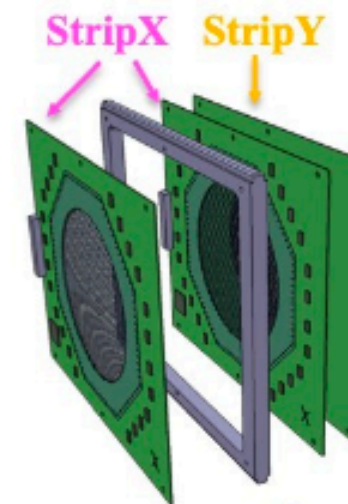
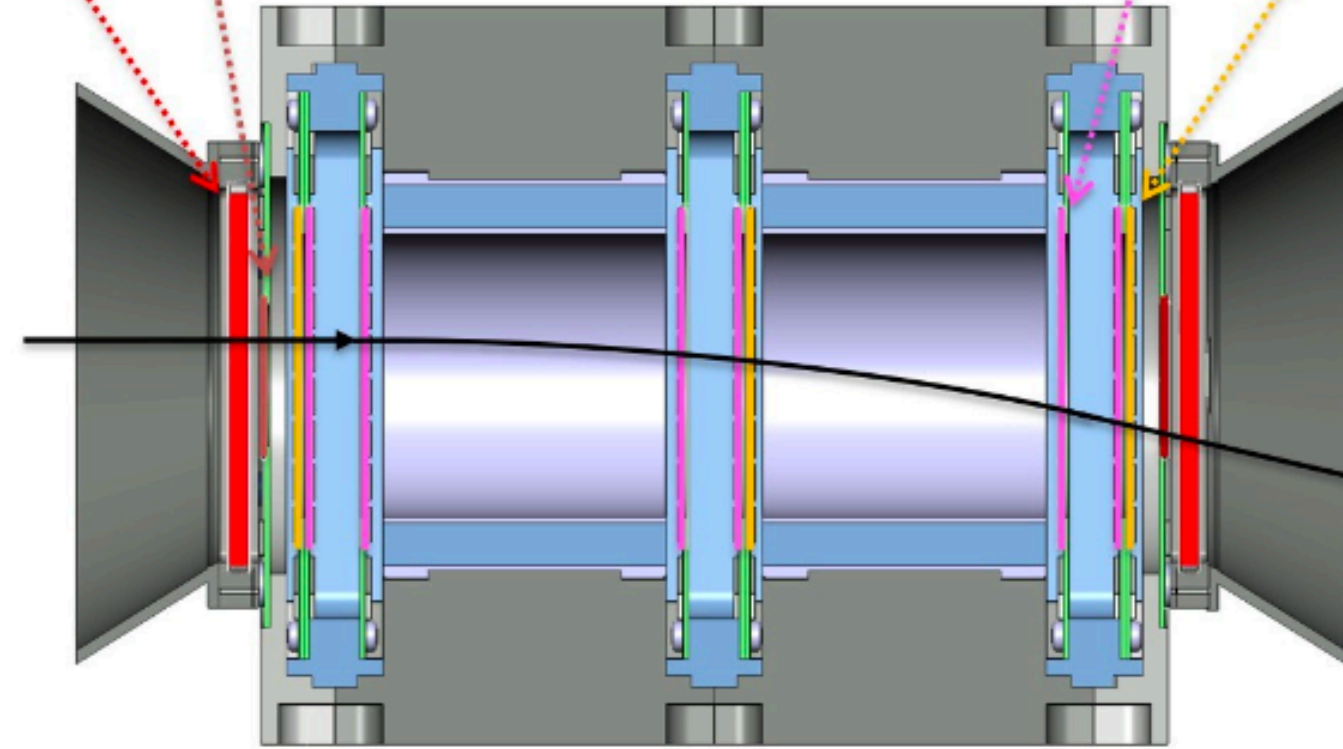
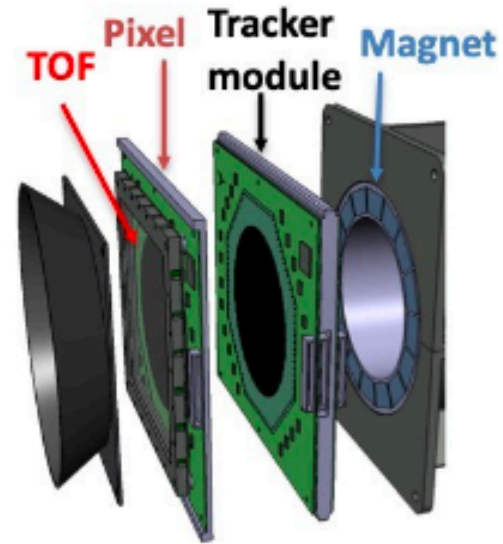


PAN Beamtest. H4 Beam Line

Johannes Hulsman

PAN: Compact Magnetospectrometer for Deep Space Missions

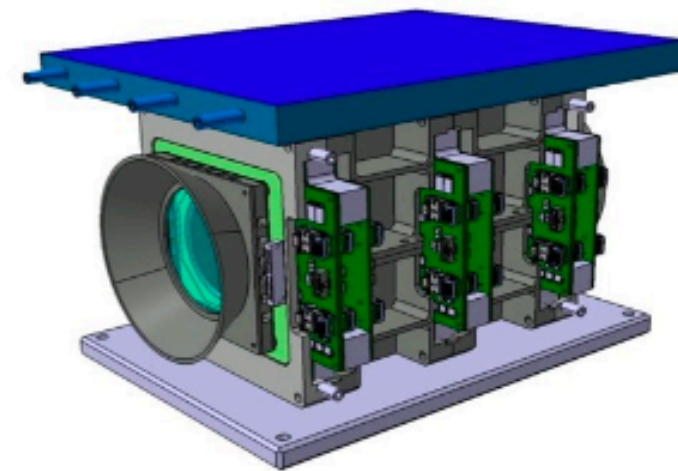
- Excellent rigidity resolution thanks to fine pitch thin (**StripX**, **StripY**) silicon detectors
- In addition: **TOF**, **PIXEL**



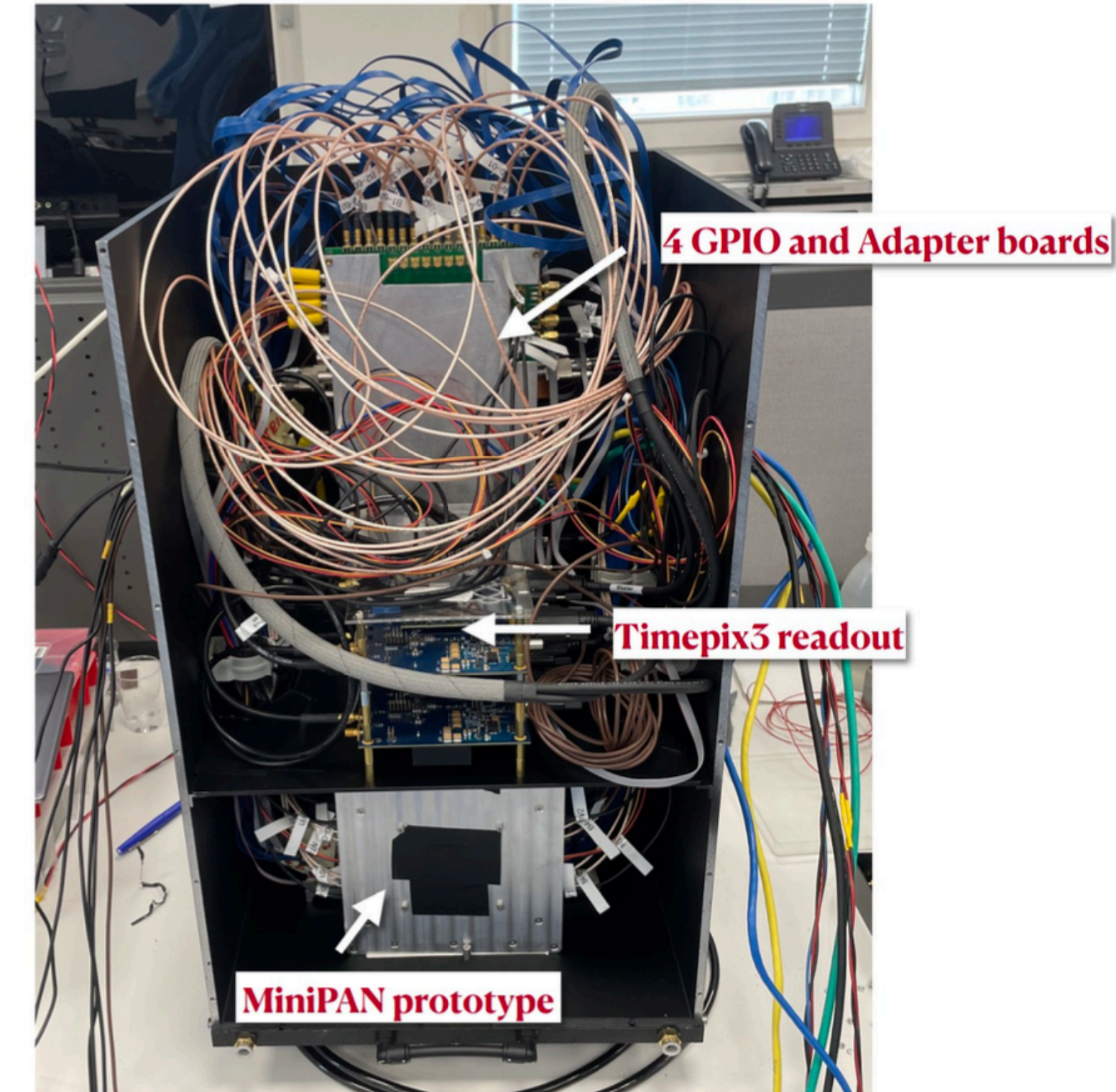
StripY: measure the particle direction in Y with an angular resolution $\sim 0.2^\circ$

- Also provide trigger
- Measure Z (both Strip-X and Strip-Y)

- **PIXEL**: 3-d points with 55 μm Si pixels
 - No measurement degradation even during the most intense solar storms
 - Provide a high rate particle counter
 - Improve tracking (a fraction of events)
 - Measure Z (a fraction of events)
 - Only partial coverage for power saving

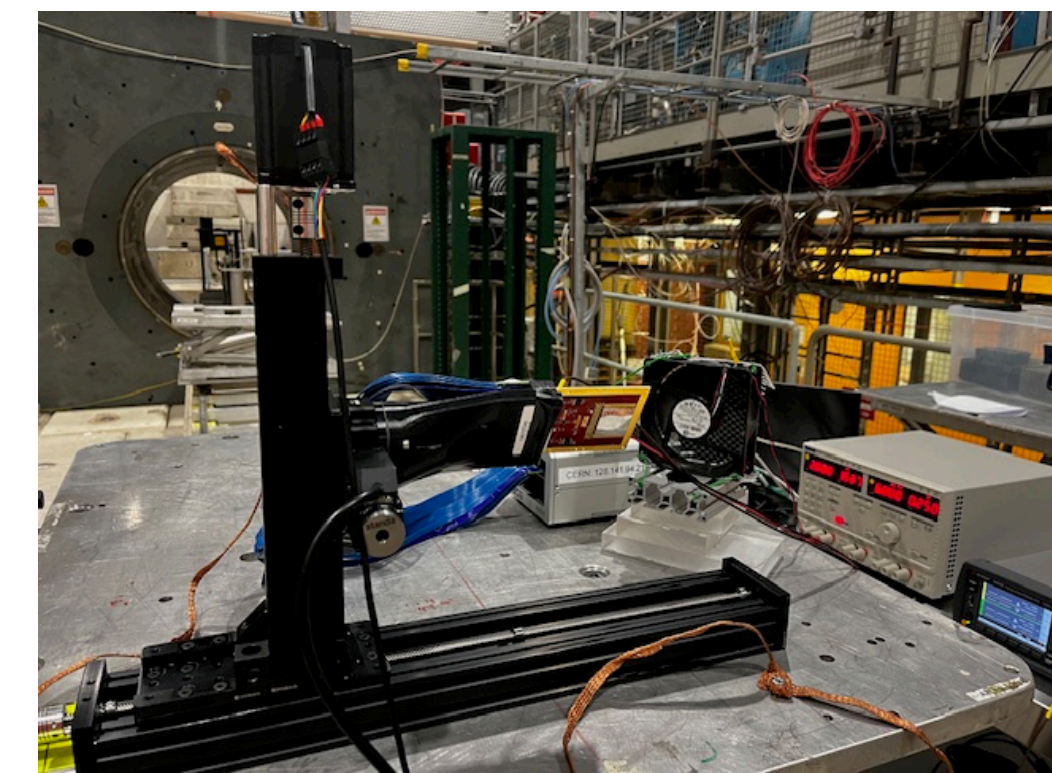


All the goodies for just <10 kg, < 30 W, $30 \times 20 \times 20$ cm³ !!!



MiniPAN prototype inside the experimental area.

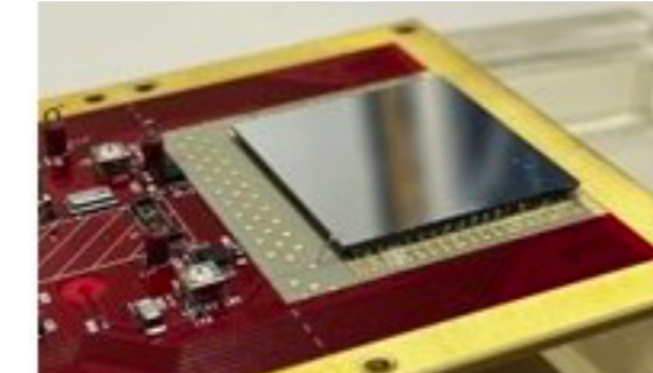
From Mini.PAN to Pix.PAN



Pix.PAN Concept Instrument Design

2 magnets + 6 layers of quad Timepix4 detectors grouped in 3 tracking stations

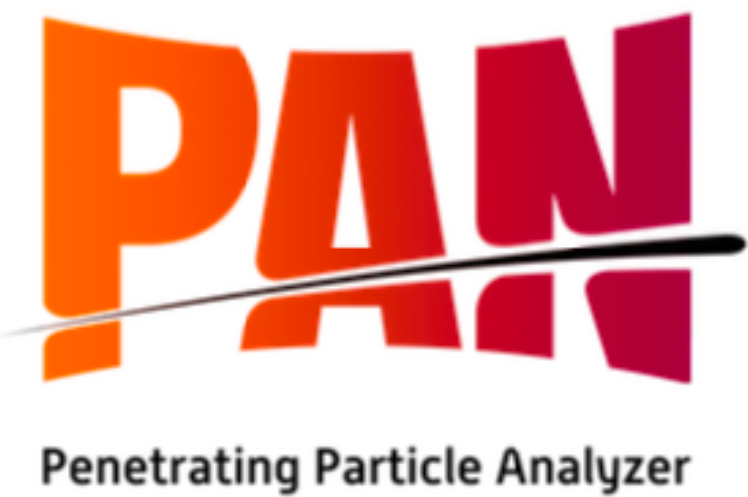
- High rate capability
- Single type of active component: Timepix4 Si pixel sensor in quad assembly
- Data-driven readout (no trigger needed)
- Full analog readout: particle identification with dE/dx
- 195 ps timestamp \Rightarrow Time-Of-Flight as additional handle for particle ID



New Pixel Sensor Design

Optimized pixel geometry for good hit resolution in bending direction

- “long” pixel: $13.75 \mu\text{m} \times 1760 \mu\text{m}$ \rightarrow hit resolution $\approx 3 \mu\text{m}$, only 1/8 of Timepix4 cells used
- connect this non-standard pixel detector to the $55\mu\text{m} \times 55\mu\text{m}$ square readout cells of Timepix4
- Save 7/8 of front-end analog power consumption plus some part of digital power



PAN SPS Beamtest

- **1 ion beamtest** campaign scheduled
 - H4, Week 48, 1 week
- **Our plans:**
 - Angular scans
 - Multiple sensor configurations
 - Two sensor types (100um and 300um)
- Our beam and exp. area needs:
 - **Fragmented hadron beam ($A/Z = ?$), 13GeV**
 - Rate: >10kHz
 - “Wide” beam ~**1x1cm FWHM**
 - A **vertically adjustable table**: DESY table preferably
 - **2 regular tables** for PCs, power supplies and other equipment inside the area