

RDH WP8: LE-CT-MIBi

Il fondo premiale IRPT (innovative radiation proton therapy) è monitorato in gruppo 5 nella sigla di riferimento RDH (RadDotherapy with Hadron) senza richieste finanziarie

Gabriele Chiodini - INFN Lecce



RDH WP8: Activity

The activity is mainly devoted to demonstrate the procurement capability and quality certification of large size polycrystalline diamond sensors to be used in IMRT (Imaging Modulated Radio Therapy).

Lecce: Diamond procurement and CrAu electrode deposition for testing (and removal after testing)

Milano Bicocca: Diamond quality certification by UV laser scan and beta source

Catania: High fluence 62 MeV proton irradiation ($> 10^{16}$ proton/cm²) and proton response measurements

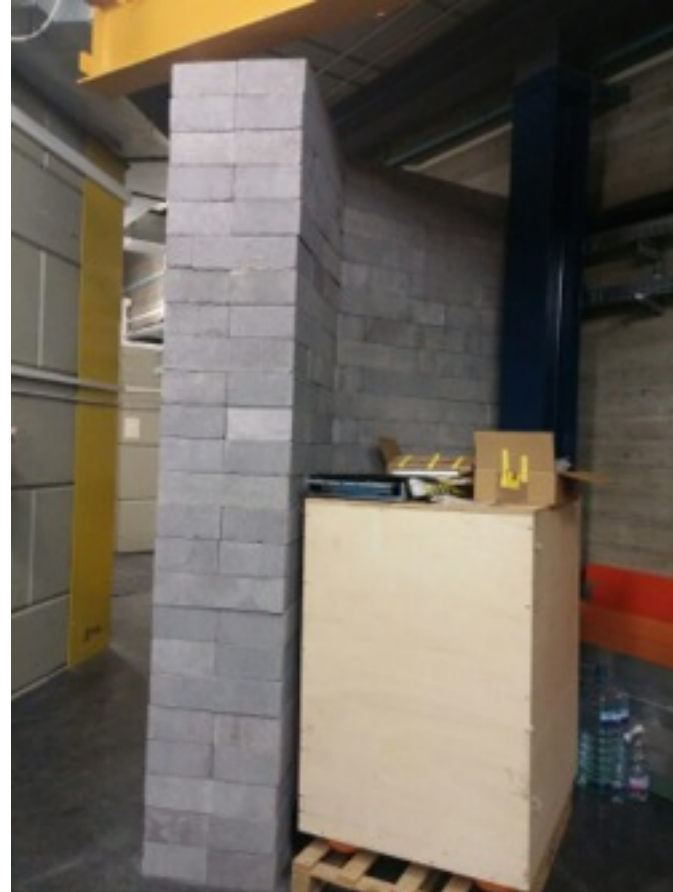
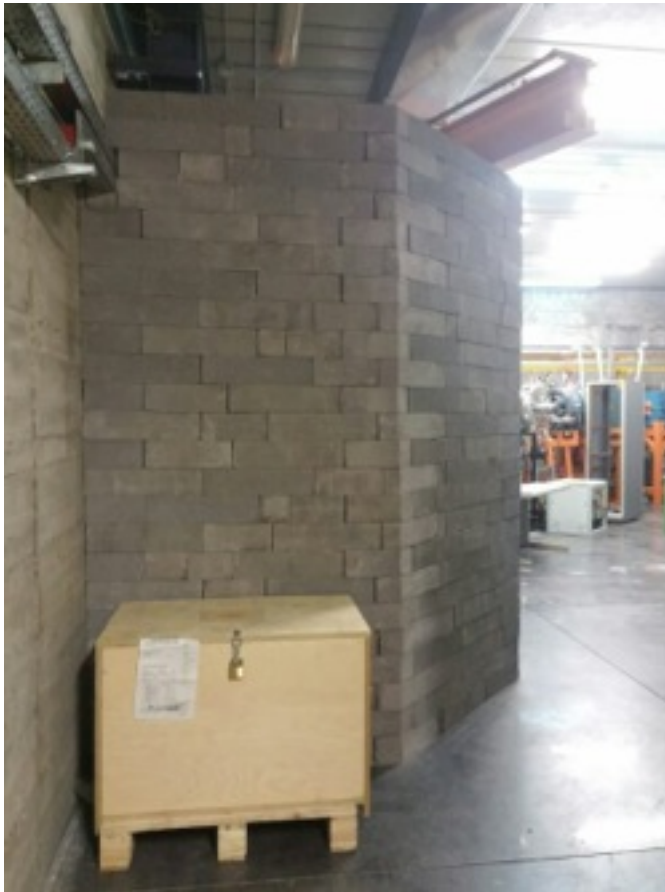
Diamond procurement (LE)

Latest procurement update of large size diamonds
from II-VI USA

Your PO N°	Our PO N°	order date	P/N	Description	Ordered qty	Shipped qty	up date on situation - April 2015
CA5335108	5466	07.02.2013	864625	diamond windows 20 x 20 x 0.5 mm	2	0	(2) - ship from USA 07/06/15
CA5800201	5517	10.03.2014	864625	diamond windows 20 x 20 x 0.5 mm	6	0	(6) – ship from USA 07/06/15
CA5854697	5526	12.02.2014	220398	diamond windows 25 x 25 x 0.5 mm	2	0	(2) – ship from USA 06/21/15

In july we should have all diamonds

Concrete shielding at LNS

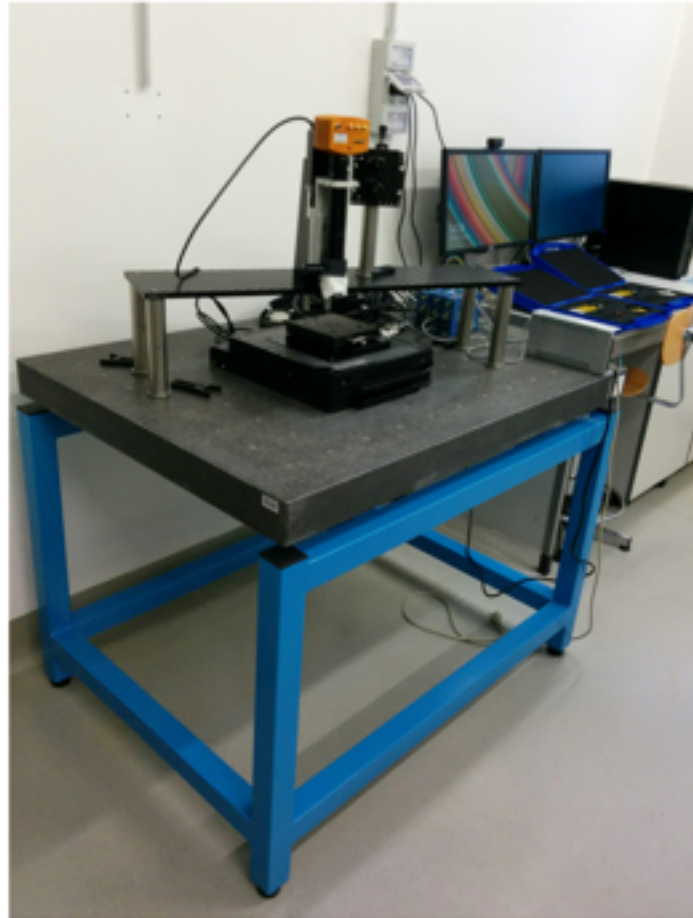


Already operational at zero degree line. Used in May 2015:

- Diamond irradiation tests
- ATLAS Italia HVCMOS irradiation tests.

- Testbeam in May could reach 10 nA cyclotron current in steady state and 20 nA for half hour (goal was 50 nA)
- To increase up to 50 nA the cyclotron extractor must be water cooled (evaluating when to do the next test)
- Open a new irradiation regime suitable for LHC Phase II upgrade

Diamond QA setting in Mi-Bi



The components of the stations are:

- two lasers (1064nm and 375 nm)
- XY moving system
- chuck
- granite table (with light-tight and gas-tight cover)
- digital microscope



All component are in hand and are being assembled

**Total cost=100 keuro
used 34 ke out of 53 ke**

What next

1. CrAu electrode deposition for testing (and removal after testing)
2. Diamond quality certification before and after CrAu electrode deposition (UV laser and X-ray)
3. Diamond response after high fluence 62 MeV proton irradiation ($> 10^{16}$ proton/cm²)

Premiale Funds

Assigned in 2014

Catania	:	20ke CO + 10 ke APP	+ 5ke MI
Lecce	:	45ke CO + 32 ke INV	+ 5ke MI + 2y PostDoc
Milano-Bicocca	:	53 ke INV	
TOT	:	65ke CO + 95 APP/INV	+ 10ke MI = 160 ke + 2y PostDoc

Left for 2016

Catania	:	15 ke left mostly for beam dosimetry at high rate
Lecce	:	28 ke + 1.5 year PostDoc
Milano-Bicocca	:	19 ke left mostly for chiller system and AOB
TOT	:	62 ke left + 1.8y PostDoc

2016 RDH-WP8

City	Name	Role	FTE
Catania	Cristina Tuvè	Associated Professor	20%
Lecce	Gabriele Chiodini	INFN Researcher (IRPT_MIUR no RDH)	10%
Lecce	Mary De Feudis	PhD	20%
Lecce	Maurizio Martino	Associated Professor	20%
Lecce	Annapaola Caricato	Uni. Researcher	20%
Milano-Bicocca	Mauro Dinardo	Uni. Researcher	10%
Milano-Bicocca	Luigi Moroni	Dir. INFN	0%

No financial
request
RDH-WP8

RL RDH 2015: Gabriele Chiodini
RL RDH 2016: Luciana Dini (VWP2)

RDH asks one more year in CSN5 to conclude the experiment