

TB setup for Luxe study

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LUXE



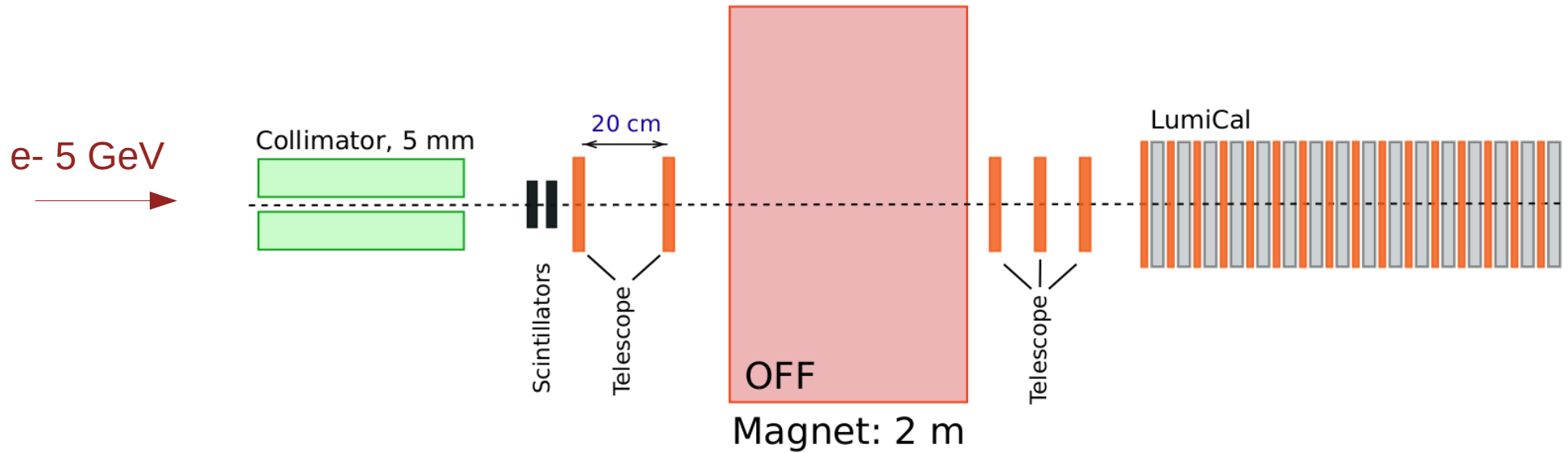
LUXE meeting
December 05, 2019

Outline

LUXE – **L**aser **U**nd **X**FEL **E**xperiment

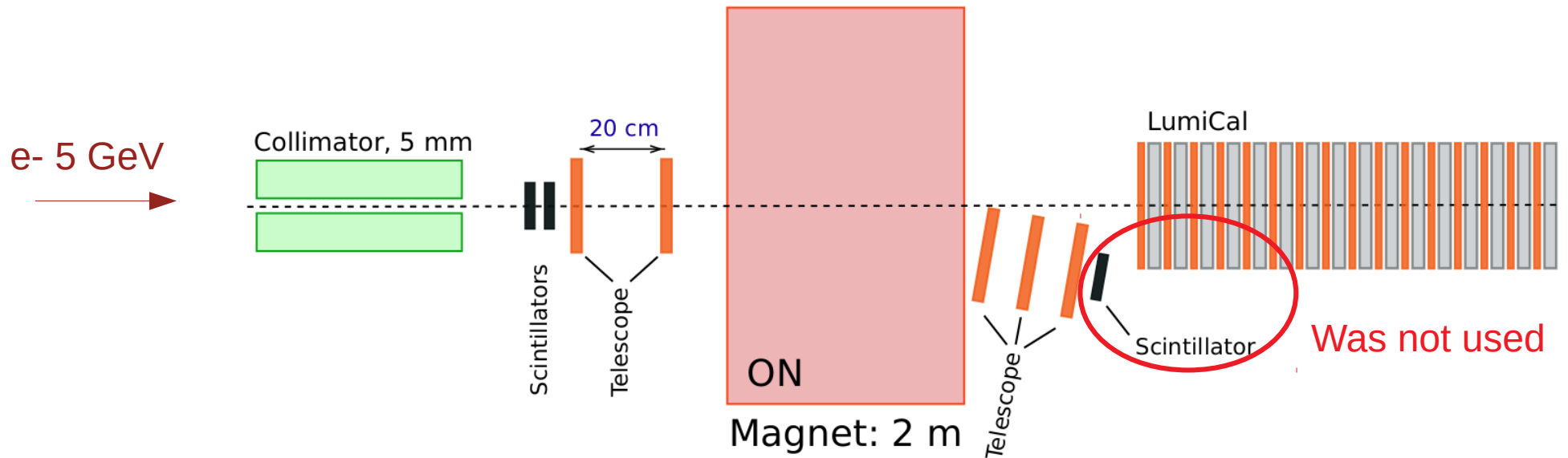
- Possible TB setups for LUXE study
- Hits reconstruction in Alpide telescope planes

Setup 1



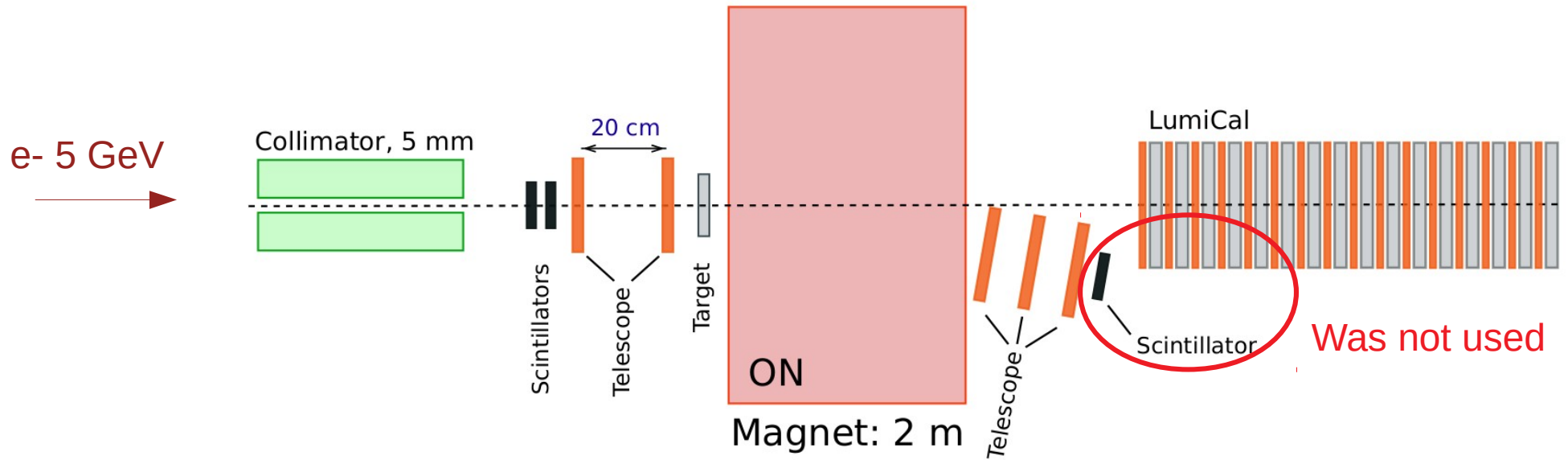
- Measure the effect of the air 2 m.
- Other beam energies?
- Collimator with 5 mm square cross section?

Setup 2



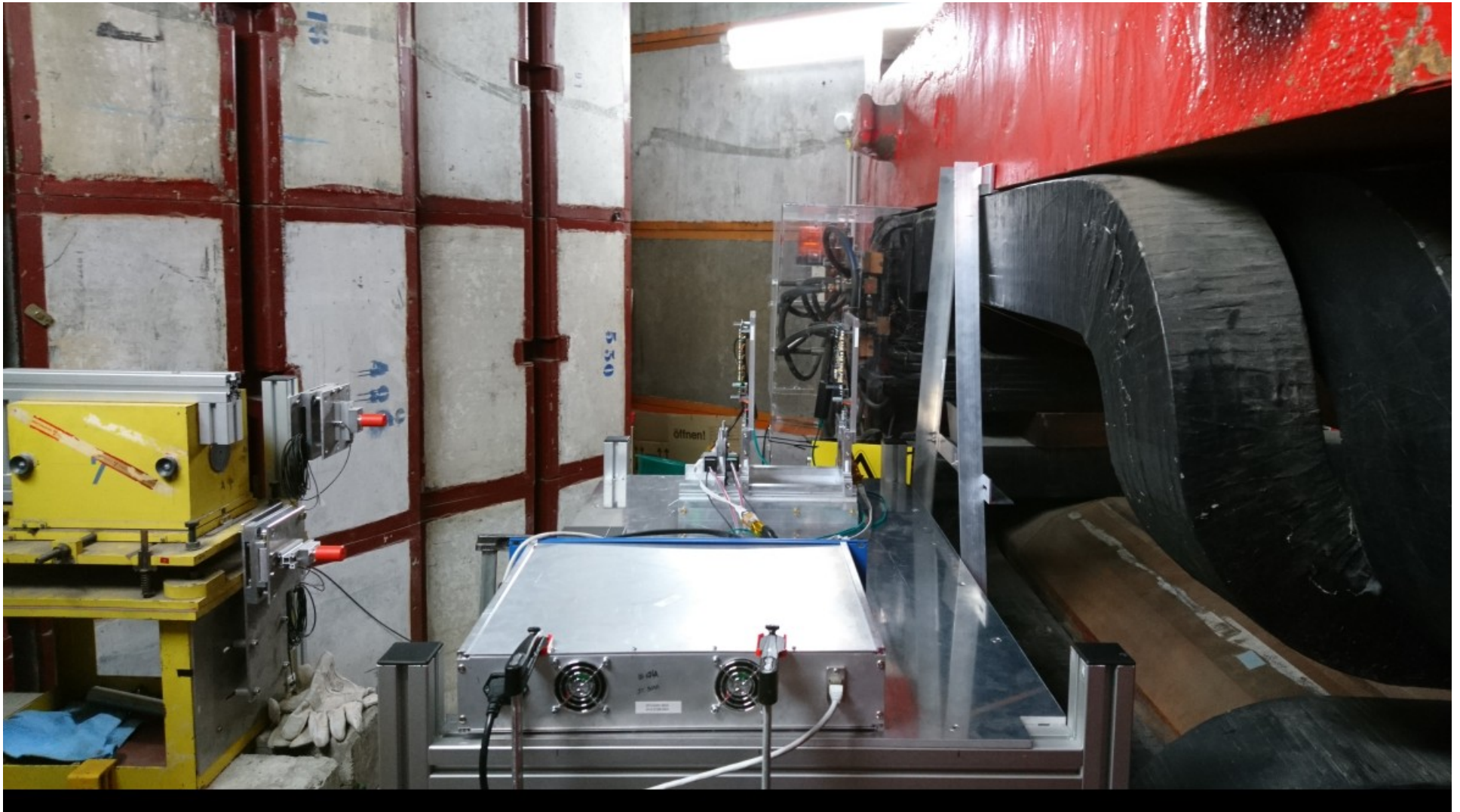
Check and optimize position of the beam after the magnet

Setup 3

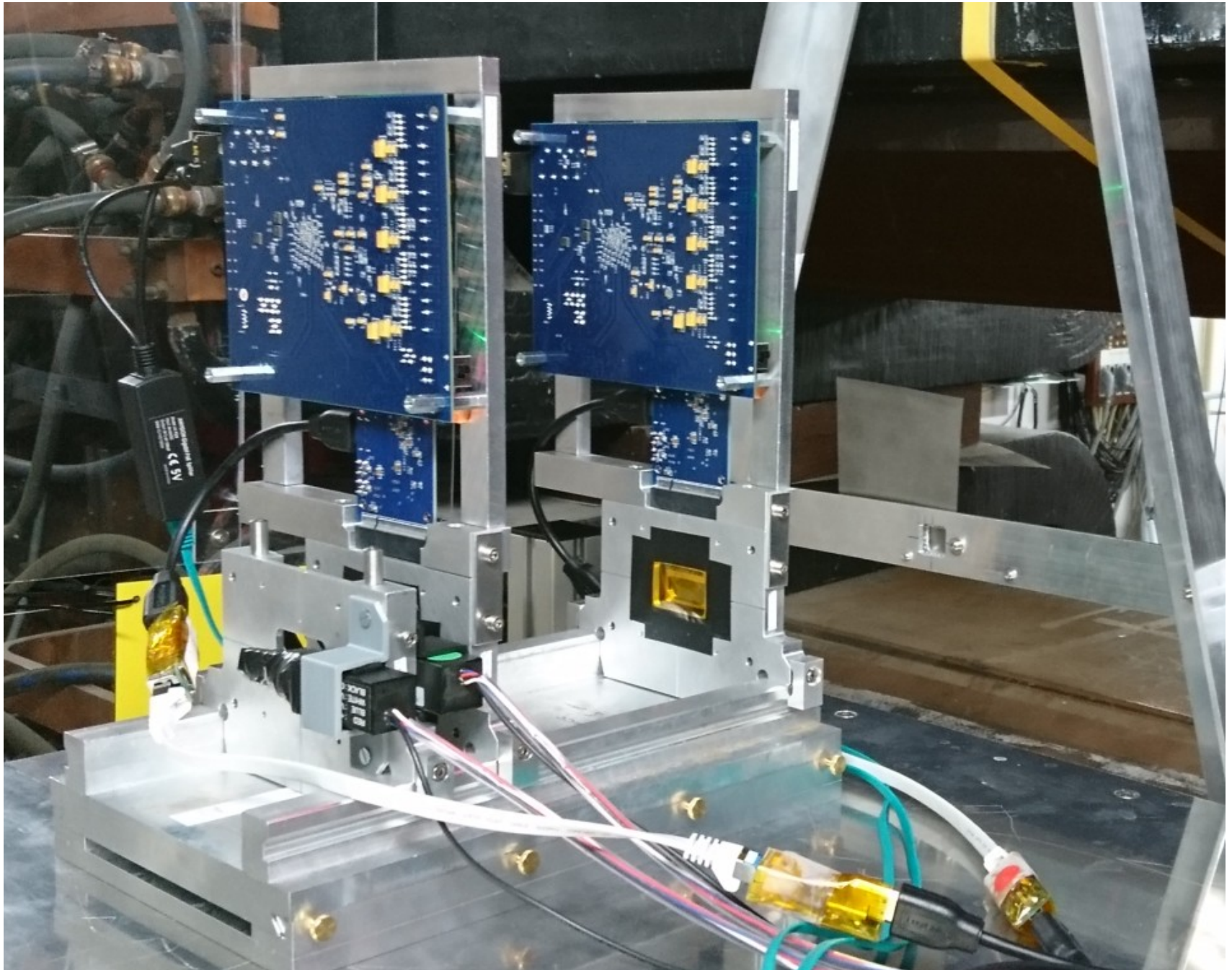


- Tungsten 0.1 mm (3% X_0)
- Beam position at front plane of telescope $X \approx 45$ mm.
- Telescope sensor size 30 x 15 mm²;
- Covers electrons 5 GeV – 3.0 GeV;
- Photons: up to 2 GeV;

Upstream of the target



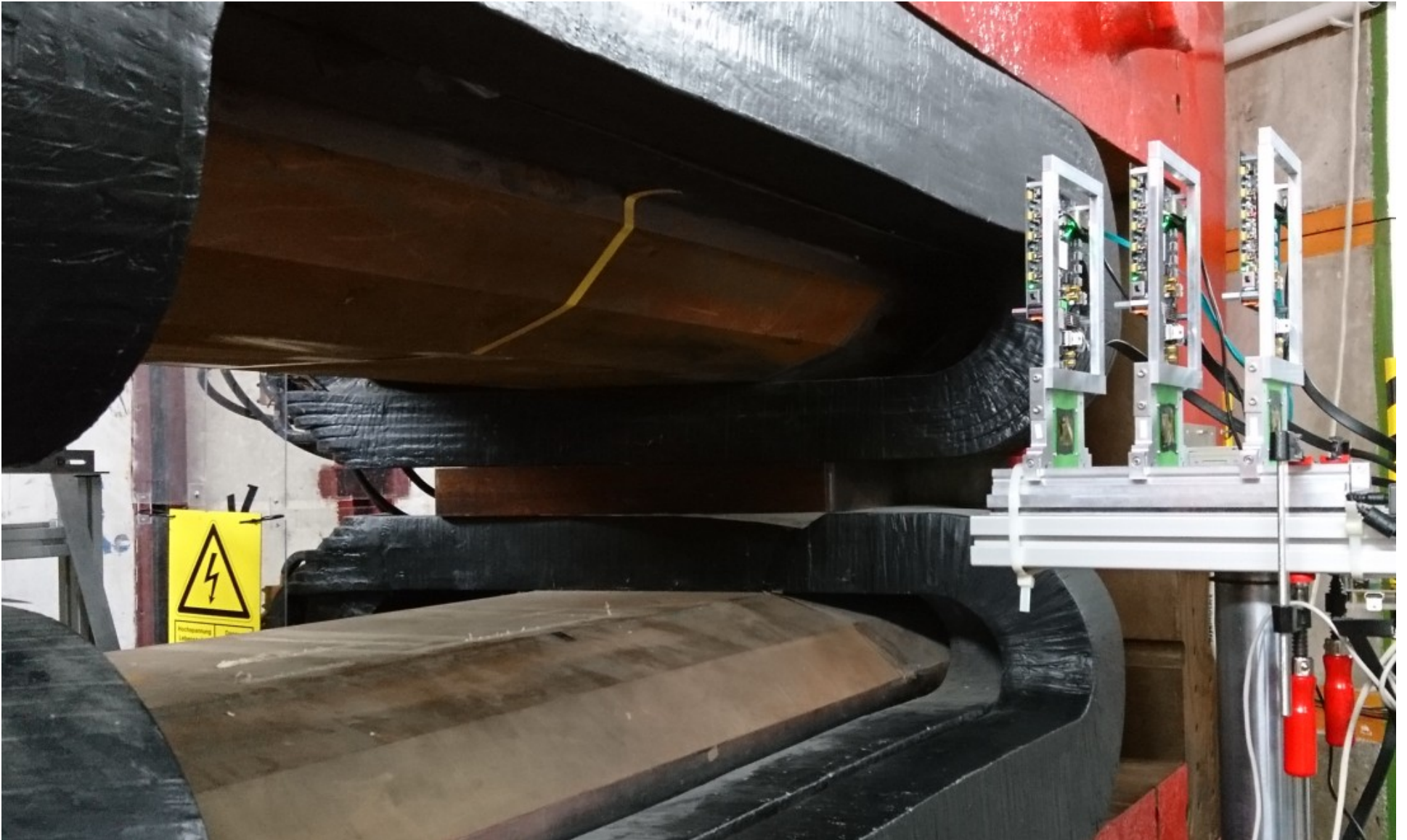
Upstream of the target



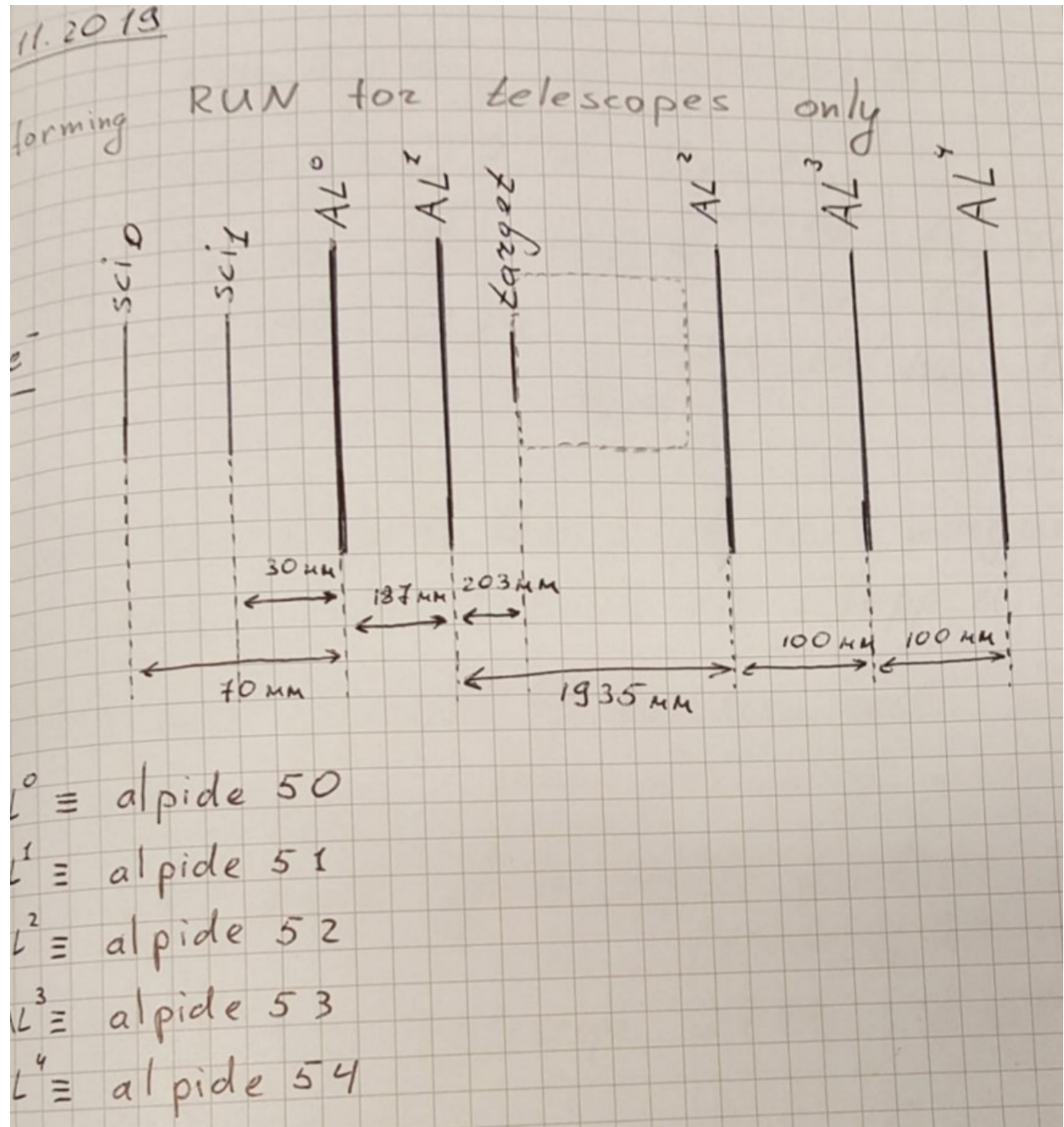
Downstream of the target



Downstream of the target



TB Setup Sketch



Data processing

- Data converter from raw format to LCIO
- Eutelescope software. It uses ILC software:
 - for geometry settings (GEAR)
 - Marlin (Modular Analysis and Reconstruction for the LINear Collider) for data processing;
 - LCIO for input/output.

Noisy pixels (default settings for threshold)

Run 49

```
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Noisy Pixel Finder summary:  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 0 noisy pixels on sensor: 0  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 0 noisy pixels on sensor: 1  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 0 noisy pixels on sensor: 2  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 1 noisy pixels on sensor: 3  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 0 noisy pixels on sensor: 4
```

Run 60

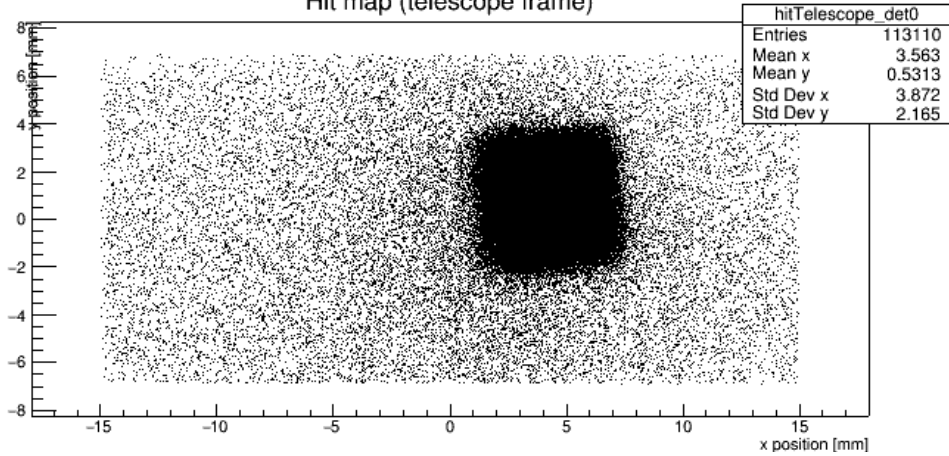
```
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Noisy Pixel Finder summary:  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 1 noisy pixels on sensor: 0  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 0 noisy pixels on sensor: 1  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 0 noisy pixels on sensor: 2  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 1 noisy pixels on sensor: 3  
jobsub.noisypixel(INFO): [ MESSAGES "HotPixelMasker" ] Found 0 noisy pixels on sensor: 4
```

Geometry description

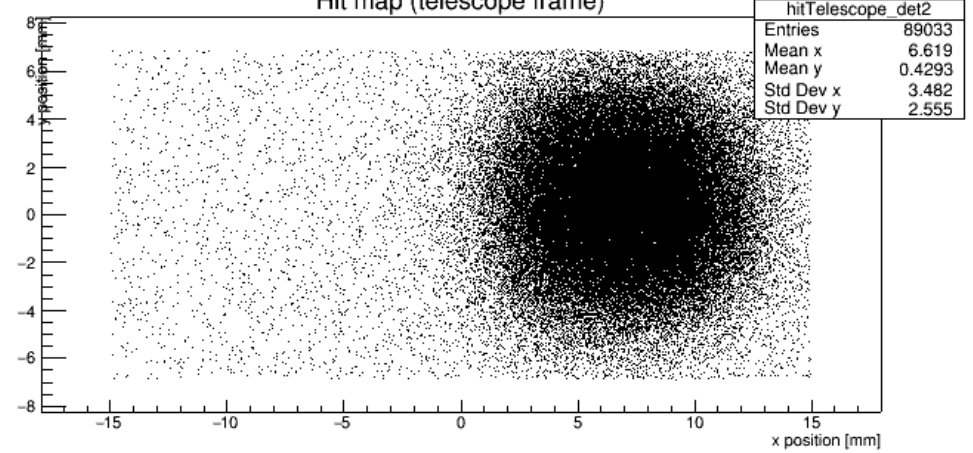
```
<gear>
<!--GEAR file for DATURA Telescope in DESY TB 21 - Nov. 2012 -->
<global detectorName="EUTelescope"/>
<BField type="ConstantBField" x="0.0" y="0.0" z="0.0"/>
<detectors>
  <detector name="SiPlanes" geartype="SiPlanesParameters">
    <siplanesID ID="0"/>
    <siplanesType type="TelescopeWithoutDUT"/>
    <siplanesNumber number="5"/>
    <layers>
      <!--Telescope Plane 0 -->
      <layer>
        <ladder > ID="0"
        >>> positionX="0.00"> positionY="0.00"> positionZ="0.00"
        >>> rotationZY="0.00"> rotationZX="0.0"> rotationXY="0.0"
        >>> sizeX="29.94176"> sizeY="13.76256"> thickness="0.05"
        >>> radLength="93.660734"|
        >>> />
        <sensitive > ID="0"
        >>> positionX="0.00"> positionY="0.00"> positionZ="0.00"
        >>> sizeX="29.94176"> sizeY="13.76256"> thickness="0.025"
        >>> npixelX="1024">> npixelY="512"
        >>> pitchX="0.02924"> pitchY="0.02688"> resolution="0.005"
        >>> rotation1="1.0"> rotation2="0.0"
        >>> rotation3="0.0">> rotation4="1.0"
        >>> radLength="93.660734"
        >>> />
      </layer>
      <!--Telescope Plane 1 -->
      <layer>
        <ladder > ID="1"
        >>> positionX="0.00"> positionY="0.00"> positionZ="20.0"
        >>> rotationZY="0.0"> rotationZX="0.0"> rotationXY="0.0"
        >>> sizeX="29.94176"> sizeY="13.76256"> thickness="0.05"
        >>> radLength="93.660734"
        >>> />
        <sensitive > ID="1"
        >>> positionX="0.00"> positionY="0.00"> positionZ="18.7"
        >>> sizeX="29.94176"> sizeY="13.76256"> thickness="0.025"
        >>> npixelX="1024">> npixelY="512"
        >>> pitchX="0.02924"> pitchY="0.02688"> resolution="0.005"
        >>> rotation1="1.0"> rotation2="0.0"
        >>> rotation3="0.0">> rotation4="1.0"
        >>> radLength="93.660734"
        >>> />
      </layer>
      <!--Telescope Plane 2 -->
```

Hits, run 60, magnet off

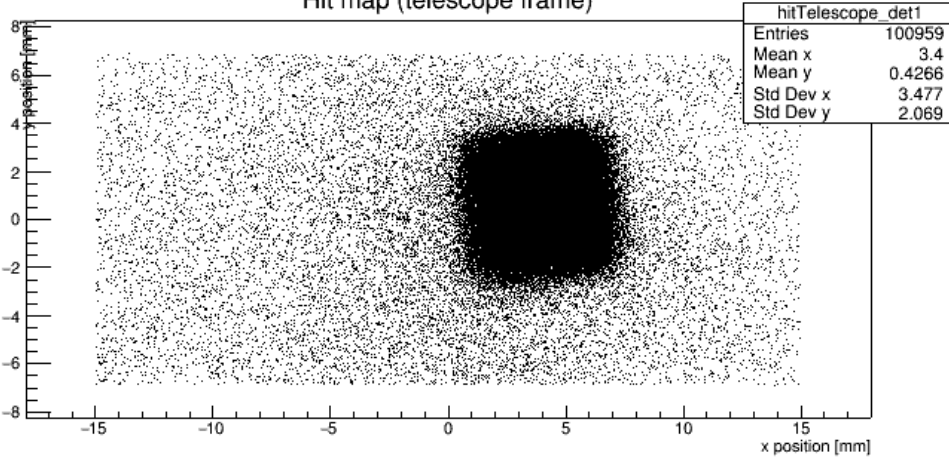
Hit map (telescope frame)



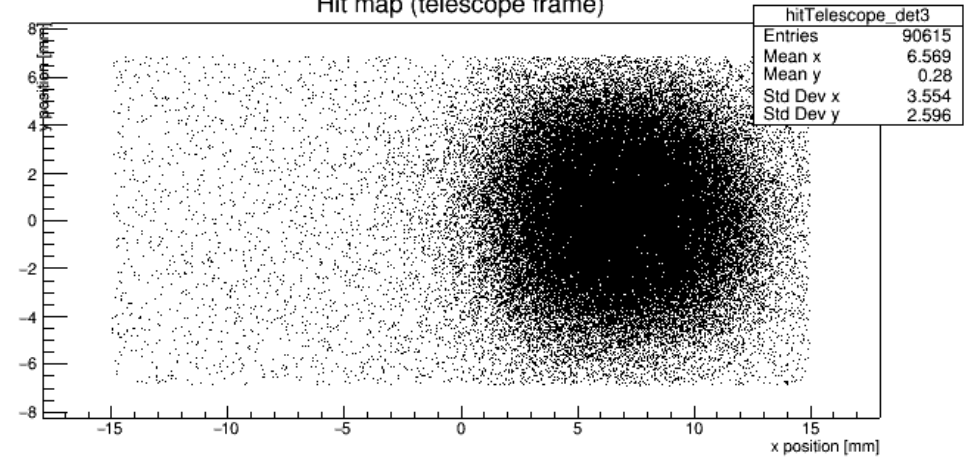
Hit map (telescope frame)



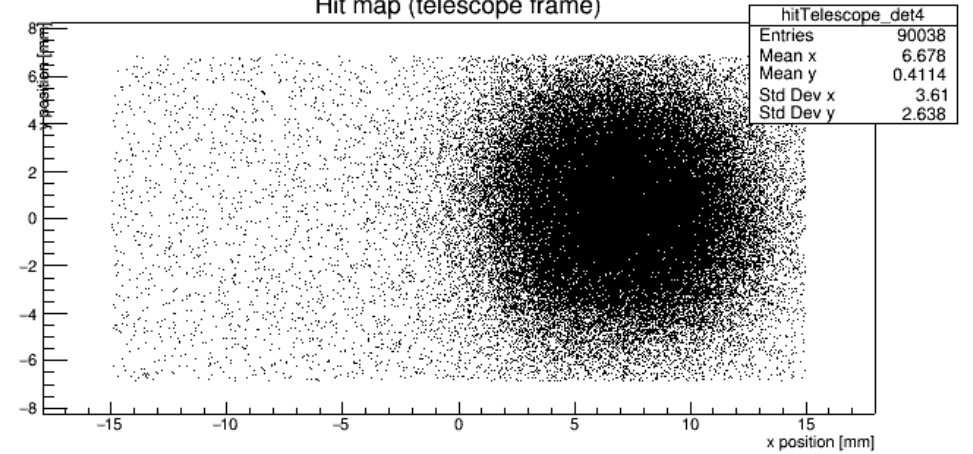
Hit map (telescope frame)



Hit map (telescope frame)



Hit map (telescope frame)



Hits, run 49, magnet 0.2T

