

Status of the Diamond Target

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PADME Collaboration meeting 29 Oct 2015

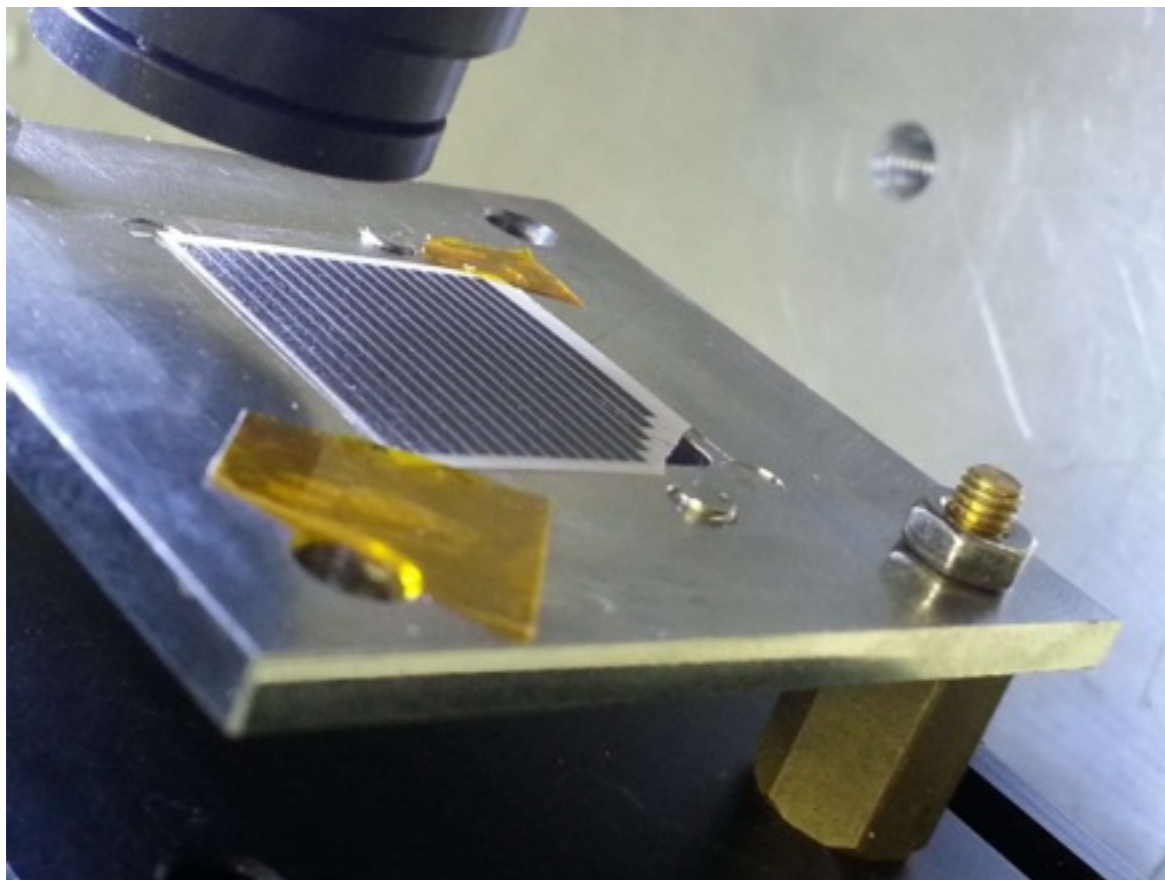
Sensor procurement

- **Two 2x2x0.0050 cm³ diamonds in June 2014**
 - First broken in four pieces opening the gel pack. One pieces used in Nov. 2014 tesbeam.
 - Second broken a corner opening the gel pack. 18X+18Y strip sensor graphitized in Sep-Oct 2015 for Nov. 2015 testbeam
- **Twelve 0.5x0.5x0.0050 cm³ diamonds in April 2015**
 - Used for prototyping. Two 4X+4Y strip sensors graphitized for Nov. 2015 testebeam
- **Two 2x2x0.0050 cm³ diamonds in June 2015**
 - Acquired by Frascati, now in Lecce
- **One 2x2x0.0100 cm³ diamonds in Sept 2015**
 - Acquired by Frascati, now in Lecce

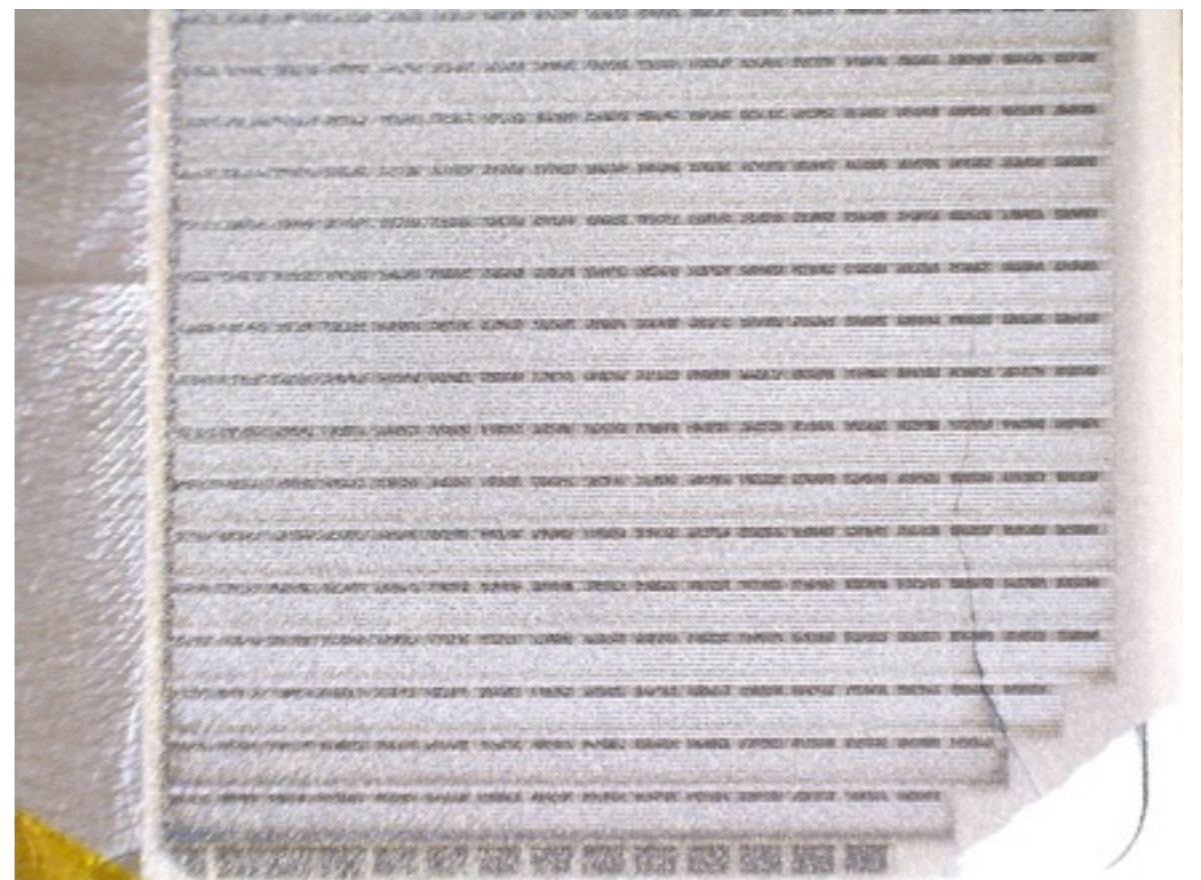
We need this buffer

Target prototype status

- 2x2x0.0050 cm³ diamonds to be used in Nov. 2014 tesbeam
- 18 strips X + 18 strips graphitized in Lecce
- 1 mm pitch and 200 um separation
- Sensitivity 15-20 MIP
- One corner broken opening del gel pack (stop using the shipping gel pack for storage)



Diamond sensor on the holder before second face graphitization. The visible strips are on the back-face.

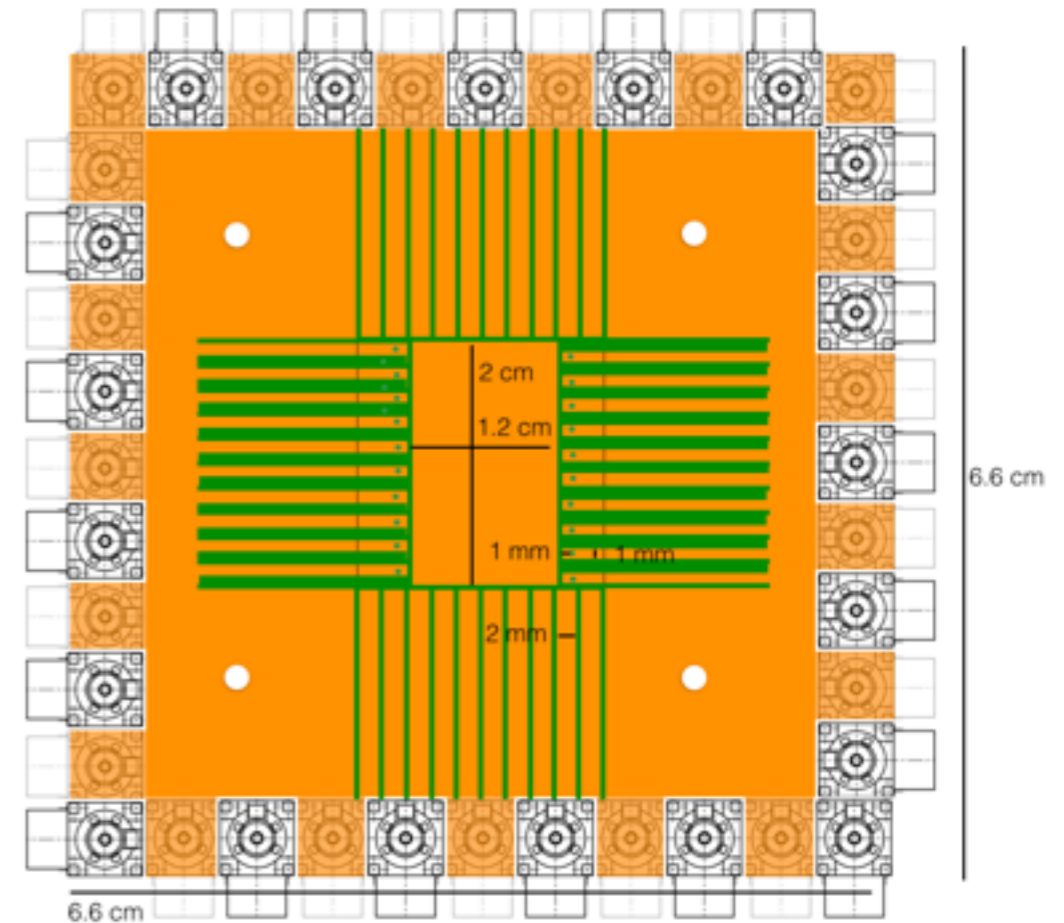


Final diamond sensor after graphitization on both faces

Oustanding issue

We are currently working on:

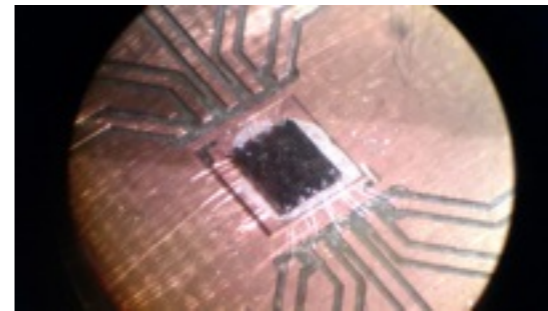
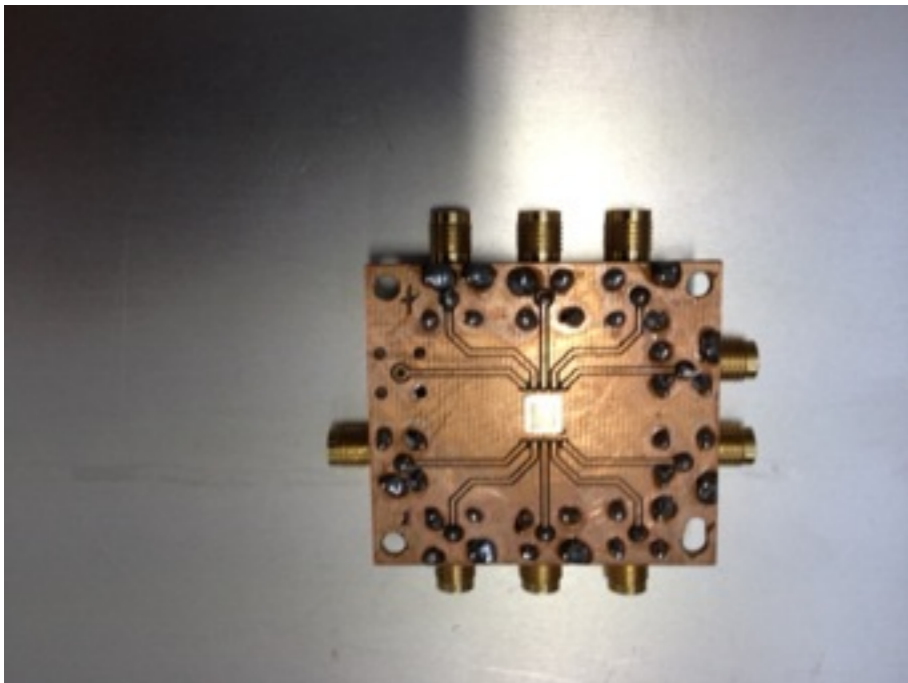
- High voltage breakdown tests
- Interconnection to readout board
- Handling
- Mounting on the mechanical frame



Testbeam PC board sketch

The INFN stop in November of purchases
make thinks more complicated

Other diamond detectors



- 0.5x0.5x0.030 cm³ diamonds to be used in Nov. 2014 testbeam
- 20 strips 3mm long + one 3x3mm² pad graphitized in Lecce
- 180 um pitch and 80 um separation
- Aluminium wire bonding
- Under test in Lecce with gamma source
- Sensitivity 1 MIP



- Two 0.5x0.5x0.005 cm³ diamonds to be used in Nov. 2014 testbeam
- 4 strips X + 4 strip Y 3mm long graphitized in Lecce
- 1 mm pitch and 200 um separation
- Under assembly in Lecce
- Sensitivity 15-20 MIP

Testbeam instrumentation

17 chs caen Digitizer (likely replaced by PADME VME digitizer)



HV Keithley

LV Agilent for
cividec ampliifer

4 RF cividec

7 CSA cividec

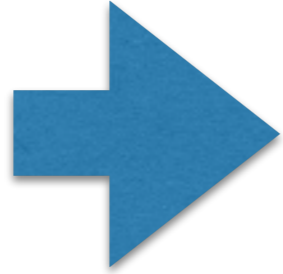
Mechanical
support for
detectors

BOX: 10 RF
cividec + 10
CSA cividec

Testbeam setup

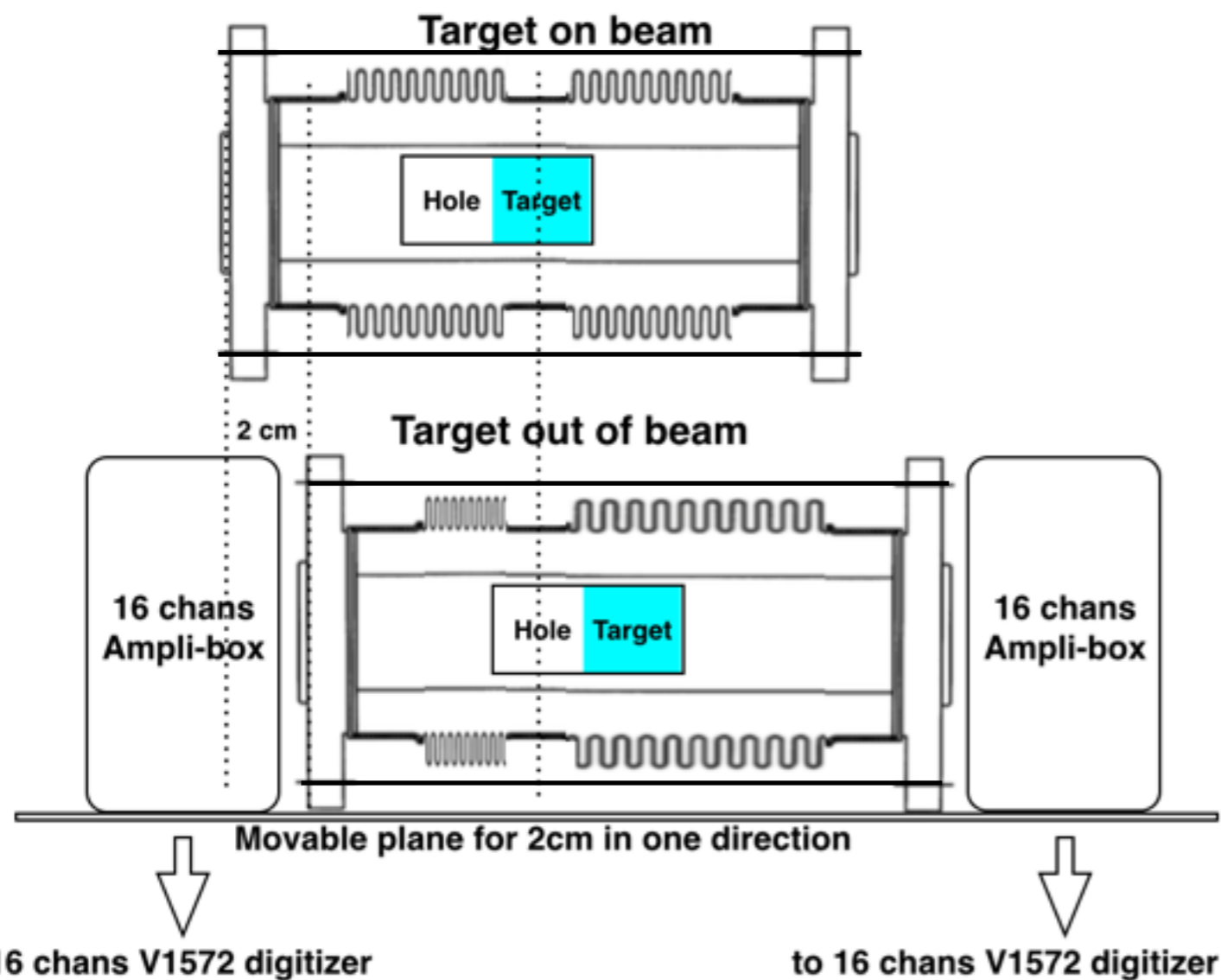
- **X strips readout by CSA amplifier and biased to 50 V**
- **Y strips readout by RF amplifier and biased to 0 V**
- **Readout from VME digitizer**
- **External trigger**
- **Dump event by event (at least 20 waveforms) together with timepix hits (50 Hz rate)**

Testbeam goal

- Charge collection efficiency
 - Response uniformity
 - Strip cross-talk
 - Beam average position resolution
 - Beam profile resolution
- 
- Strip pitch
 - Number of strips
 - Readout electronics

This is a fundamental step and experience no matter if we go for a full carbon diamond, a traditional metalized diamond or a simply passive diamond

Target mechanics proposal



Two transverse vacuum bellows with:

- external flange rigidly connected to each other and to the pc board target and between each each other other
- internal flange rigidly connected to beam pipe
- Vacuum feed-throws for electrical connection by pc-board glued to the external flanges.