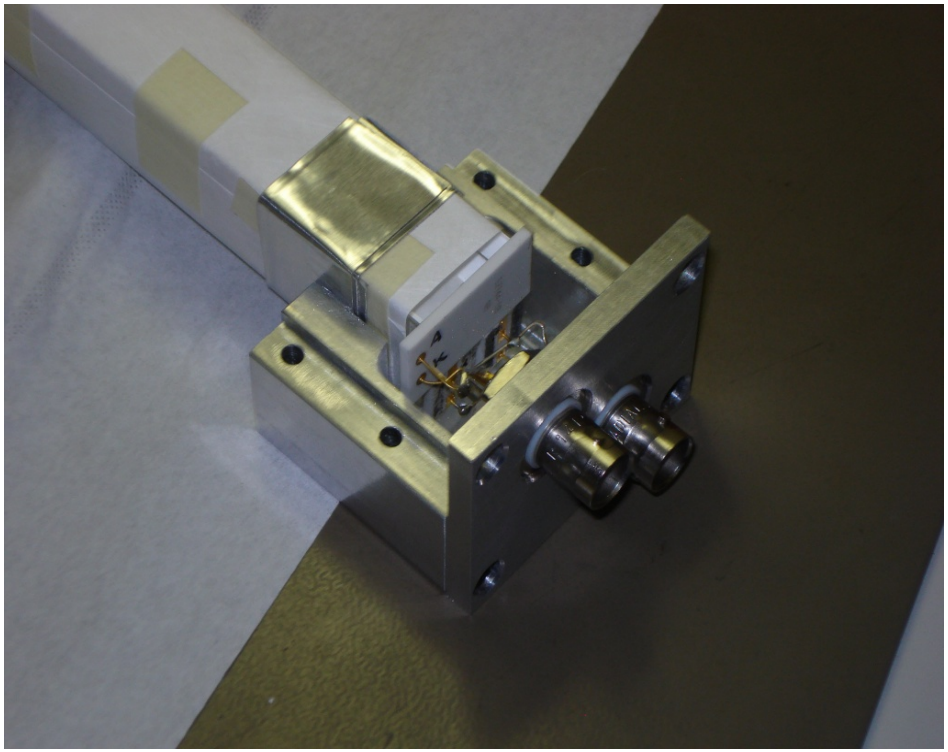
Beam Test

1 LYSO crystal (2x2x20cm) is read by two different sensors

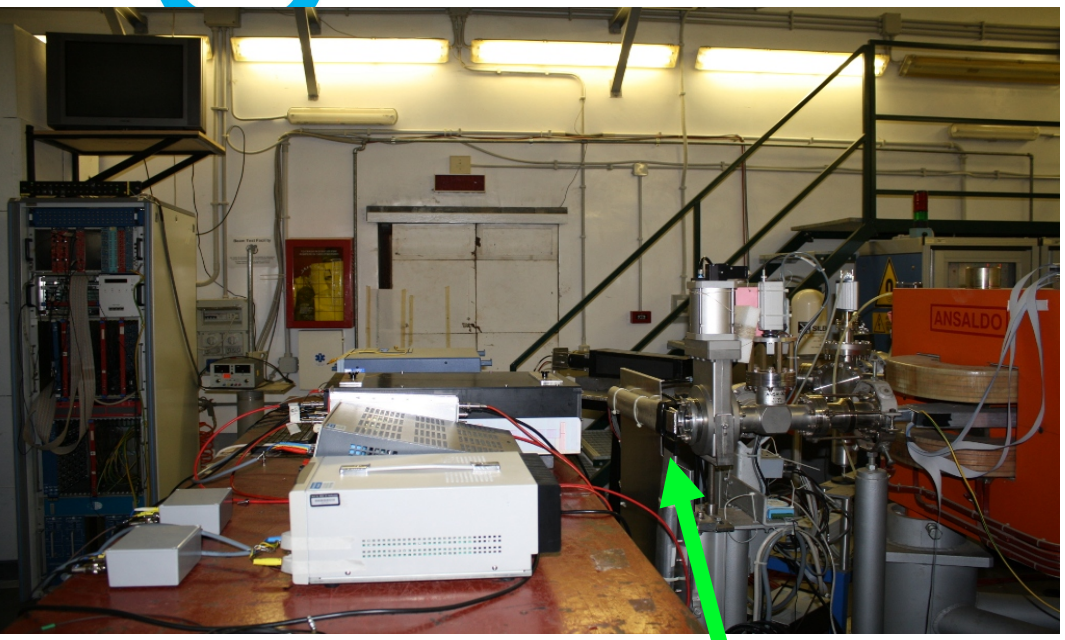
- 1 Photodiode PiN Hamamatsu S2744-08 (1x2cm)
- 2 APD Hamamatsu S8664-55 (0.5x0.5cm each)
- same APD used by CMS

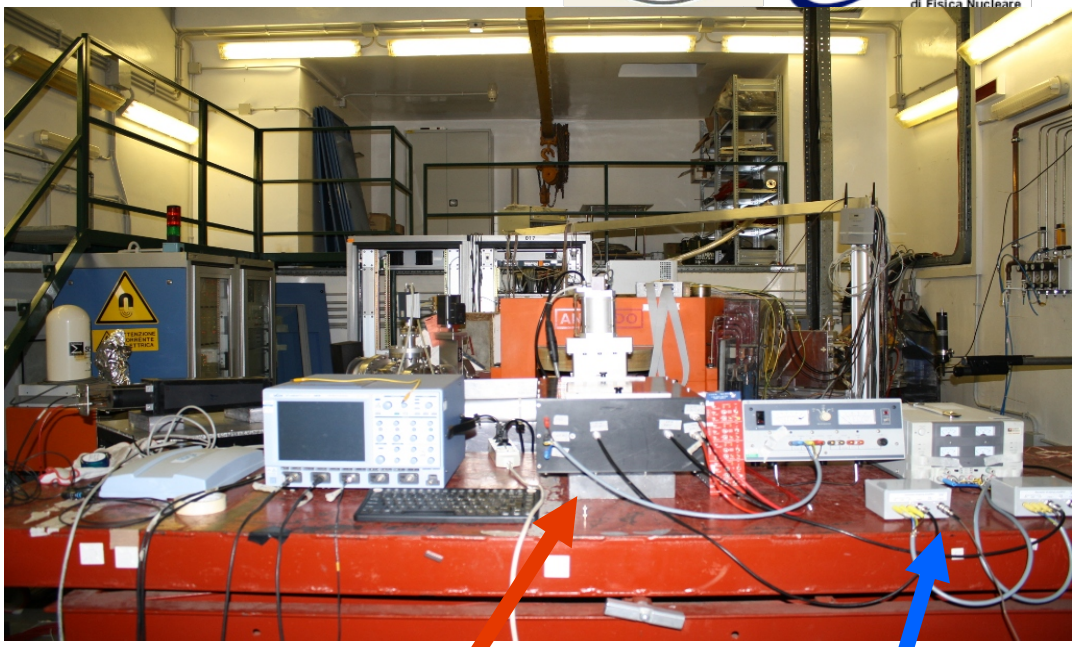




This crystal was also tested with PMT and Na22 source

Beam Test Configuration





Beam Estraction

Crystal Black Box

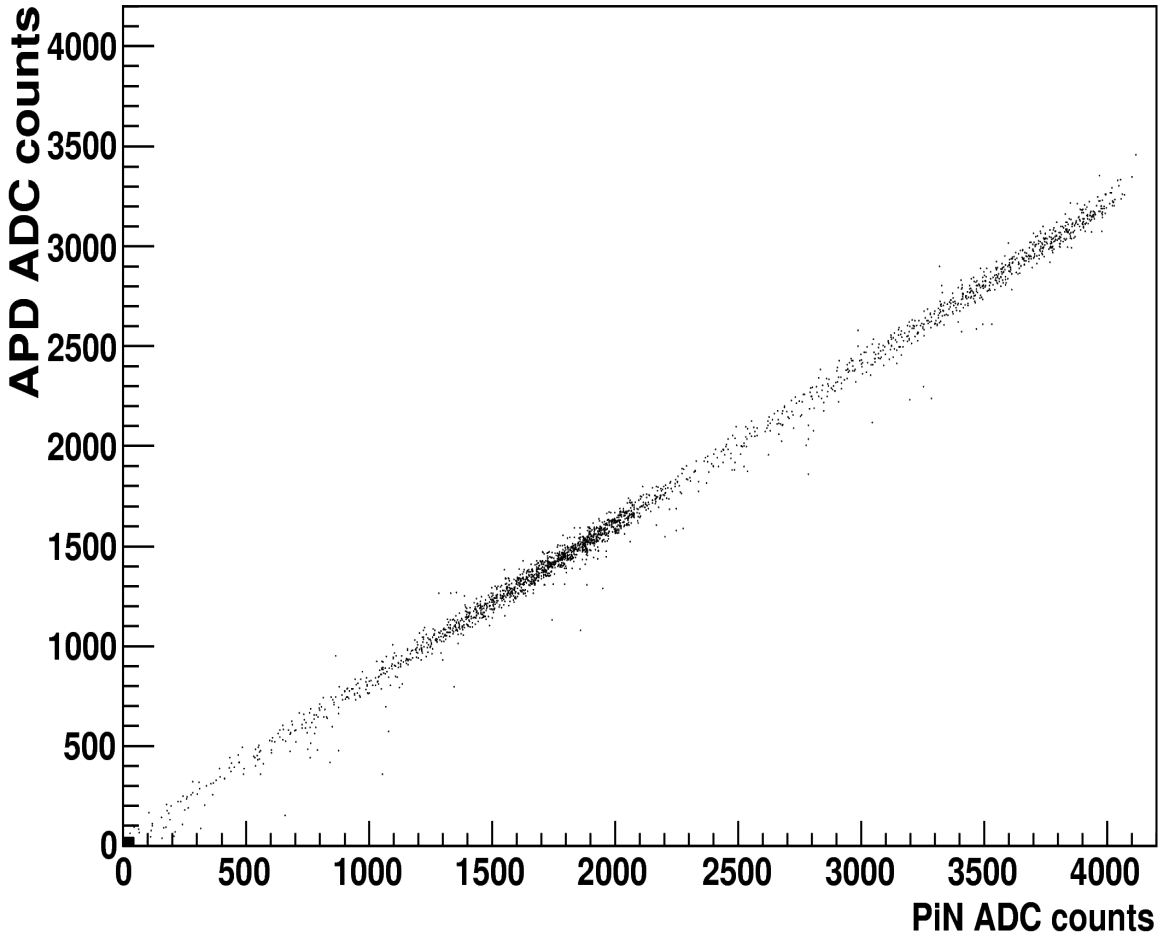
Shapers

Caratteristiche Frascati Beam Test Facility

Energy Range	50-500 MeV e-/e+
Max. Repetition Rate	50 Hz
Pulse Duration	1-10 ns
Particles/Pulse	1 to 10^{10} particles

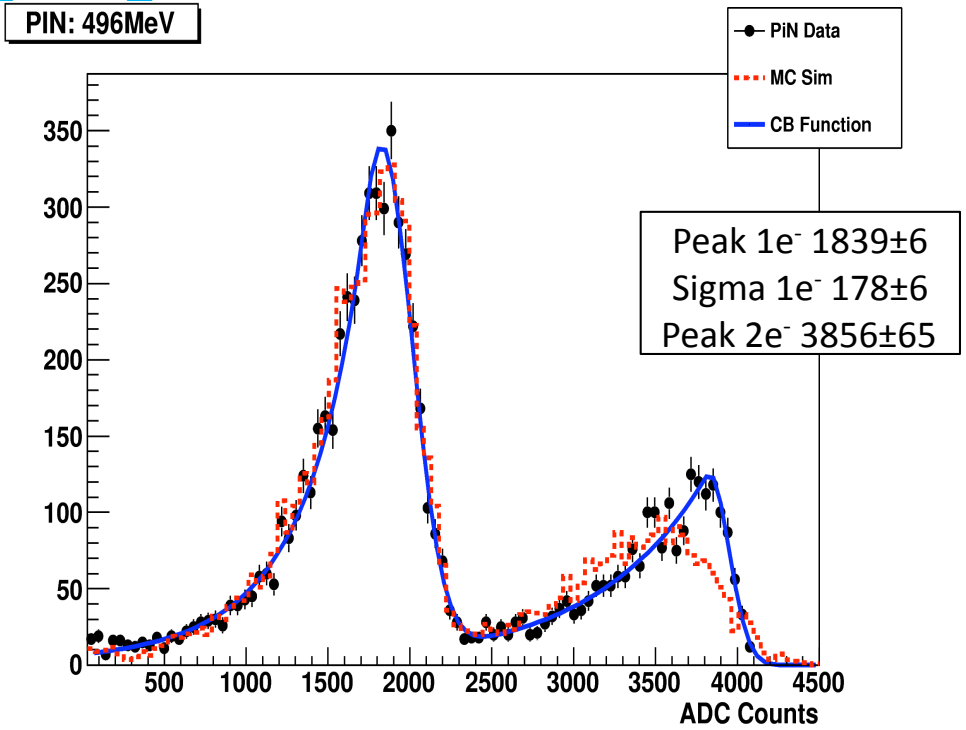
Energy Scan

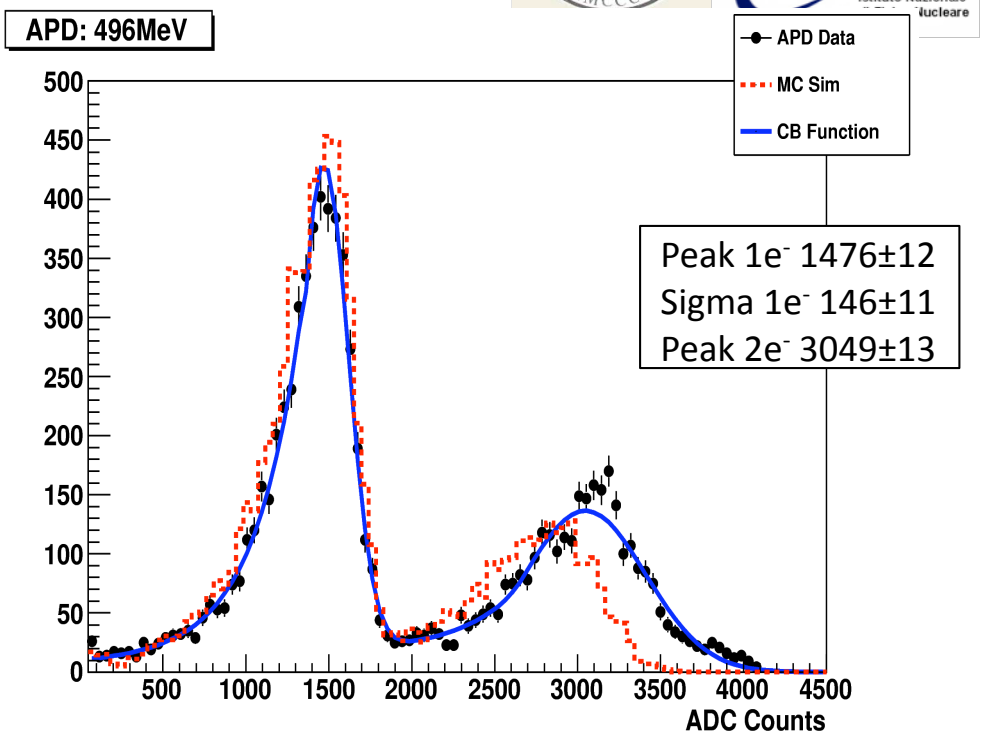
PiN vs APD 496MeV



There is a perfect correlation between PiN and APD response (sensors are seeing the same amount of light)

Energy Scan





- one e- and two e- peaks are evident
- fits are made with the sum of two CrystalBall function
- beam position is measured by a fibrometer (resolution ~cm)

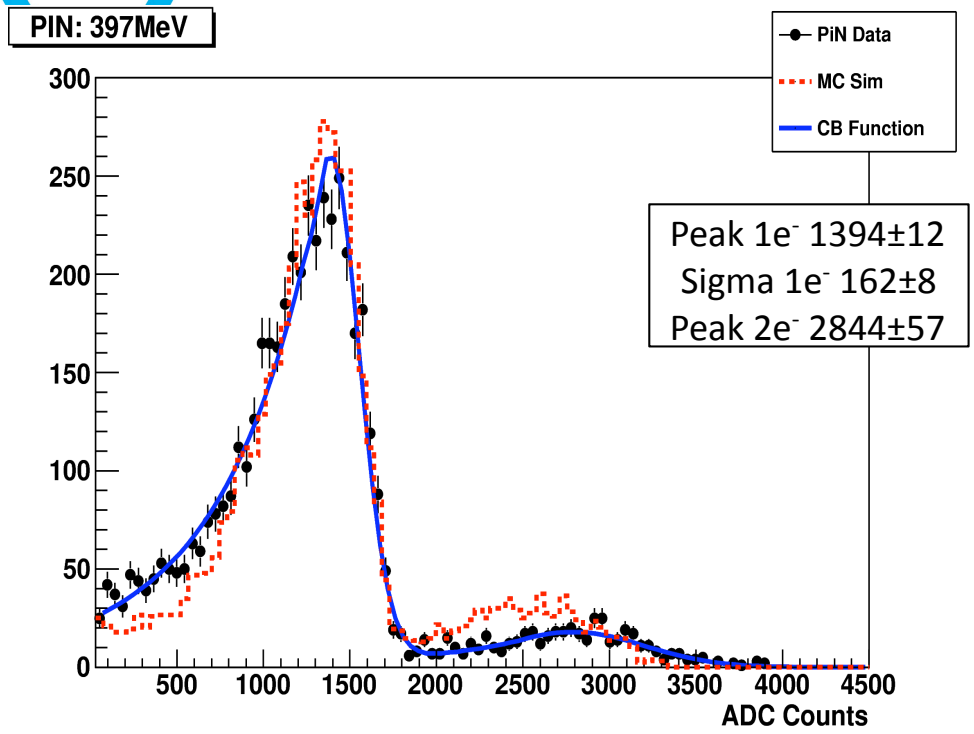
- MC simulation parameters:

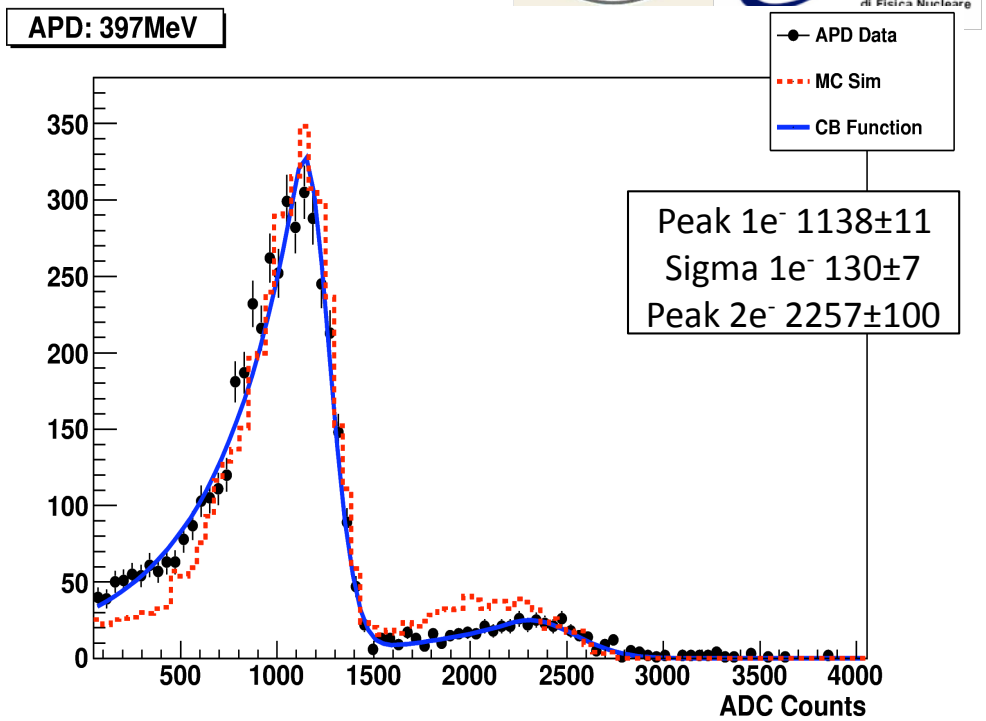
Beam Dimention : $\sigma_x = 7.5mm \quad \sigma_y = 2mm$

Divergence: $\sigma_{div} = 2mrad$

Offset: $\delta_x = \delta_y = 5mm$

Energy Scan





beam composition (1e-/2e- ratio), position and divergence change with energy

MC simulation parameters:

Beam Dimention :

$$\sigma_x = 13.2mm \quad \sigma_y = 2mm$$

Divergence:

$$\sigma_{div} = 2.5mrad$$

Offset:

$$\delta_x = \delta_y = 6mm$$

It is very important to measure the beam parameters
The fibrometer has not enough resolution

For April TB the idea would be to use a telescope of silicon sensors (P. Lubrano)

BT@BTF scheduled from April 12 to May 2nd 2010

BT@CERN (high energy) we need to ask for beam time as soon as possible, the schedule is very crowded, choose a period during this meeting

April BT at BTF

Put under test matrix of 5x5 LYSO crystals + external ring of CsI crystals (CLEO)

Crystal procurement:

-8 crystals ordered at St. Gobain by INFN

-4 to be ordered by INFN (we asked for an offer, to be ordered before end 2009)

-13 will be ordered by Caltech

- finalizing dimensions → done
- CsI crystals for the external ring available @Caltech

Electronics: 2 options

1) Rome and Perugia are working on a new readout with PD → some channels ready for the BT
2) Caltech has 50 channels available with APD's + CMS DAQ

Mechanics:

-Carbon fiber or glass fiber structure

- CAD drawing of the structure by June (INFN) → done
- visiting producer beginning of July → done
- production start end October

Simulation: available, tested and running

Conclusions

- Study of 1 crystal at BTF in June has been very useful to test the facility and understand what is needed for April.
- Analysis and MC comparison shows that results are as expected in terms of signal from APD and PiN and linearity.
- Beam has to be monitored with some instrumentation not available at the BTF, but we can have something ready for April (telescope of silicon sensors)
- The rest is in place or is on the way to be in place for April
- Dates for BT@CERN should be decided asap