

Target Status and Plans

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PADME Collaboration meeting 1-2 March 2016

Overview

- 1. Study of diamond detector in Lecce**
- 2. July 2016 testbeam**
- 3. Mechanics**
- 4. Items to do**

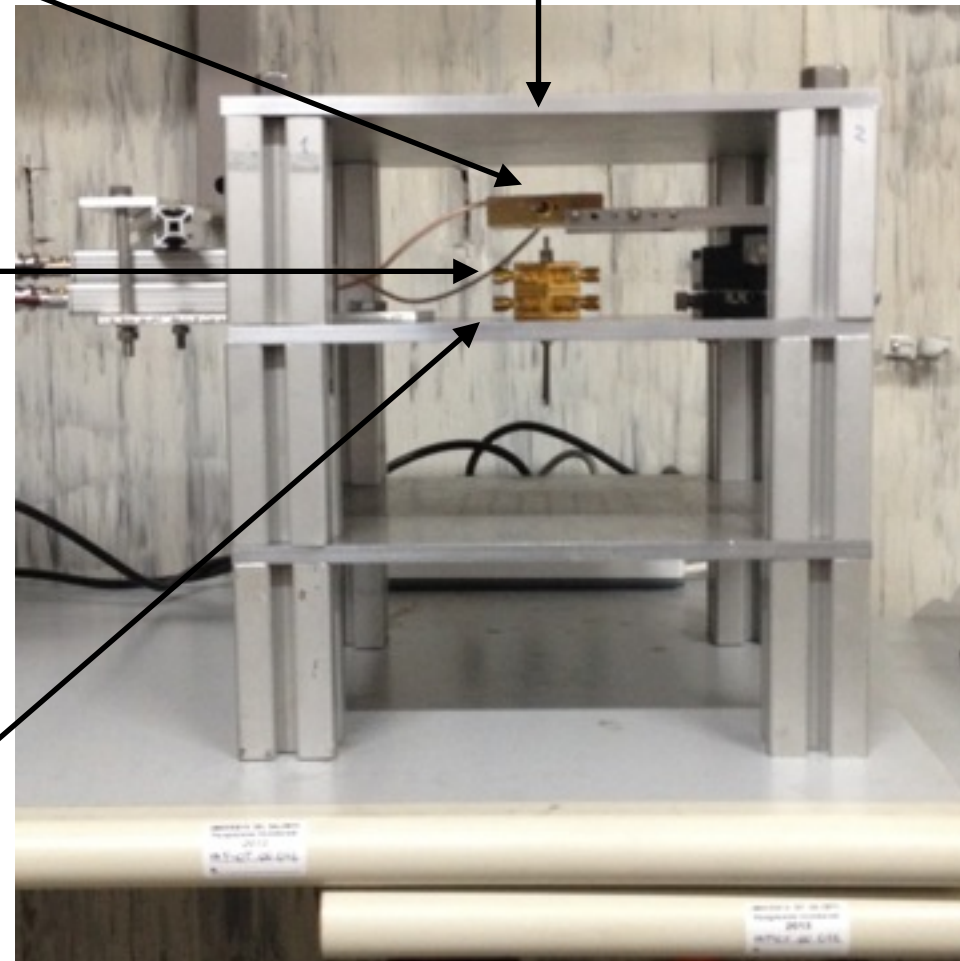
Study diamond detector in Lecce

Device under
test xy
movement

Radioactive Source
holder and hole

4 strips
Single
crystal
diamond

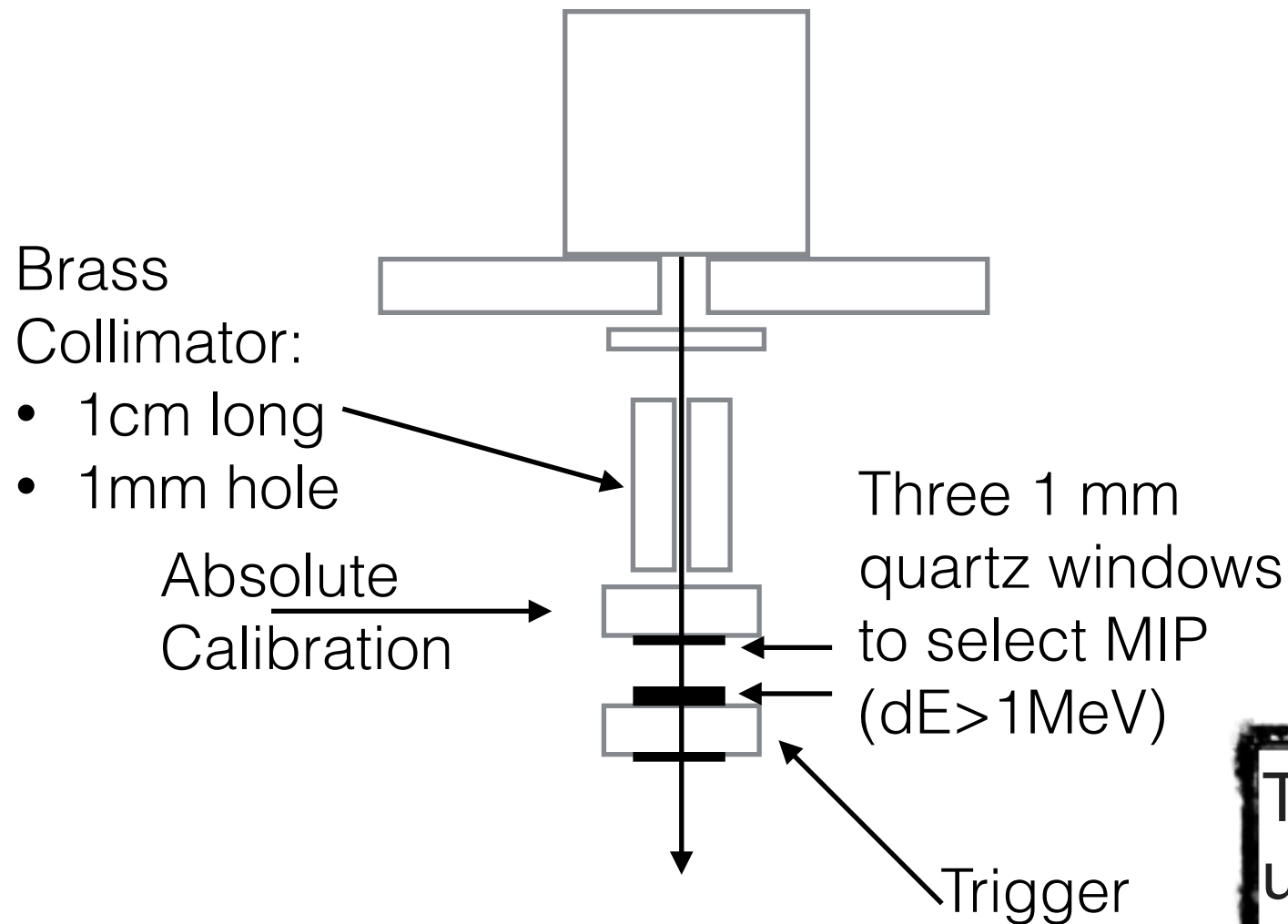
4 strips
Poly
crystal
diamond



Alpha and beta sources

Beta-Sr90

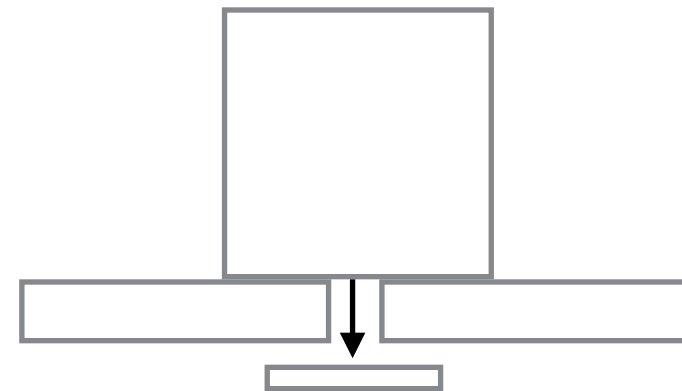
2.28 MeV end point



- MIP as BTF .
- Signal= (ccd=10um)x36e-/um=360e-h
- FE Noise =1000 e-
- Trigger + oscilloscope average

Alpha-Am241

5.48 MeV



- Penetration depth about 12 um
- Signal=5.48 MeV / 13.6 eV = 403,000 e-h >> FE noise
- Self-trigger

The goal is to measure detector uniformity:

- Beta source mimics BTF with 1 e- multiplicity but $S/N \ll 1$
- Alpha source $S/N \gg 1$ but stop in the sensor

Next testbeam

- Skip April TB to concentrate efforts in July TB
- We want to test a real padme target for July TB:
 - Real size sensors
 - All channels interconnected and in the readout
 - Final PC-board

Next Sensors

For June 2016 we would like to:

1. Fabricate a graphitized sensor in Lecce $2 \times 2 \times 0.01 \text{ cm}^3$ with final geometry: 19X+19Y strips, 1 mm pitch, 100 μm gap, 19 mm long.
2. Buy same size and geometry Cr(50nm)Au(200nm) metallized sensor from AppliedDiamond as reference and back-up solution.

Front-end electronics

We have 17 Charge Sensitive Amplifiers and 15 RF Amplifiers from civedec.

We have to look for others 6 Amplifiers

Wait before to buy an other 10CSA+10RF civedec box

We need on-board electronics for smaller envelope and/or better S/N?

Mechanics

- We have to organize a meeting between Lecce and Frascati mechanical and vacuum experts to define a baseline design and proceed with the purchases.
- Realize a first mechanical prototype.
- Learn how to vacuum seal PC-board and flange.
- Vacuum test to study outgassing from sensor and pcb.
- This must be done before July 2016 testbeam

Items to do

- Diamond interconnection on pc-board
- Space for diamond target, mechanics, cable, service.
- Detector service and control system
- Full carbon target production protocol (safety compliant)
- Target handling procedure
- Target characterisation
- Target documentation, database, webpages