

HGTD - October test beam campaign

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Overview

- October test beam will start next week
- Doodle for shift booking (@Suyu)
 - <https://doodle.com/poll/6w37n7wxt5iaed8z>
- One week test beam (17th - 24th October)

The calendar grid shows weeks 40 to 52. Weeks 40-43 are light blue, weeks 44-49 are yellow, and weeks 50-52 are green. A brown shaded area covers weeks 42-43, circled in orange with the handwritten note "Coordinate with itk". A blue box labeled "LHC Ion run" is centered over weeks 46-49. A red box labeled "Xmas" is in week 52. An arrow labeled "End of run" points to week 50.

	Oct			Nov				Dec			End of run		
Wk	40	41	42	43	44	45	46	47	48	49	50	51	52
Mo	1		15	22	29	5	12	19	26	3	10	17	24
Tu													Xmas
We													
Th													
Fr													
Sa													
Su													

Beam

- Test will be done in Preveessin
- Using a beam of pions
- Energy: 40 GeV (probably will be able to use a beam of 120 GeV - not sure)

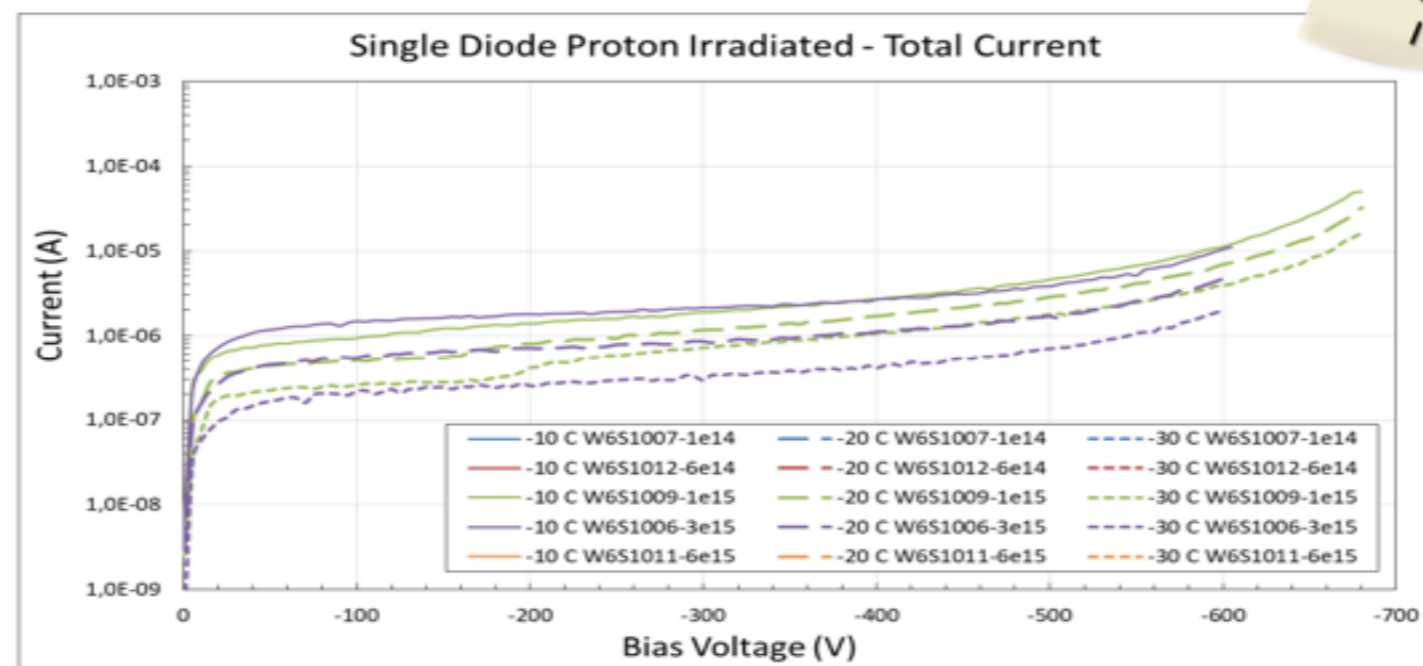
Sensors for the test beam - Single pad

- Neutron irradiated Gallium (From Barcelona)

- https://indico.cern.ch/event/726344/contributions/3162576/attachments/1726239/2788561/HGTD_TestBeam_Intro_2_10_18.pdf

Single Diodes

	W6S1007	n	$1 \times 10^{14} n_{eq}/cm^2$	0 min
	W6S1012	n	$6 \times 10^{14} n_{eq}/cm^2$	0 min
10924	W6S1009	n	$1 \times 10^{15} n_{eq}/cm^2$	0 min
	W6S1006	n	$3 \times 10^{15} n_{eq}/cm^2$	0 min
	W6S1011	n	$6 \times 10^{15} n_{eq}/cm^2$	0 min



Sensors for the test beam - Arrays

Arrays

10478	W5S219	n	$6 \times 10^{14} n_{eq}/\text{cm}^2$	0 min
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FBK

- Proton irradiated FBK sensors does not seem likely to make it to test beam
- Neutron irradiated FBK sensors may arrive during the test beam, need to coordinate with Gregor, should not depend on them

CNM AIDA Run

- 2 2x2 pad arrays at 50 μm thickness with intre-pad spacing of 37 and 47 μm (on 2 and four channel boards)
- Some single dies if single channel boards available

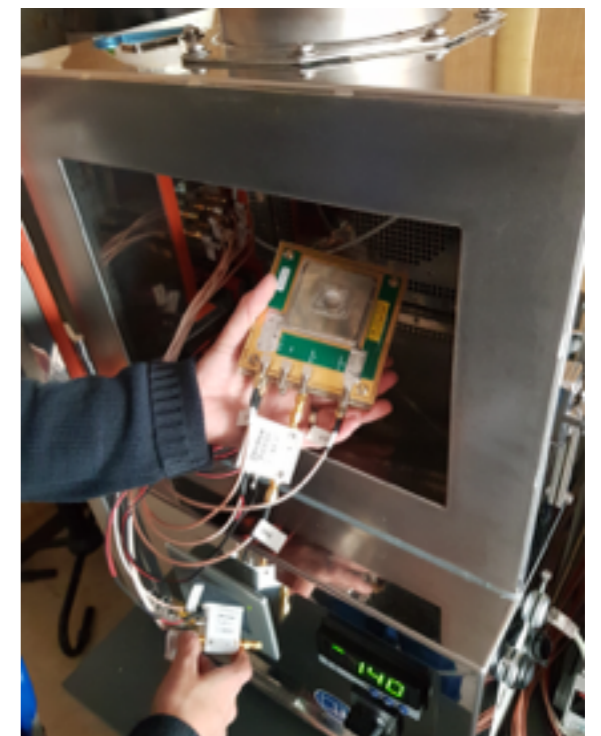
Coordinate with Giulio

If Only Gallium Sensors available only one area will be used for both electronics and ALtiRoC

Rate studies have been agreed with our beam physicist, higher priority than AIDA run

Pre-Test Beam preparation

- Doing some tests of the sensors in the HGTD lab at point 1 in Meyrin
 - The threshold of self-triggering for the sensors
 - At which threshold the sensor does not self-trigger a signal when no source is available
 - For different temperature and different HV
 - Beta source tests for later timing studies



Xin's questions (1)

- Some of them were already answered in the previous slides
- **What is the expectation from the test beam?**

To complete the full program of the test beam. The main goal is to study the timing resolution of the sensors for different irradiation fluence.

The new version of electronic (ALTIROC-V02) will also be tested in this campaign

Xin's questions (2)

- **What is the DAQ for the sensors readout? and data format?**

We have two oscilloscopes (each one with 4 channels) One of the four channels is connected to a PhotoMultiplier (where Cherenkov light is used) to be used as a reference for timing measurements (It is fast signal for timing reference).

We have one telescope to be used as a tracker to detect the tracks of particles.

LabView software is used to monitor voltages and cooling. Data is registered by the oscilloscope. The format of output data is .dat and .txt files.

Xin's questions (3)

- **Any existing similar test beam data can be used for pre-analysis?**

We have the data from the previous test beams (last one from September). They can be found here:

Oscilloscope: `/eos/atlas/atlascerngroupdisk/det-hgtd/testbeam/September2018/`

Telescope: `/eos/atlas/atlascerngroupdisk/det-hgtd/testbeam/September2018/telescope/`

Analysis: There exist a framework (developed by Nikola Macovek from Orsay) to analyse the data. It has been used for the previous test beams. The framework takes as inputs the raw oscilloscope data.

<https://twiki.cern.ch/twiki/bin/view/LAr/HGTDPyAna>