



# Plan for the SiPM based SciTil detector for PANDA: Indian Participation

**Bidyut Jyoti Roy**  
*NPD, BARC, Mumbai*  
*(on behalf of India-Panda collaboration)*

## The India- PANDA Collaboration Team:

**BARC-Mumbai (NPD, ED)**  
**IIT Bombay,**  
**IIT Indore,**  
**Gauhati Univ.**  
**AMU Aligarh, Aligarh**  
**South Gujrat Univ.-Gujrat,**  
**IIT- Gauhati,**

**Theoretical work:**  
**SINP- Kolkata,**  
**TIFR- Mumbai**  
**VECC- Kolkata**  
**Sardar Ballava Univ., Gujrat**  
**BITS, Goa**  
**BARC**  
**Industry: BEL, Bangalore & SITAR, bangalore**

**For SciTiL: BARC, Gauhati univ. and Aligarh univ.**

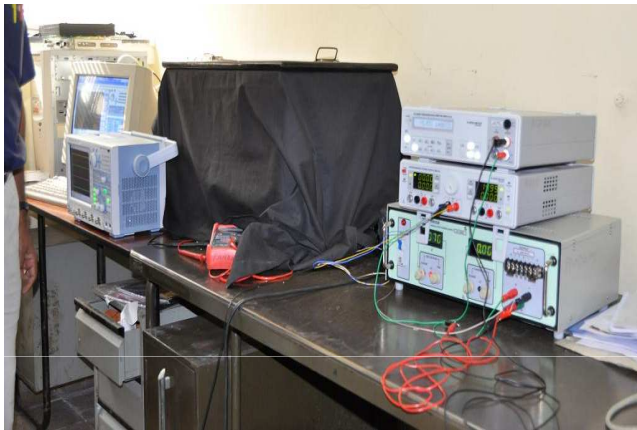
- **At NPD, BARC, we have setup a Lab and have started initial R&D activities on SiPM and SciTil detector.**
- **In addition, NPD, BARC also involved in physics simulation**
- **We will be also interested to develop software for SciTil and to implement in the PANDARoot frame work.**

**Man-power : The Intermediate Energy Physics Group is involved in this activity: At present it is a small group. Efforts are put to add manpower.**

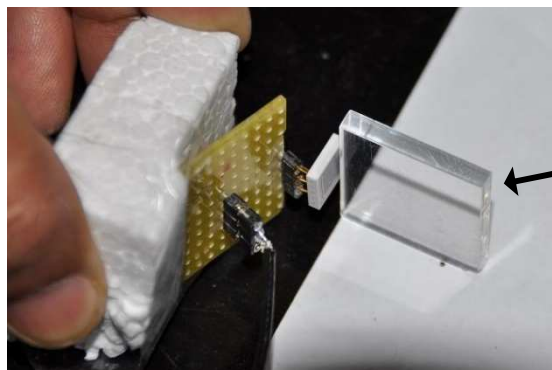
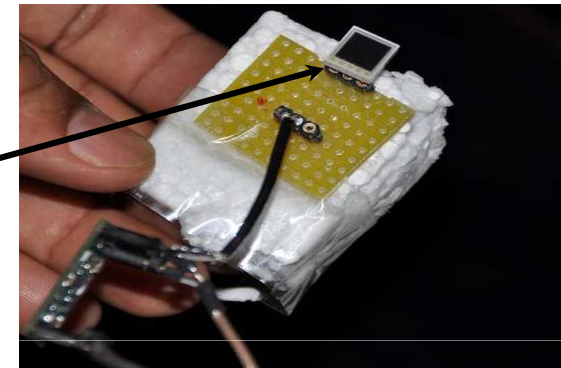
**>> Apart from BARC, universities in Gauhati and Aligarh are involved (university contribution will be mainly towards simulation and test). Both universities have submitted project for student support.**

## SiPM test facility at NPD, BARC

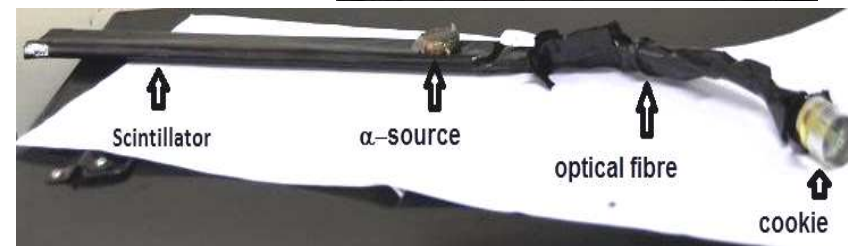
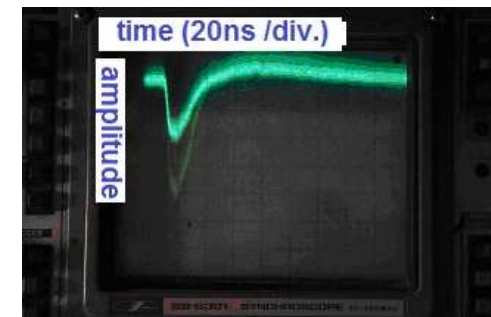
At NPD, BARC we have just started both **SIMULATION & HARDWARE** activities for initial R&D.



Hamamatsu  
MPPC  
3x3mm<sup>2</sup>



BC408 Scint.  
30x30x5mm<sup>3</sup>



## Simulation Activity:

- We have also started simulation activities with a simple Monte Carlo simulation program SLitrani.
- To start with we have taken Macro that was written by GSI group. We have installed it at BARC and made it running. Basically we are learning this software and will carry on further.
- We want to implement the SciTil detector in PandaRoot frame work so that simulation with full PANDA detector can be performed

## Status of the Indian SiPM developments

→ At present we are buying what are commercially available.

→ In an another activity, BARC in collaboration with SITAR, Bangalore has already developed SiPM and they are carrying on further R&D work.

→ Now-a-days many companies (in Europe) now manufacturing SiPMs, so buying also an another option, if require.



## Budget: ?



Element	Dimensions	per Module	per Super-Module	Total
Scintillator Tile	28:5 _ 28:5 _ 5 mm <sup>3</sup>	4	360	5760
SiPM	3 mm x 3 mm	8	720	11520
Module	60 mmx 60 mm x 12 mm	1	90	1440
Super-Module	180 x 1800 mm x 18 mm na	-	1	16

### Our estimation:

Scintillator Tiles:	190 kEuro = Rs. 123 Lakhs
SiPM:	1400 kEuro = Rs. 900 Lakhs

### My suggestions:

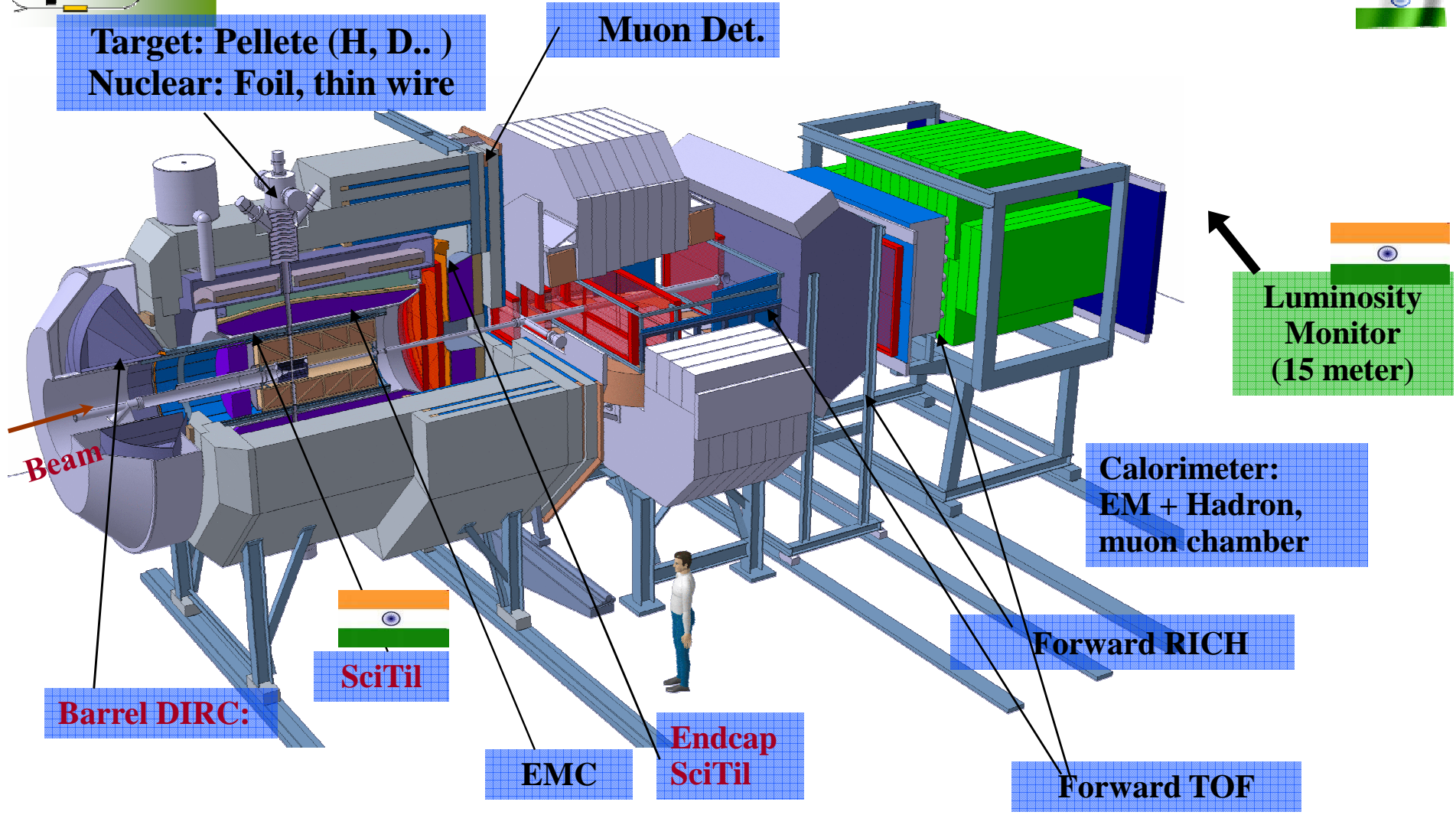
- (i) In the fair/panda cost book, the price for scitil to be shown (as Indian responsibility jointly with GSI ...
- (ii) We must have an MOU. In the long run, an MOU would be essential.



## NEWS!

**We are going to bid for hosting the PANDA collaboration meeting in March 2013 in Mumbai!**

**Thank you**



**Target Spectrometer:**  
**10 – 140 deg., Solenoid, B~ 2T**

**Forward Spectrometer:**  
**< 10 deg. , Dipole Magnet**