

HGTD IHEP meeting

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Testbeam status

- October Testbeam finished
 - From Wednesday 17th to Tuesday 23th
- 3 batches of 5 sensors are tested
- 5 voltage steps per batch
- At -30C

Batch 1

Neutron Irradiated Gallium

| | | | | |
|----------------|--------------|-------------|---------|--------------------------------|
| Batch 1 | 10924 | W6S1021 | N/A | Un-irradiated |
| | | W6S1007 | n | $3 \times 10^{15} n_{eq}/cm^2$ |
| | | W6S1012 | n | $1 \times 10^{15} n_{eq}/cm^2$ |
| | | W6S1009 | n | $1 \times 10^{14} n_{eq}/cm^2$ |
| | | W6S1006 | n | $6 \times 10^{14} n_{eq}/cm^2$ |
| | | 9088 | W9LGA35 | N/A |

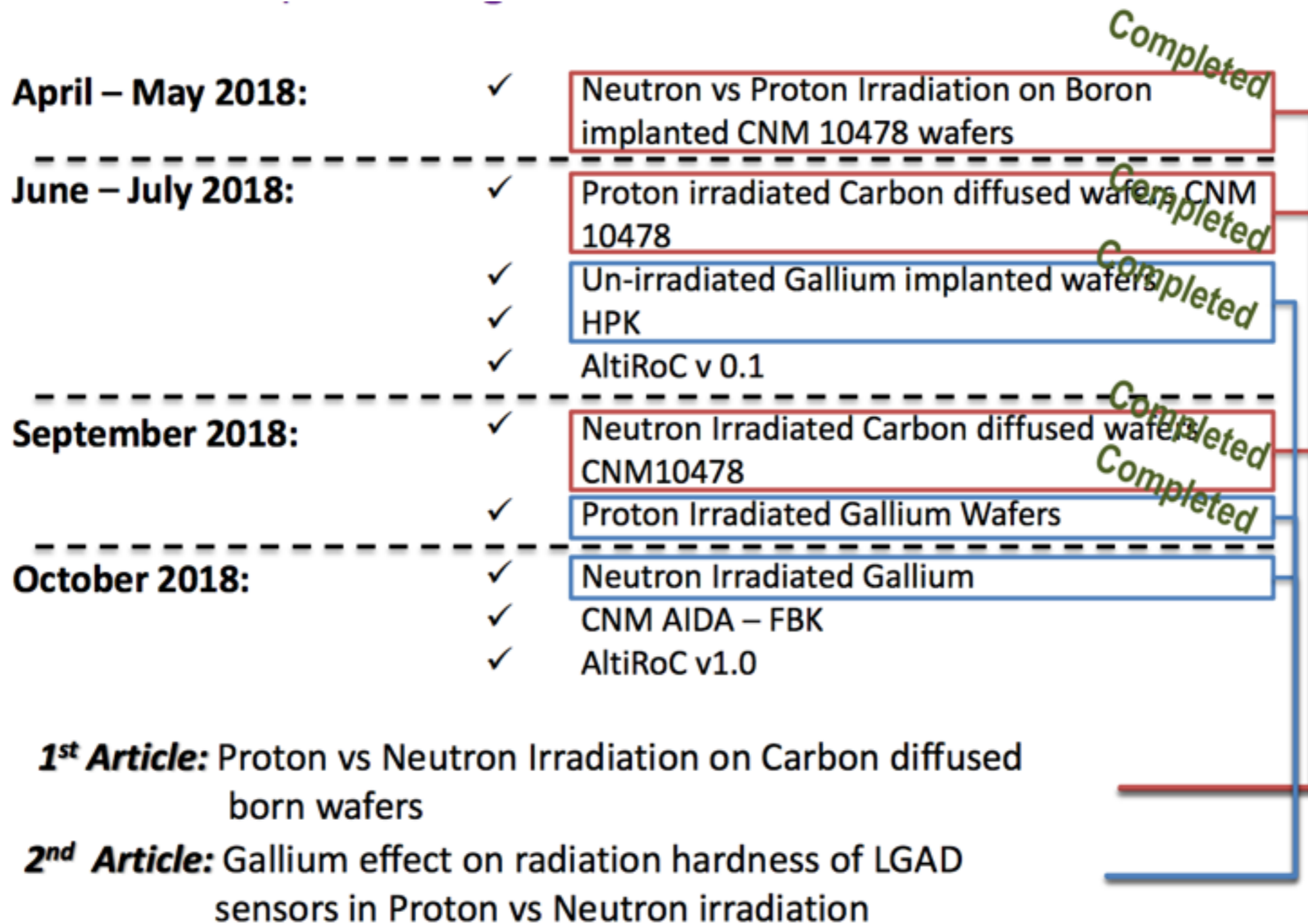
Un-irradiated single channel

| | | | | | |
|----------------|--------------|-------------|-----------|-----|--------------------------------|
| Batch 2 | 11748 | BNL | W1836 | N/A | Un-irradiated |
| | | | W1837 | N/A | Un-irradiated |
| | | | W11DB32 | N/A | Un-irradiated |
| | | | W5DB39 | N/A | Un-irradiated |
| | | FBK | 5x5 array | n | $4 \times 10^{14} n_{eq}/cm^2$ |
| | | 9088 | W9LGA35 | N/A | Un-irradiated |

FBK Neutron irradiated

| | | | | | |
|----------------|-------------|------------|-----------|-----|--------------------------------|
| Batch 3 | 9088 | | 5x5 array | N/A | Un-irradiated |
| | | FBK | 5x5 array | n | $1 \times 10^{15} n_{eq}/cm^2$ |
| | | | 5x5 array | n | $8 \times 10^{14} n_{eq}/cm^2$ |
| | | | W9LGA35 | N/A | Un-irradiated |

2018 Test Beams



What do we need to study from the test beams

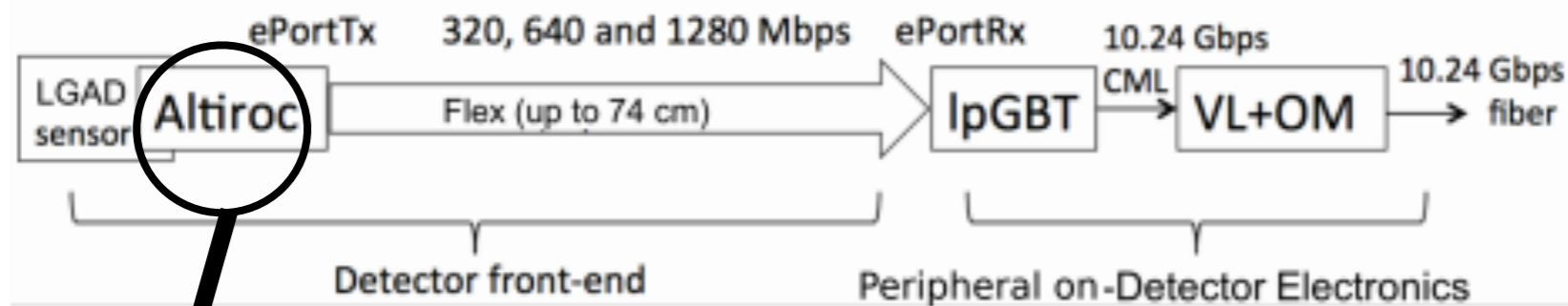
- General Goals
 - Measure the timing resolution of LGADs
 - Measure the Efficiency
 - This needs to be done for:
 - Different irradiation amounts
 - Different irradiation types and implantation

Characteristics to study

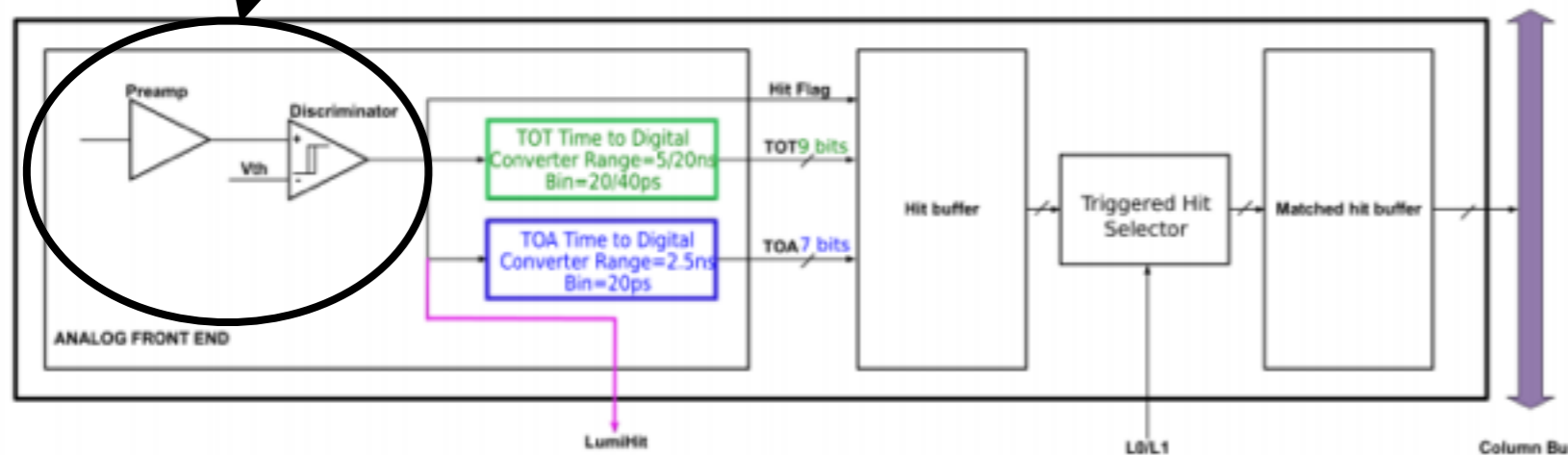
- **The pulse shape**
 - The performance of a LGAD sensor depends strongly on the characteristics of its pulse shape (Charge and rise time)
- **Efficiency**
 - defined as the number of hits that induce a sensor response (with amplitude above threshold) divided by the total number of reconstructed tracks crossing the DUT at that position.
- **Time Resolution**
 - The time resolution is calculated by measuring the width of the time difference between a given sensor and the fast SiPM

Electronics testing

- A batch of electronic boards (from Orsay) were tested in October Test beam



The data flow



- This is the available primary version of Altiroc that was tested
- It consists of a preamplifier and a discriminator (the timing resolution for this device will be studied)