Evaluation of the PETsys TOFPET2 ASIC SIPM Readout System in the Scintillating Fibre Tracker (SciFi) prototype

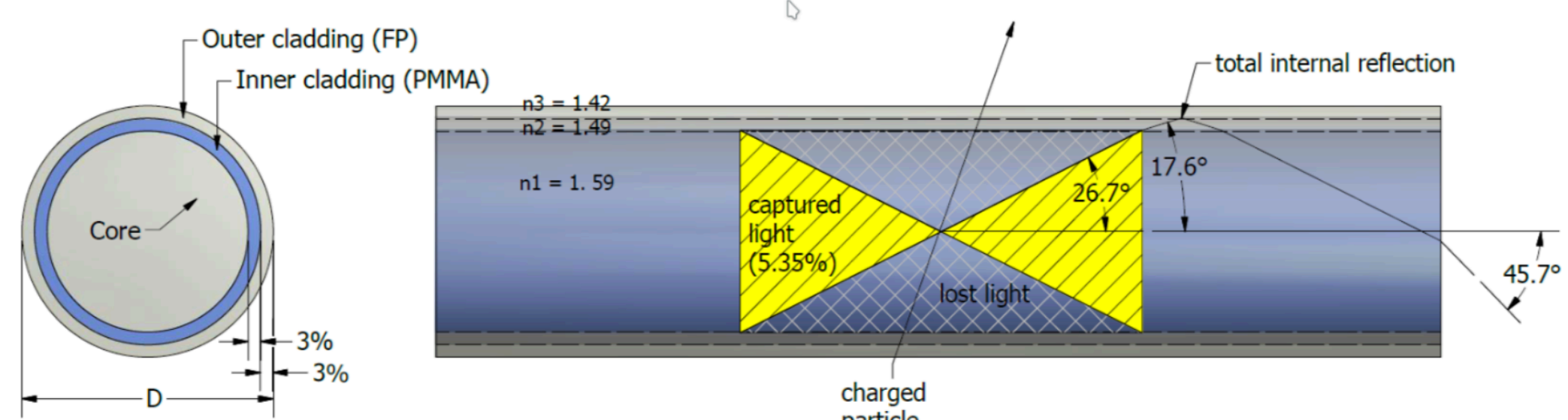**Serhii Cholak** (serhii.cholak@cern.ch), on behalf of EPFL SND group
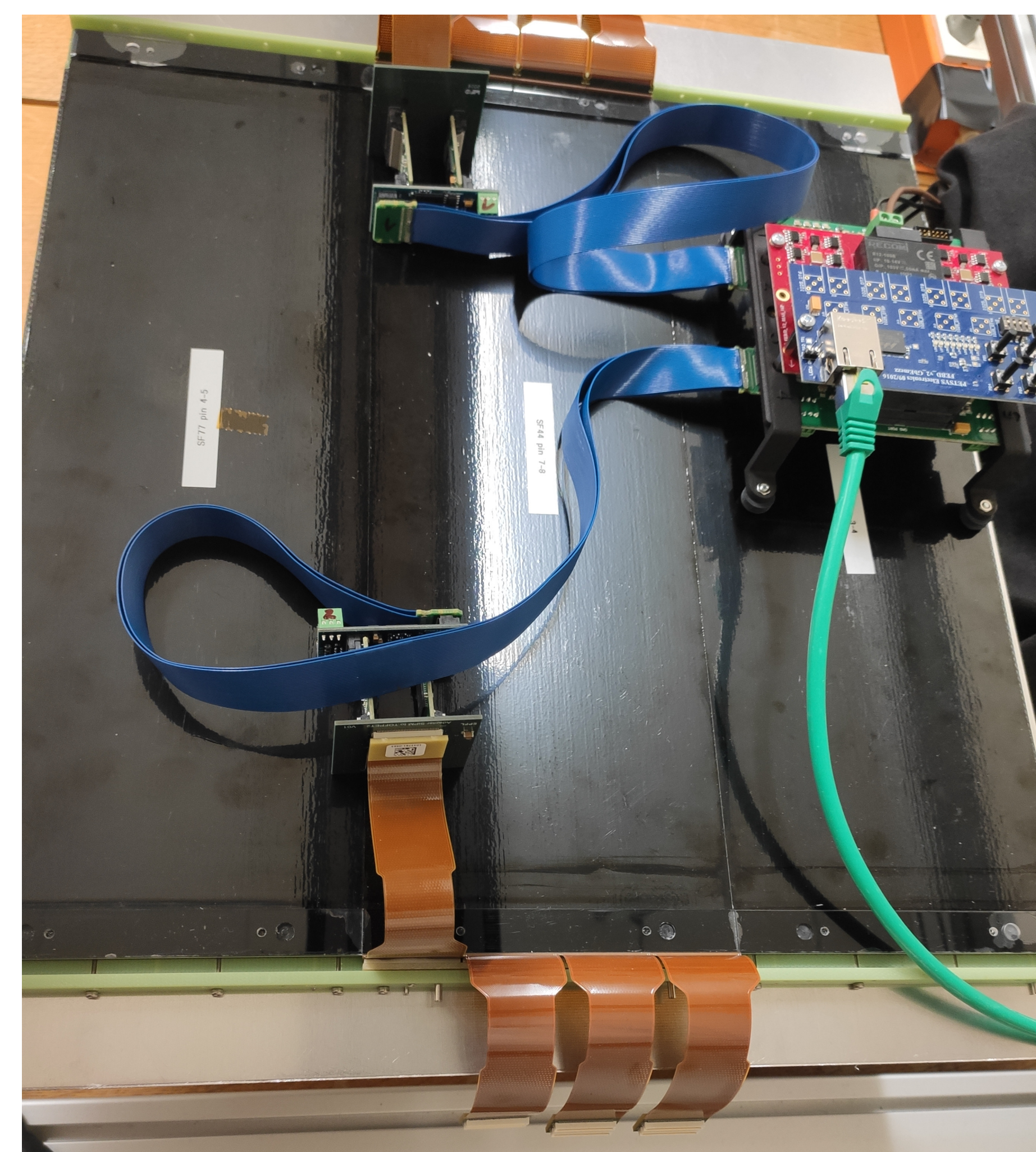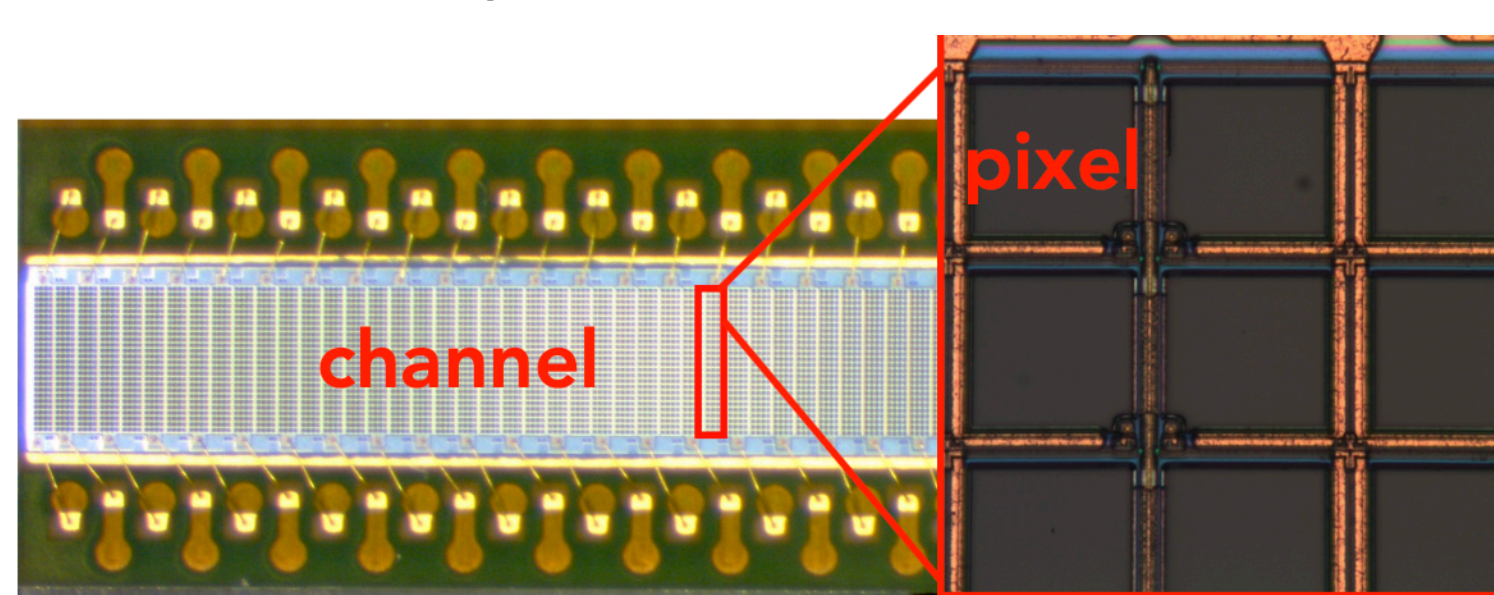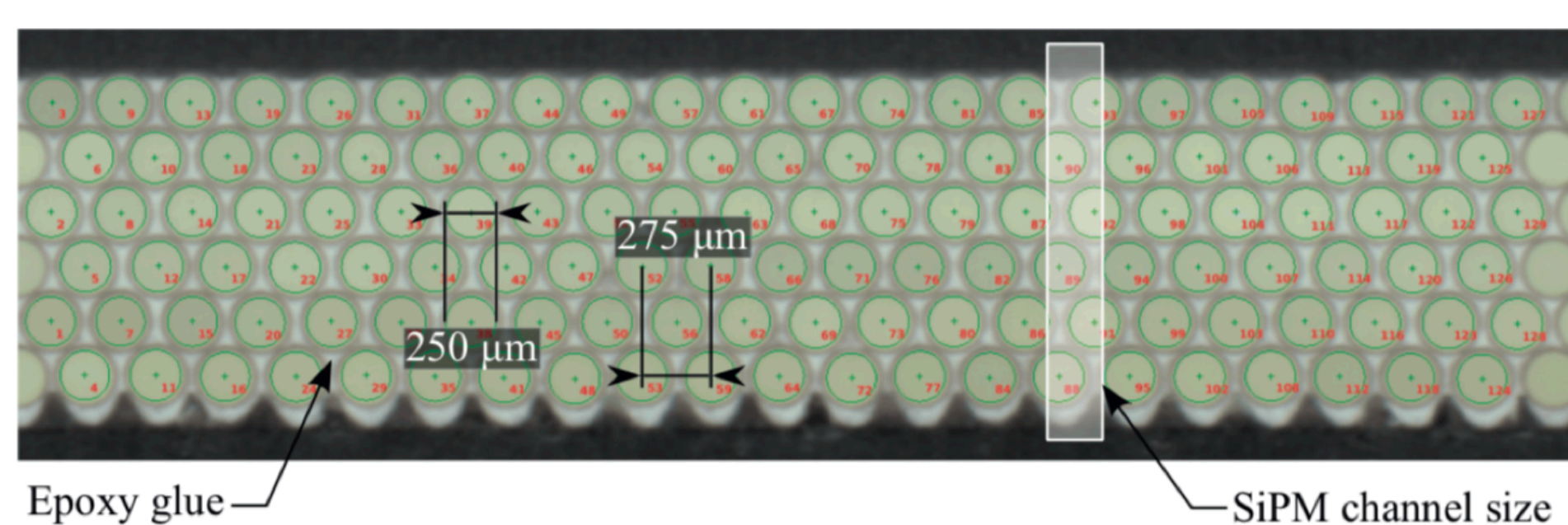
Evaluation of parameters of the following configuration:

- **Low-mass Scintillating Fibre Tracker (SciFi) technology**
- **Silicon Photomultipliers (SiPM)**
- **PETsys TOF ASIC Evaluation kit (e-kit)**

Forming together a 128 channels tracker prototype with readout from both sides
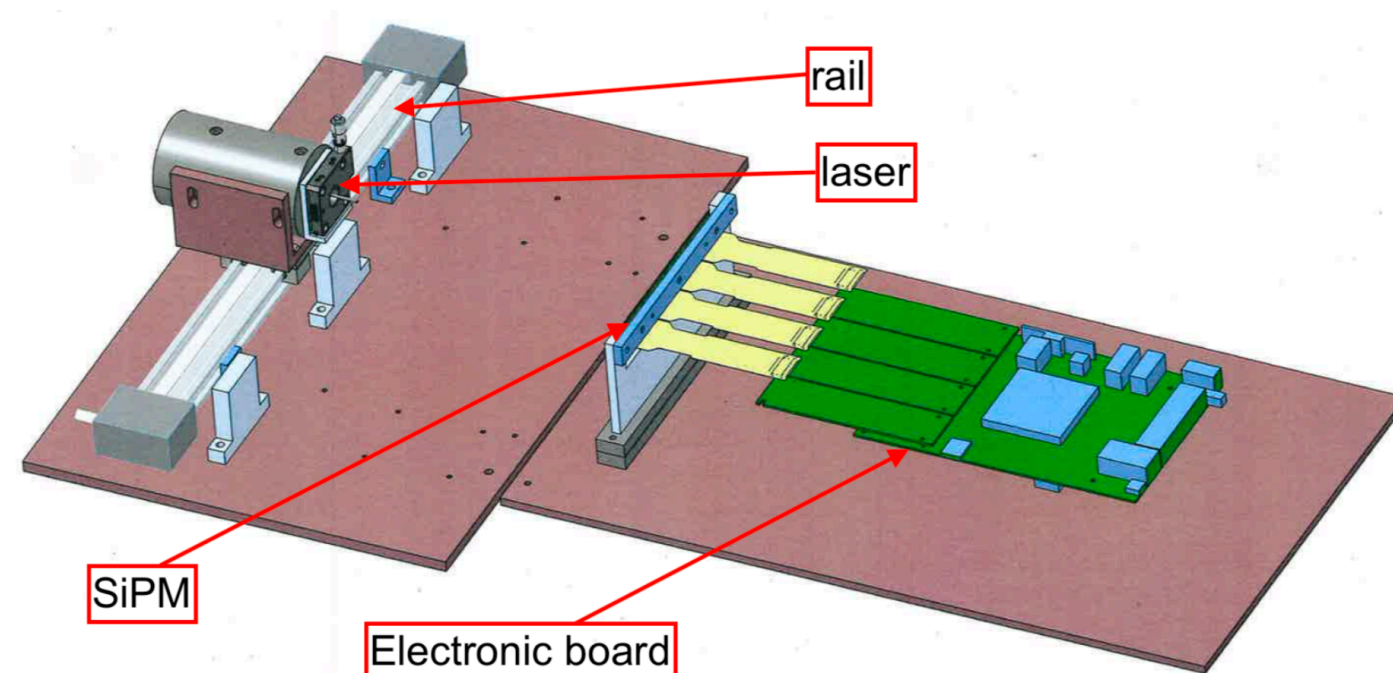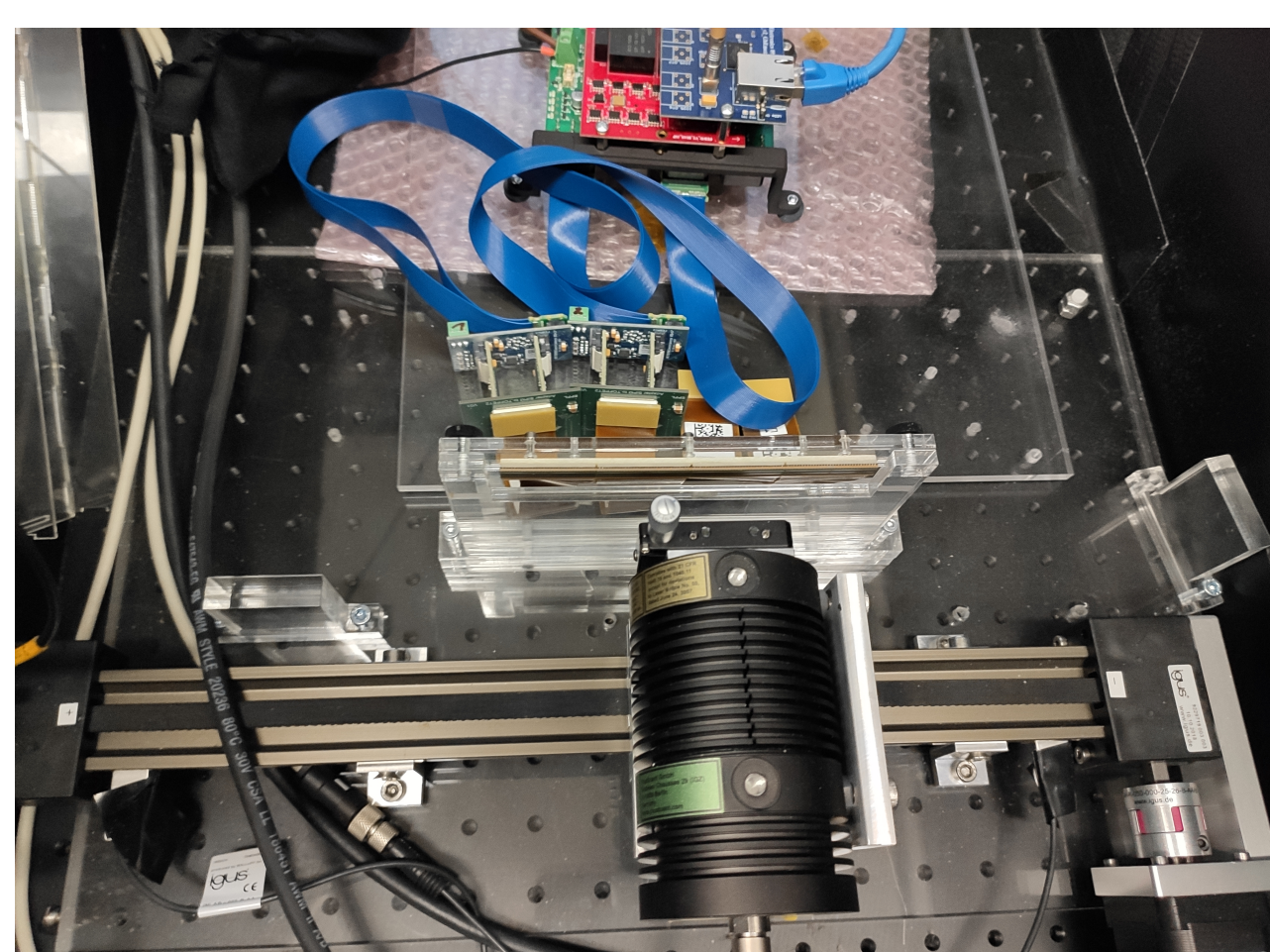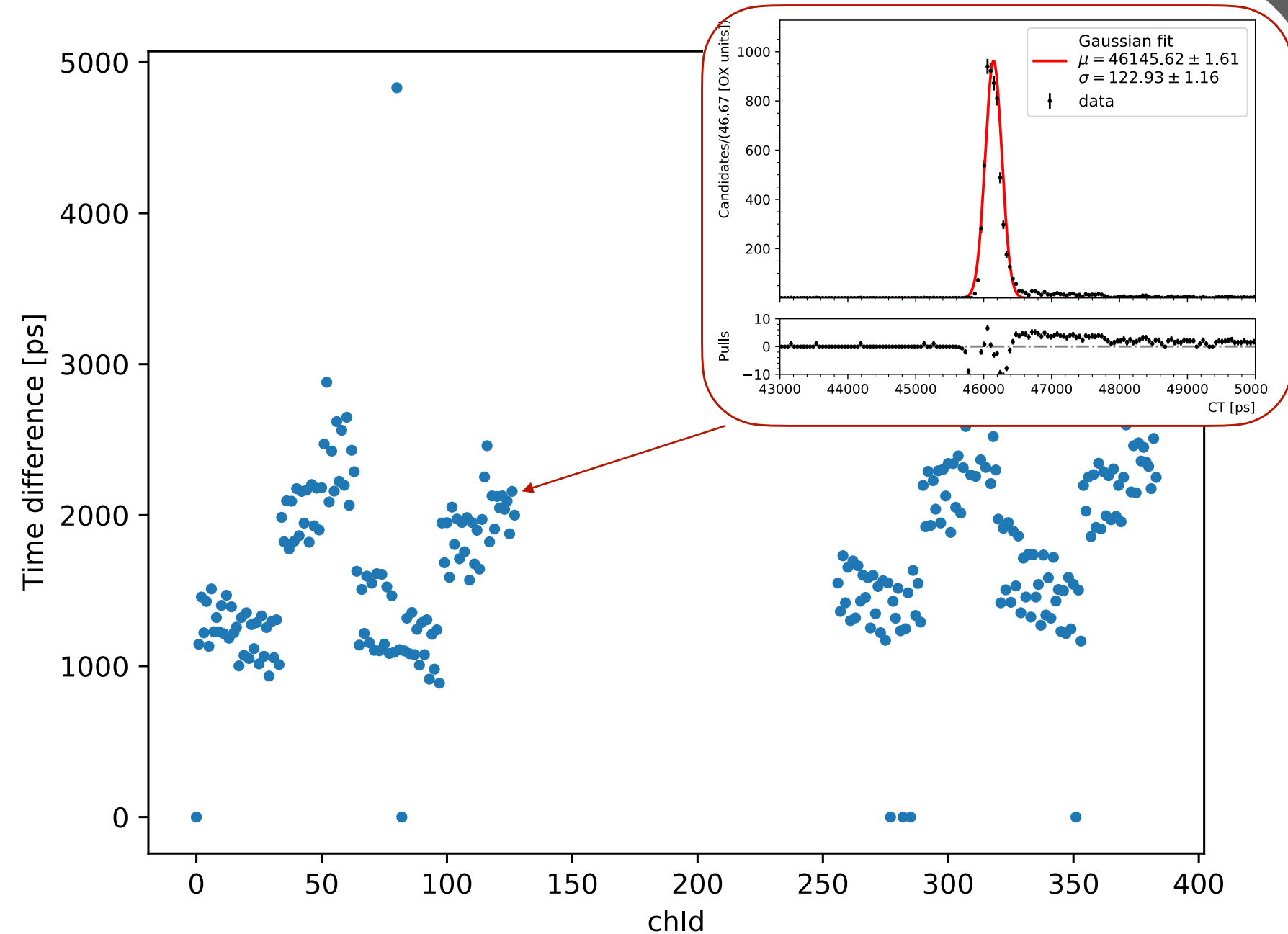

- total area: ~0.45 mm^2
- 128 channels:
  - 250 μm wide
  - 104 pixels per channel
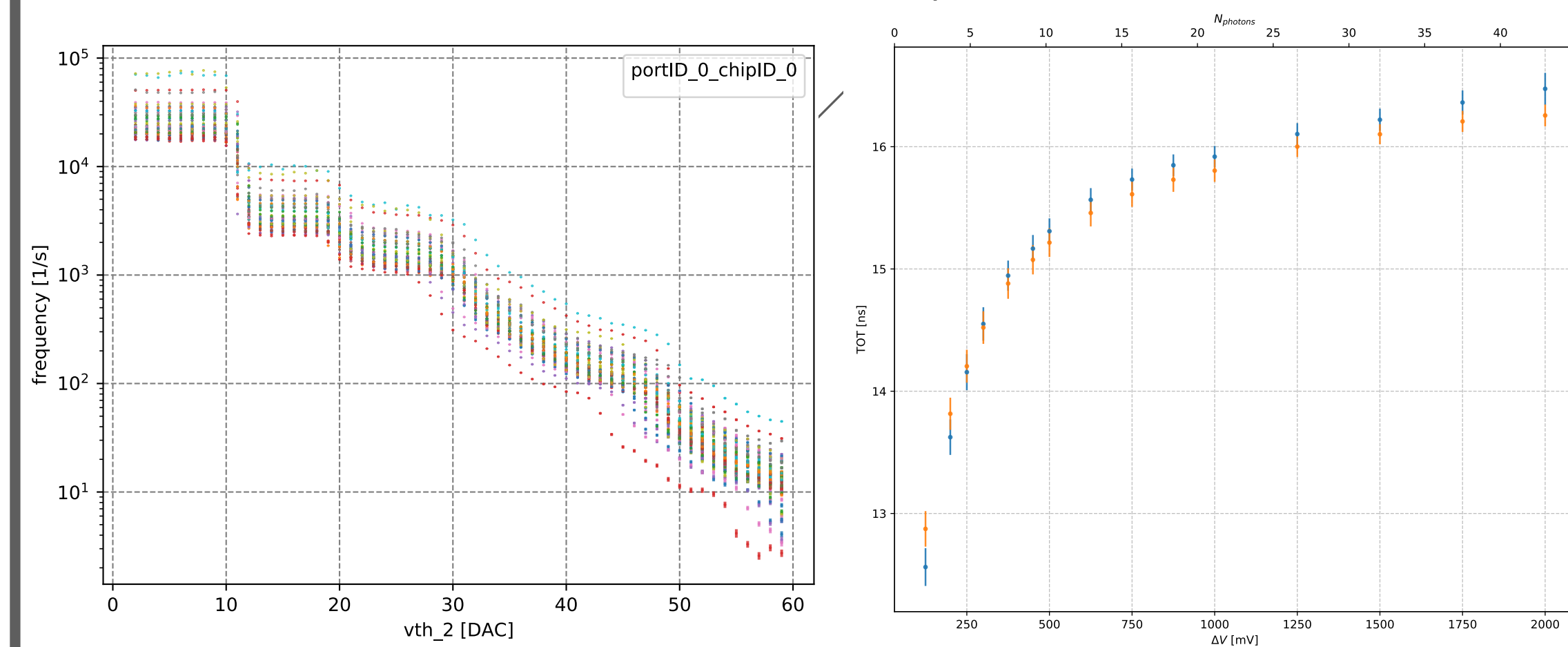 - pixel size: 57.5 μm x 62.5 μm

Timing calibration

- **The absolute time measured by each channel is not the same by default**
- **These time offsets are measured with a laser, illuminating each channel**
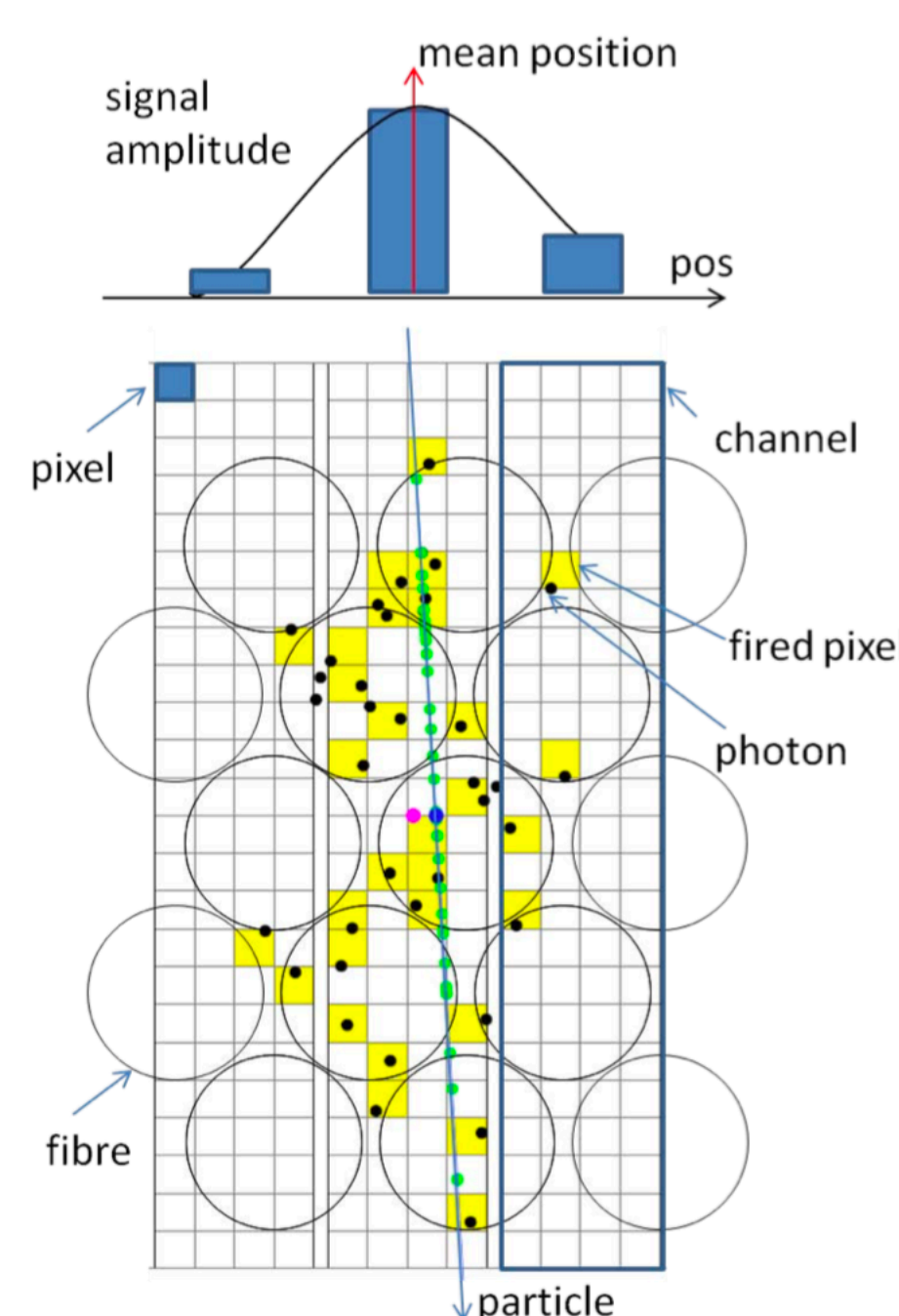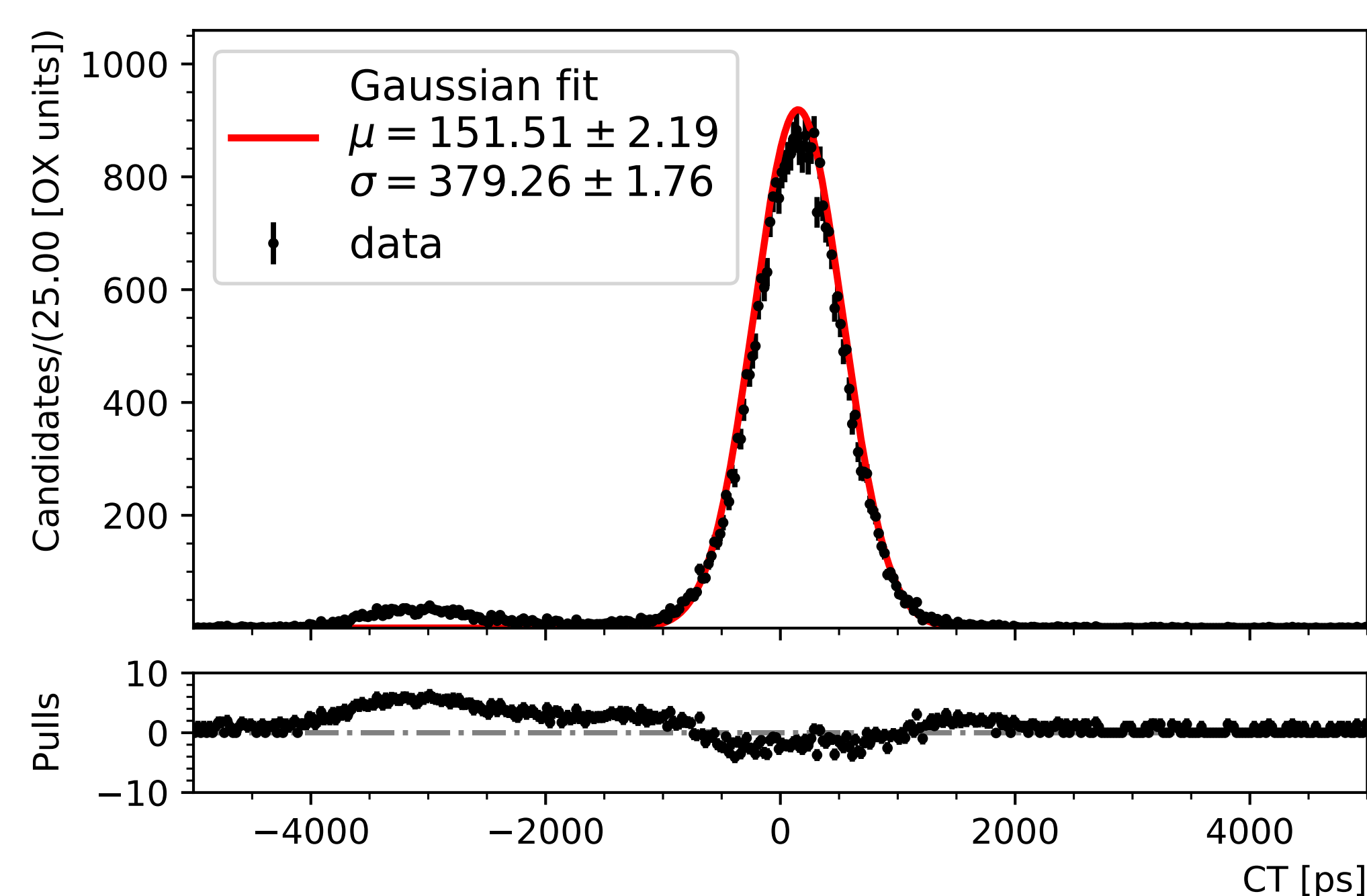- **Measured offsets remain constant in time**

Energy calibration

- **Energy thresholds are calibrated with a dark current rate scan technique**
- **Energy is measured in QDC and TOT modes**
- **Linearity of both methods is verified with injections of electrical pulses**

Does this ASIC fit to our detector?

Coincidence time resolution measurement

- **We evaluate the CTR in setup with a ^{90}Sr source**
- **Signals arrived to both sides are clusterized and evaluated**
- **Achieving 380 ps CTR on ~25ph/cluster!**

Gaussian fit
$\mu = 151.51 \pm 2.19$
$\sigma = 379.26 \pm 1.76$
data

From the prototype to employment at SND

- **SciFi tracker module of the SND@LHC experiment is designed and assembled at EPFL**
- **TOFPET2 ASICs is used for the readout FEBs**
- **To be installed already this autumn!**