TB setup for Luxe study

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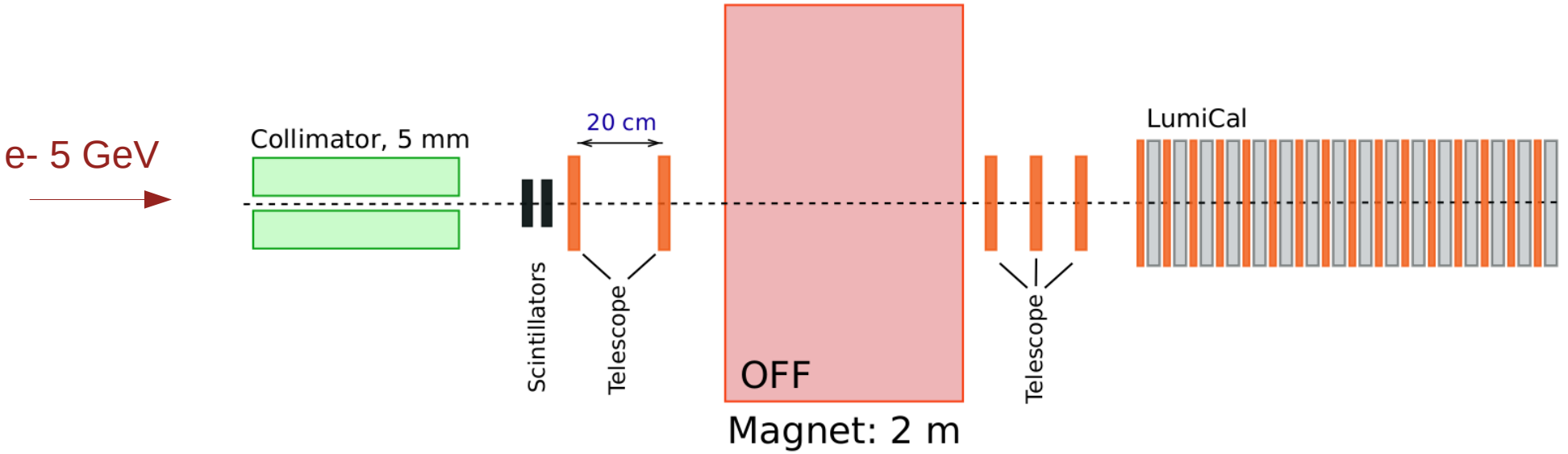
Outline

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

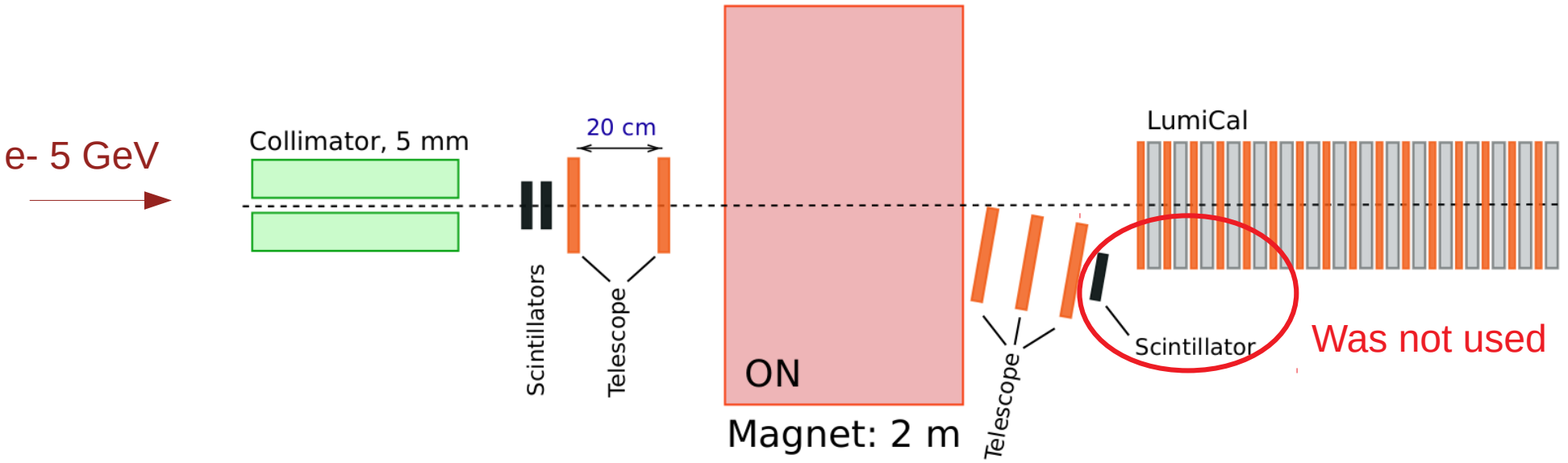
- Possible TB setups for LUXE study
- Hits reconstruction in Alpide telescope planes

Setup 1



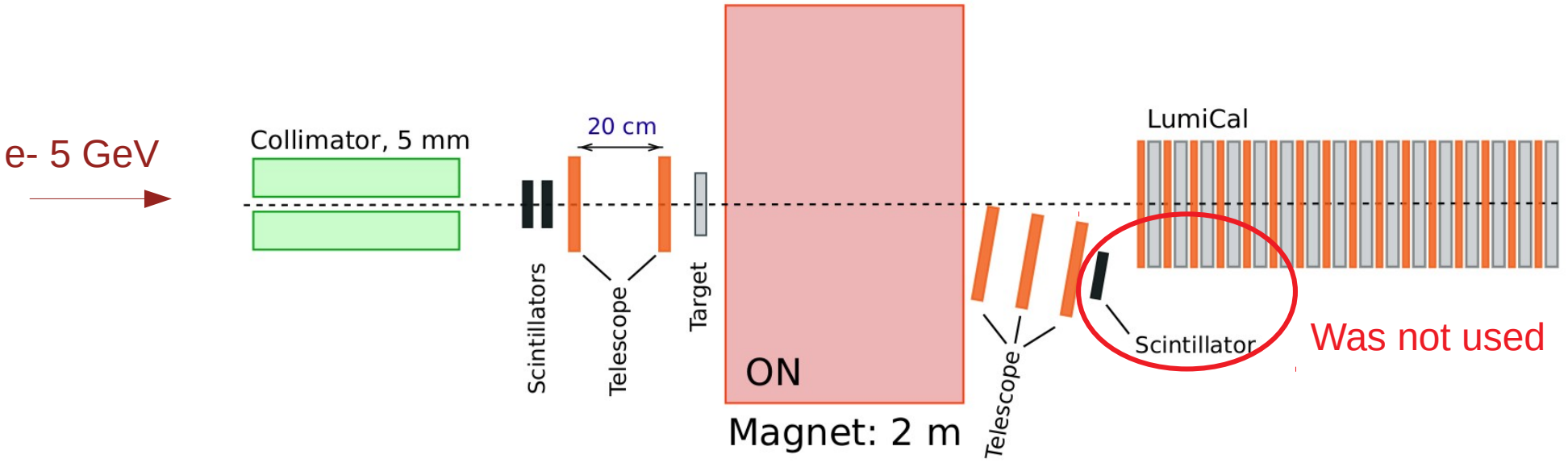
- Measure the effect of the air 2 m.
- Other beam energies?
- Collimator with 5 mm square cross section?

Setup 2



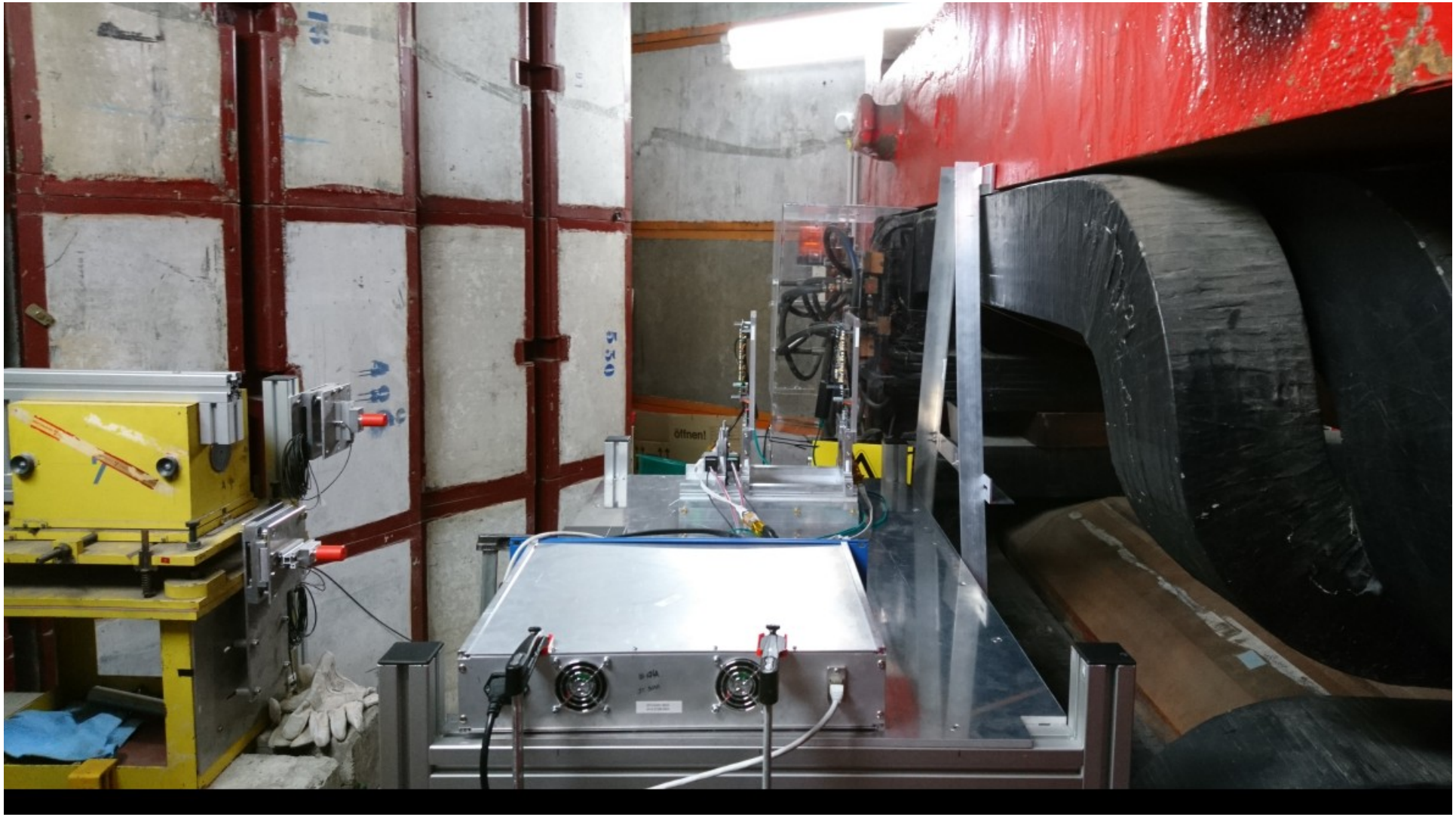
Check and optimize position of the beam after the magnet

Setup 3

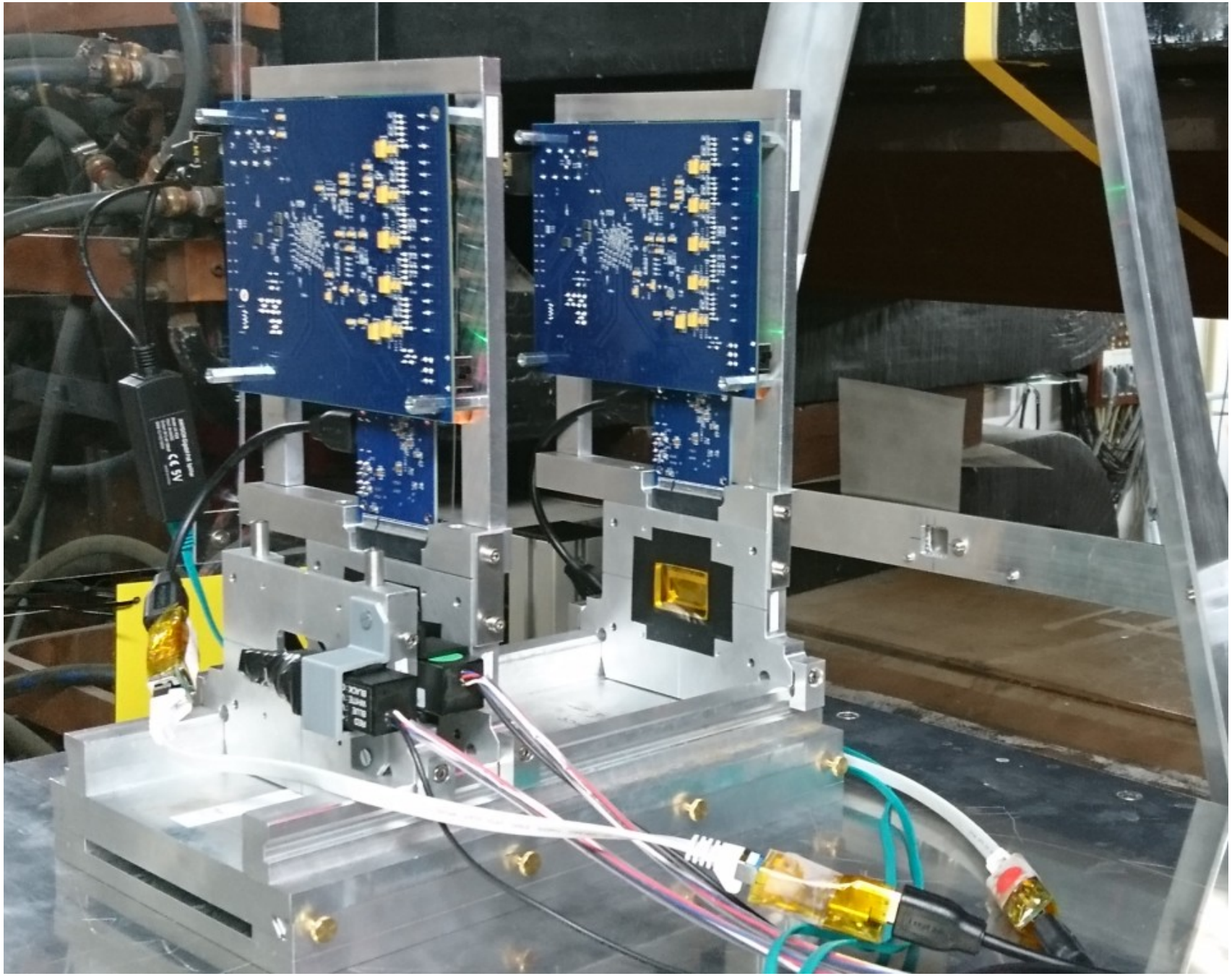


- Tungsten 0.1 mm (3%X0)
- Beam position at front plane of telescope X ≈ 45 mm.
- Telescope sensor size 30 x 15 mm^2;
- Covers electrons 5 GeV – 3.0 GeV;
- Photons: up to 2 GeV;

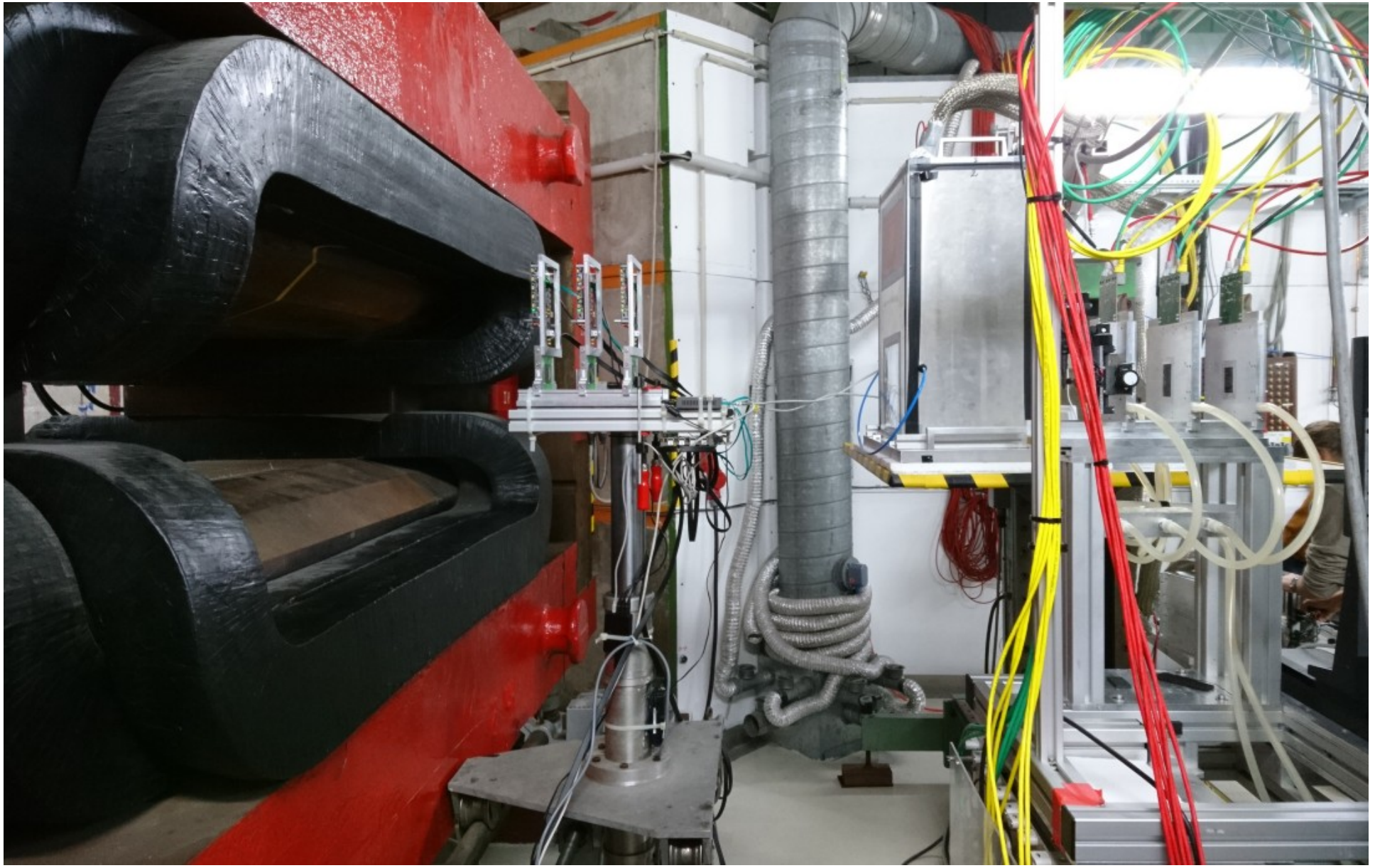
Upstream of the target



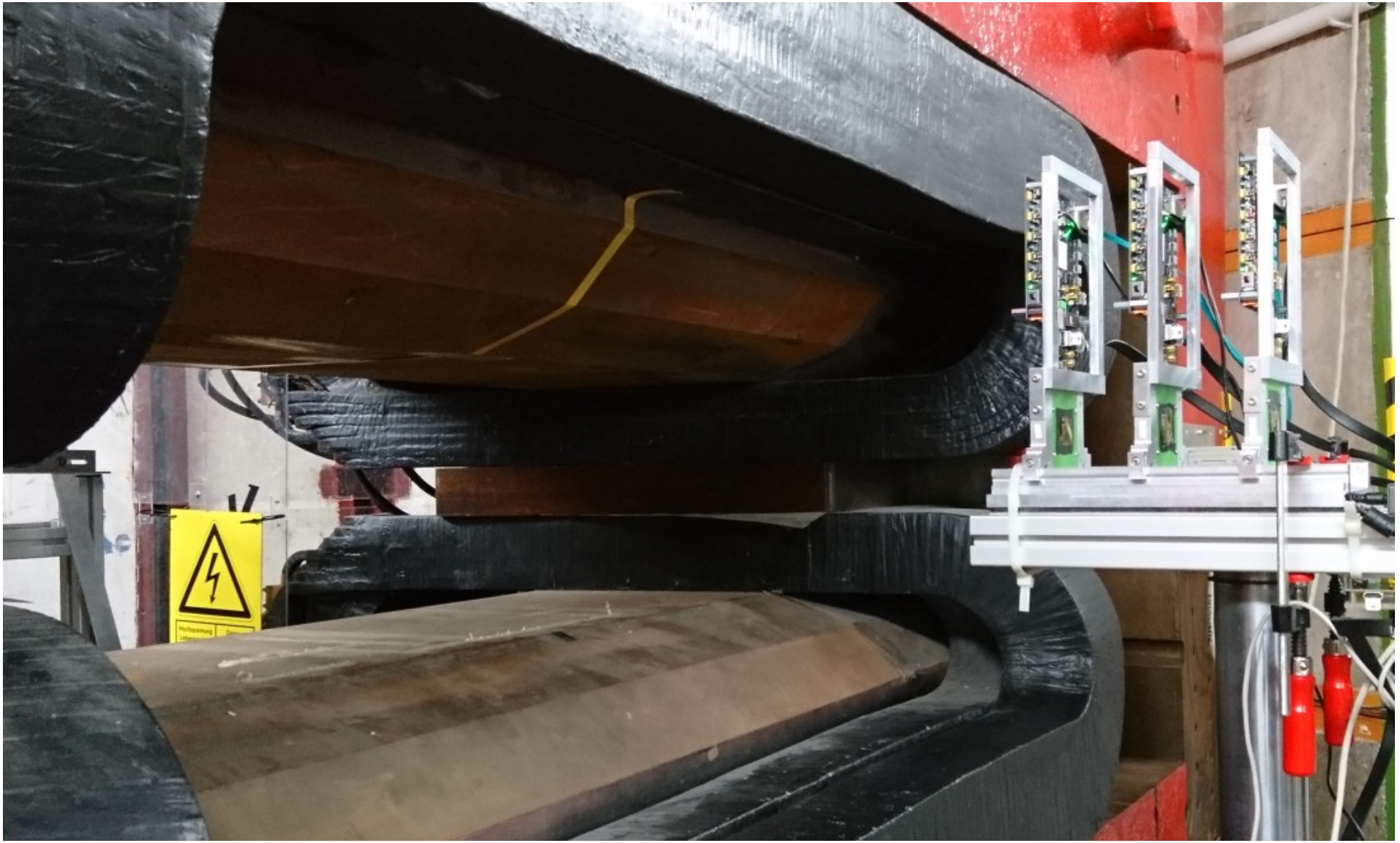
Upstream of the target



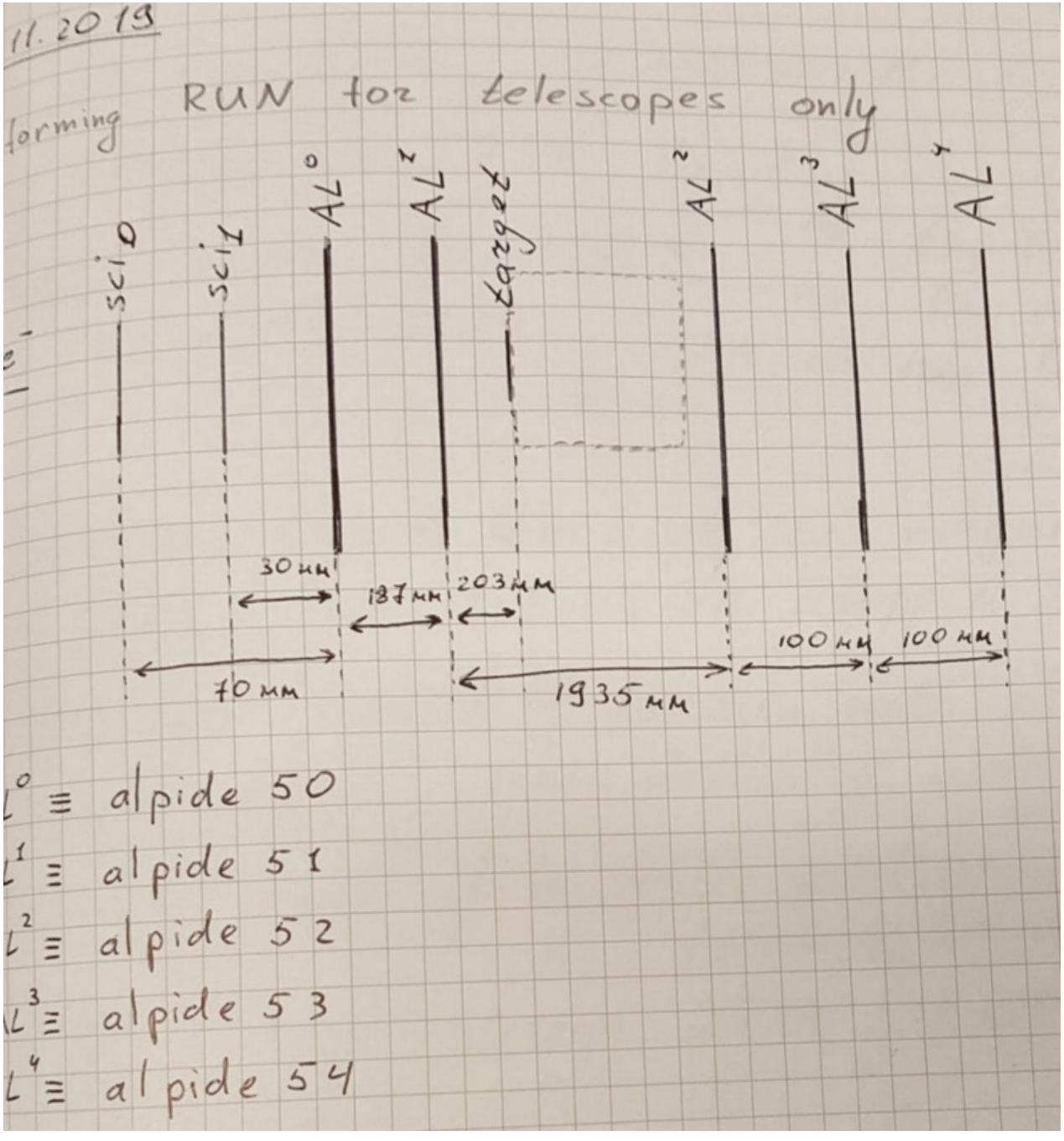
Downstream of the target



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): [ MESSAGE5 "HotPixelMasker"] Noisy Pixel Finder summary:
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 0 noisy pixels on sensor: 0
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 0 noisy pixels on sensor: 1
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 0 noisy pixels on sensor: 2
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 1 noisy pixels on sensor: 3
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 0 noisy pixels on sensor: 4
```

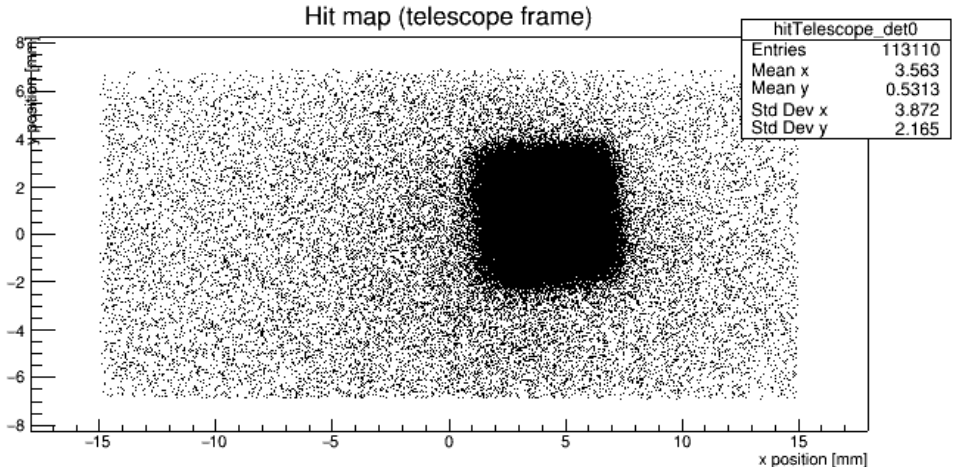
Run 60

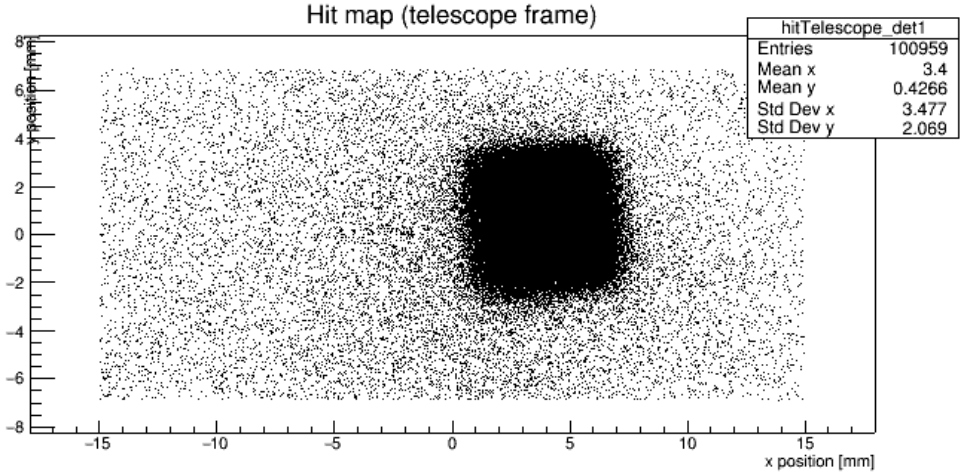
```
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Noisy Pixel Finder summary:
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 1 noisy pixels on sensor: 0
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 0 noisy pixels on sensor: 1
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 0 noisy pixels on sensor: 2
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 1 noisy pixels on sensor: 3
jobsub.noisypixel(INFO): [ MESSAGE5 "HotPixelMasker"] Found 0 noisy pixels on sensor: 4
```

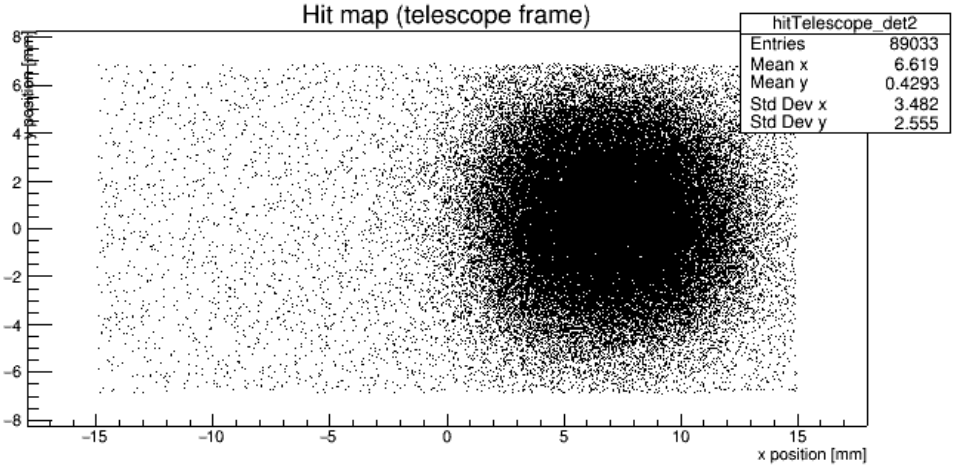
Geometry description

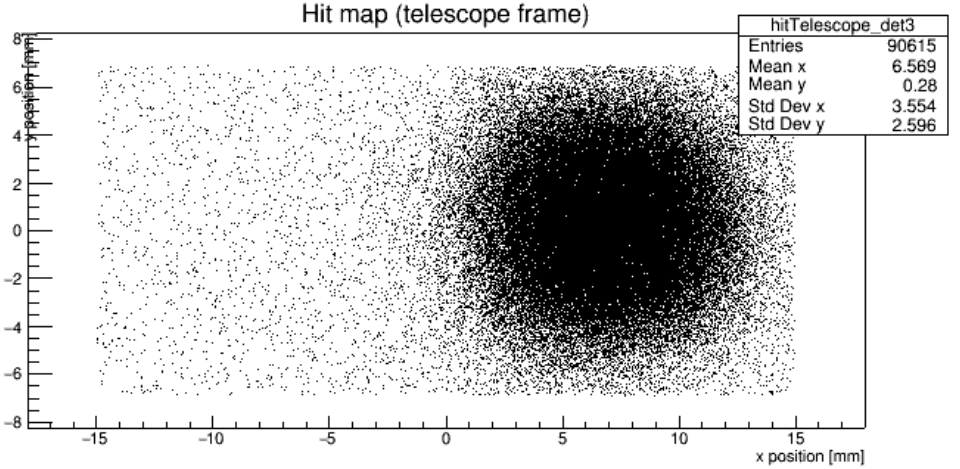
```
<gear>
  <!--GEAR file for DATURA Telescope in DESY TB 21 - Nov. 2012 -->
  <global detectorName="EUTelescope"/>
  <BField type="ConstantBField" x="0.0" y="0.0" z="0.0"/>
  <detectors>
    <detector name="SiPlanes" geartype="SiPlanesParameters">
      <siplanesID ID="0"/>
      <siplanesType type="TelescopeWithoutDUT"/>
      <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 -->
```

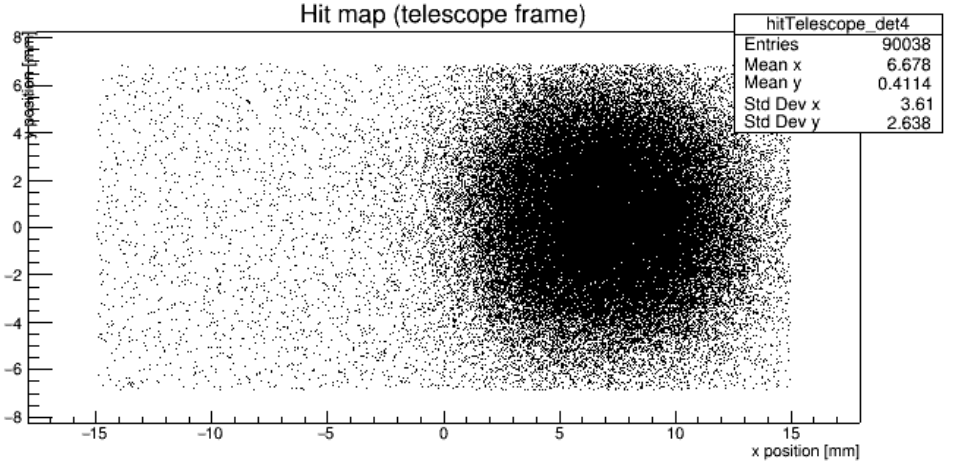
Hits, run 60, magnet off











Hits, run 49, magnet 0.2T