

MAPS activities at GUF Frankfurt

Michal Koziel

Outline

- Our team
- Realized projects
- Our test-stands
- Our labs
- Our commitment to the CREMLIN+ project

Our team



Prof. Joachim Stroth
Group leader



Dr. Christian Müntz
Project coordinator



M.Sc. Philipp Klaus
Slow control expert



Dr. Michal Koziel
Integration & CPS
expert

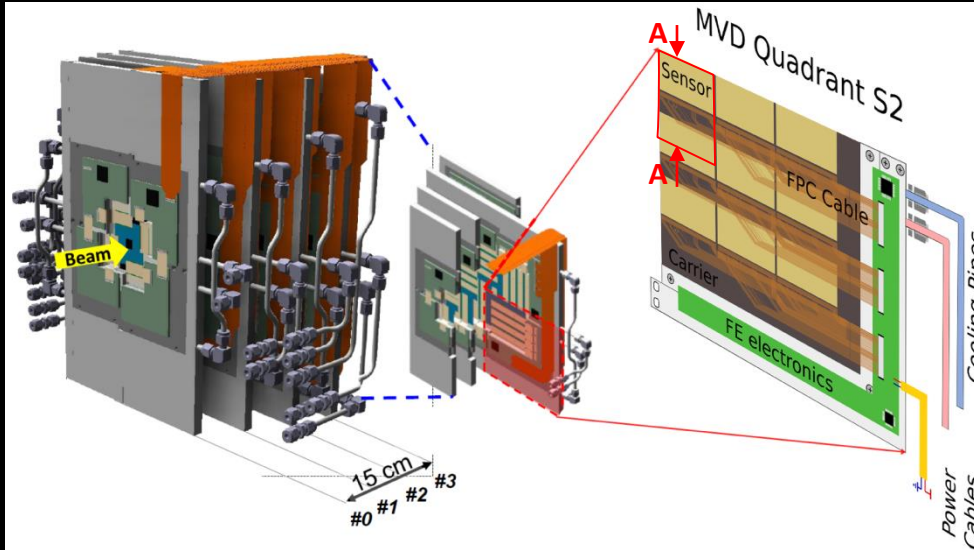


Dr. Michael Deveaux
CPS expert



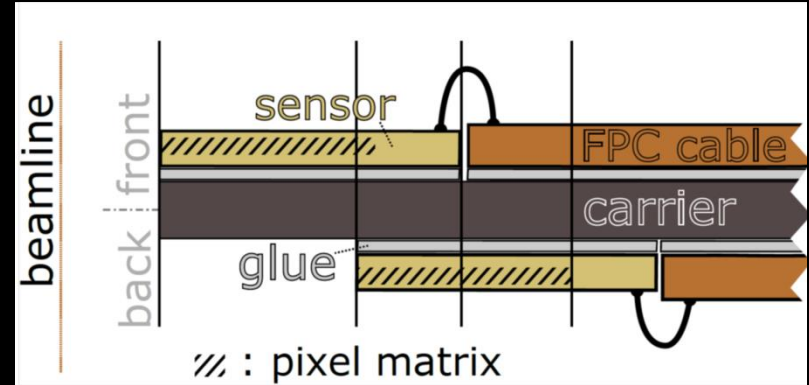
Dr. Jan Michel
DAQ expert

Integration activities driven by CBM-MVD



Sensors

A - A



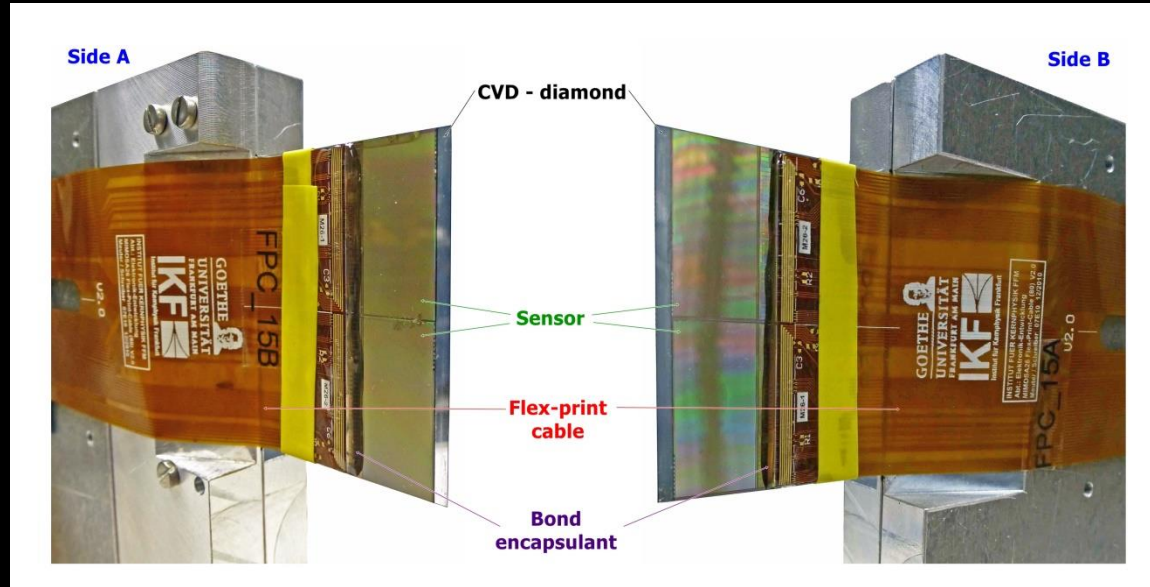
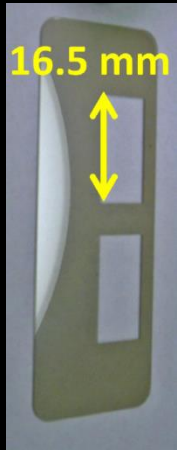
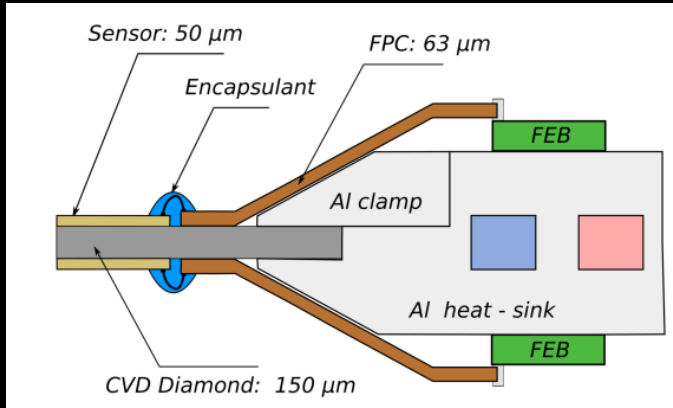
- Ultra-low material budget in the acceptance
- Services outside the acceptance
- Convective cooling => high thermal conductivity materials employed as a sensor support, clamped to a heat-sink actively cooled by the means of chiller + cooling liquid
- Vacuum operation




Financial support

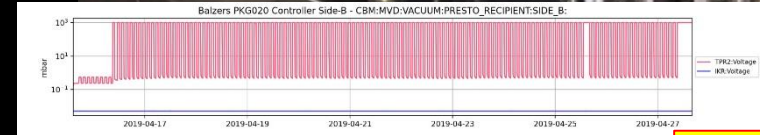
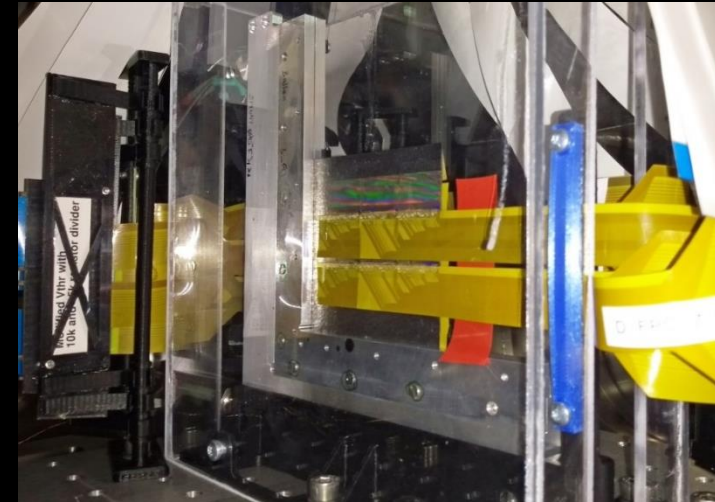
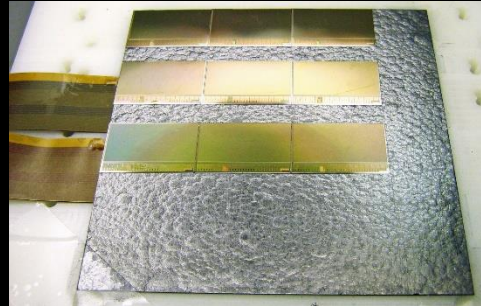
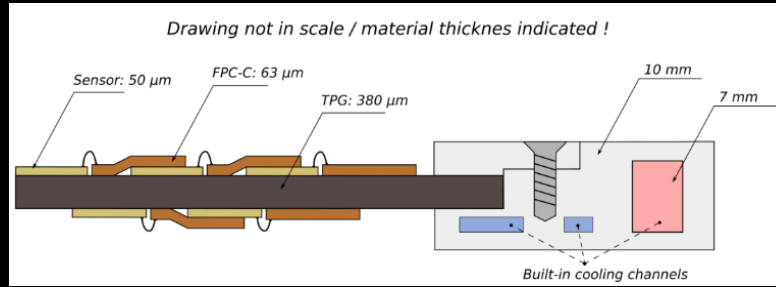
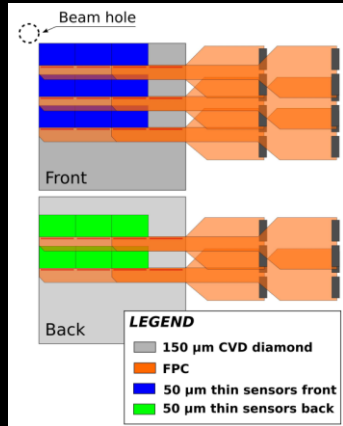


CVD Diamond-based assembly



- **Sensors:** 2 + 2 MIMOSA-26 sensors ($21.5 \times 13.8 \text{ mm}^2 / 350 \text{ mW/cm}^2$)
- **Support:** 150 μm thin CVD Diamond ($0.08 X_0 / 100 \text{ μm}$, $> 1800 \text{ W/mK}$)
- **Material budget:** 0.3% X_0
- **Tested @ beam:** 120 GeV pion beam at  SPS

TPG-based assembly



- **Sensors:** 9 + 6 MIMOSA-26 sensors ($21.5 \times 13.8 \text{ mm}^2 / 350 \text{ mW/cm}^2$)
- **Support:** min 300 μm (500 μm used) thin TPG ($0.05 X_0 / 100 \text{ μm}$, $> 1500 \text{ W/mK}$)
- **Flex-print cable:** Cu, custom made @ILFA with material budget of $0.05 X_0$
- **Material budget:** max. $0.4\% X_0$
- **In-vacuum operation:** yes, since Dec. 2018

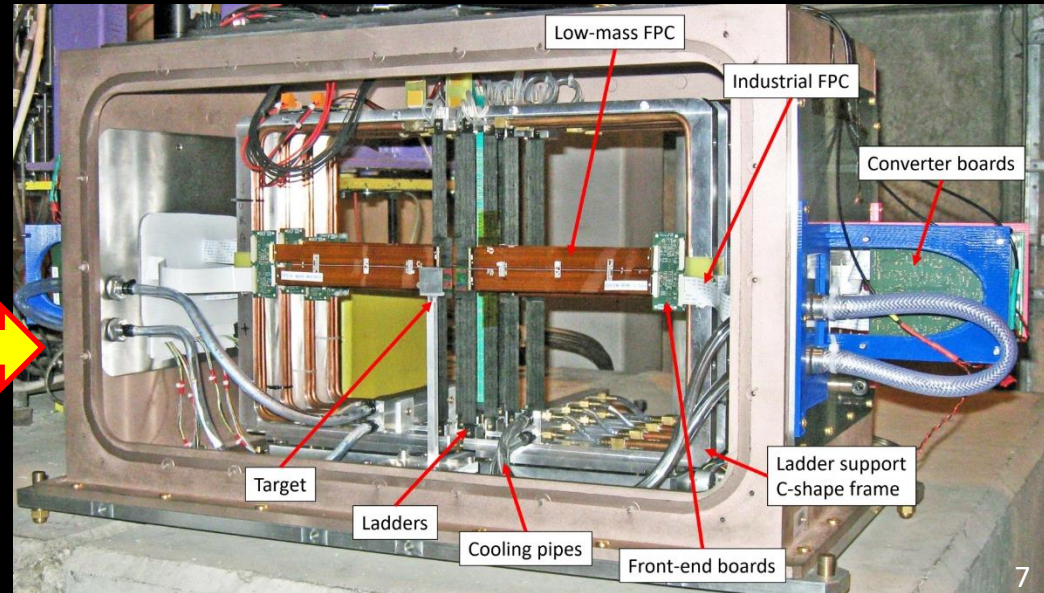
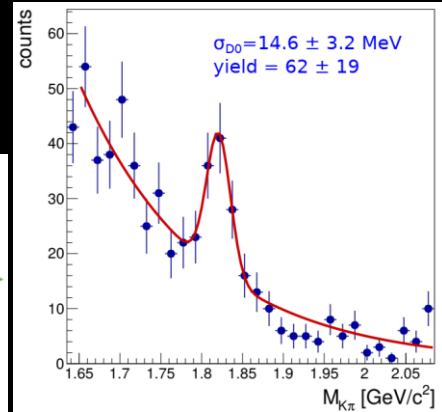
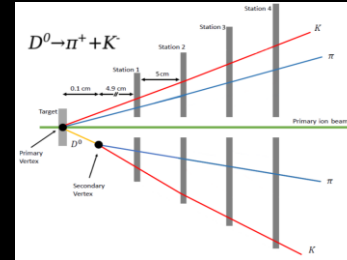
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The SHINE Vertex Detector

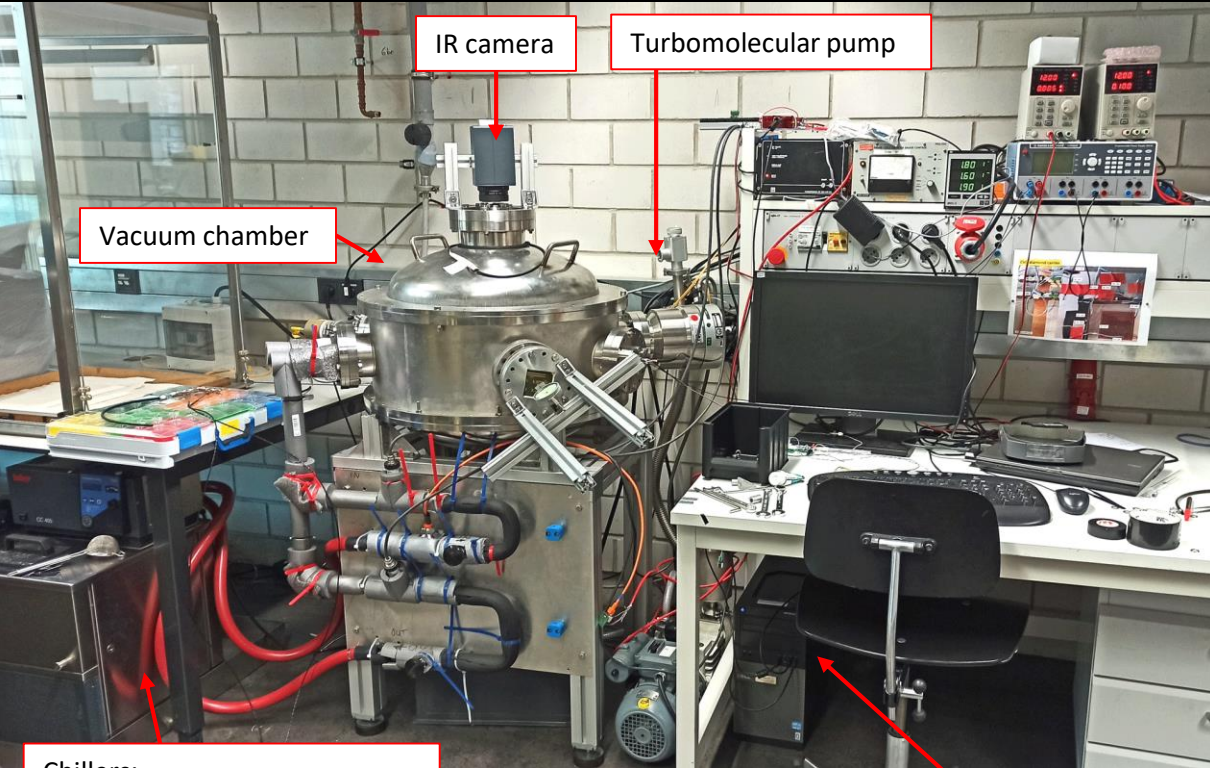
NA61



- Probe testing of thinned MIMOSA-26 sensors
- Integration
- Quality assessment
- Provide sensor readout
- Installation at the experiment site
- Know-how transfer



Vacuum test-stands



IR camera

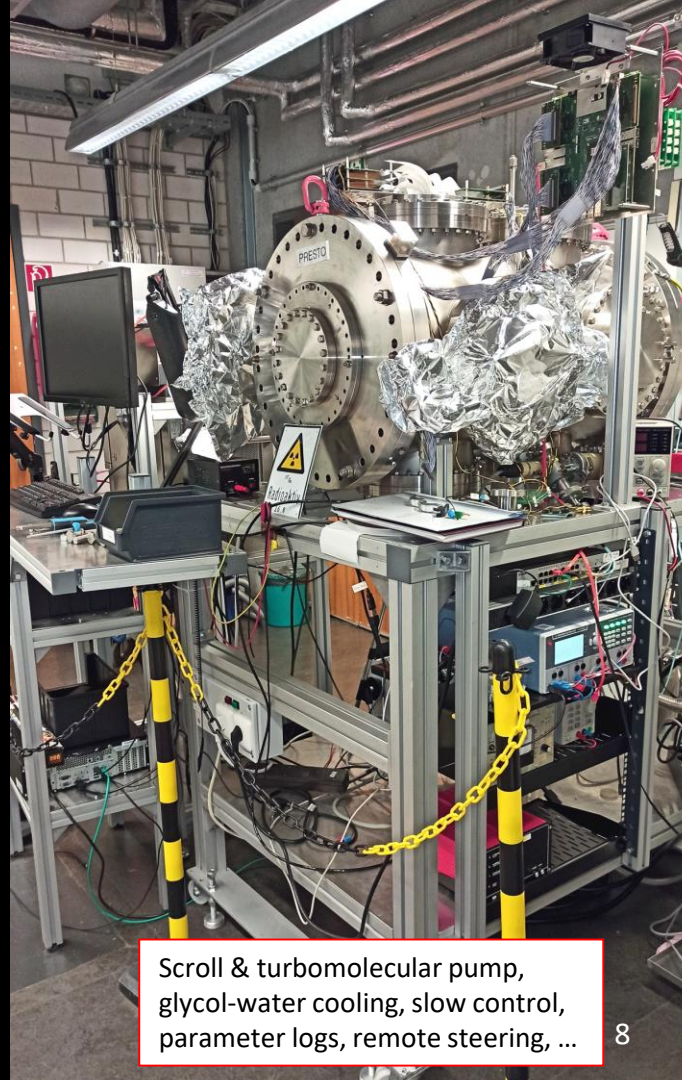
Turbomolecular pump

Vacuum chamber

Chillers:
• Huber with glycol water mix.
• Julabo with Novec 649

Scroll pump

Slow control



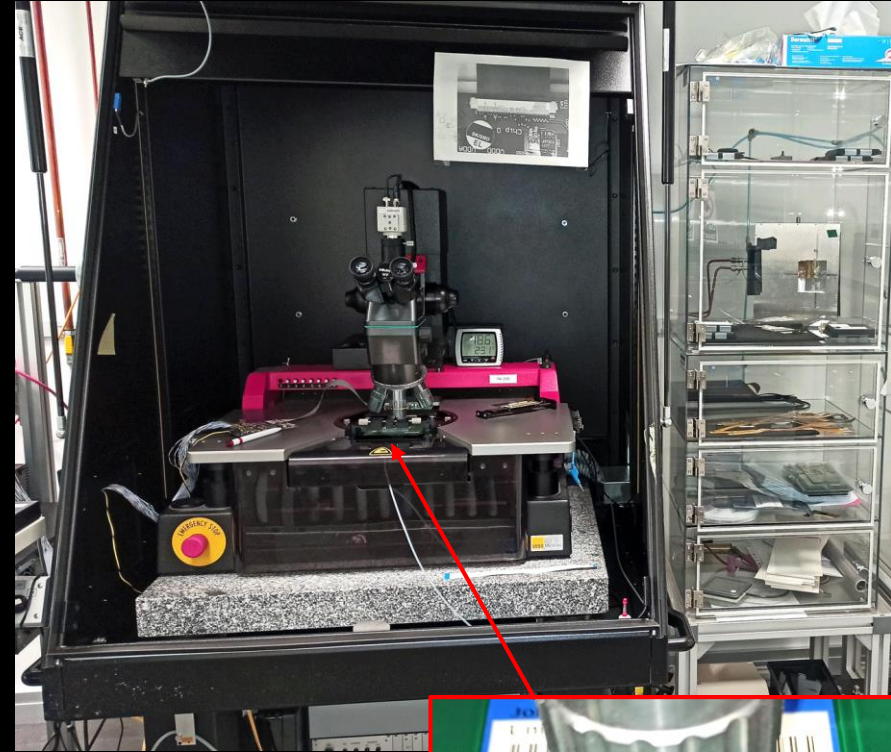
Scroll & turbomolecular pump,
glycol-water cooling, slow control,
parameter logs, remote steering, ...

Grey / clean room @IKF



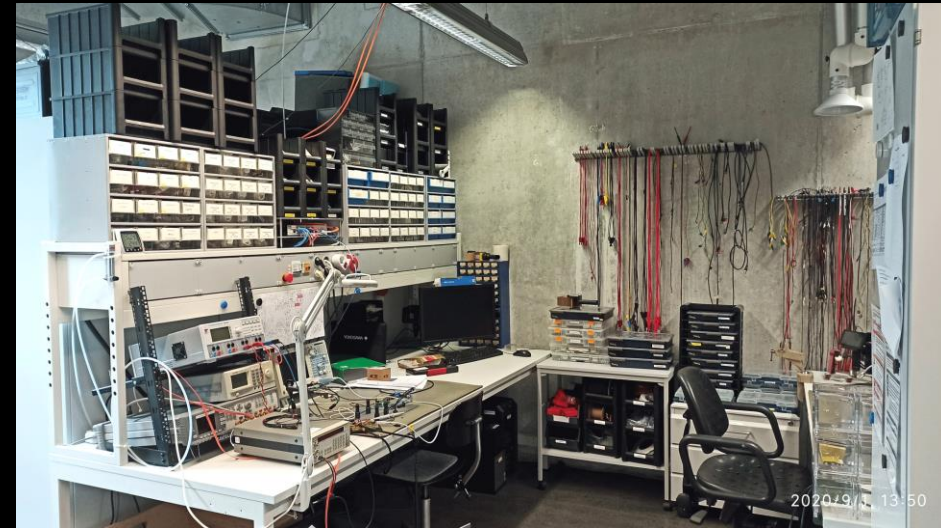
- Manual wire bonder
- Probe-tester Suss Microtec PA-200
- Chuck adapters for thin sensor probing designed and manufactured at GUF
- Dark chamber
- Flow boxes
- ESD protected

18 m² ISO Class 8 clean room



Electronic & DAQ lab

- Focus: digital electronics (e.g., TRB boards family)
- PCB production @ external manufacturers
- PCB design and assembly @GUF



Outlook:

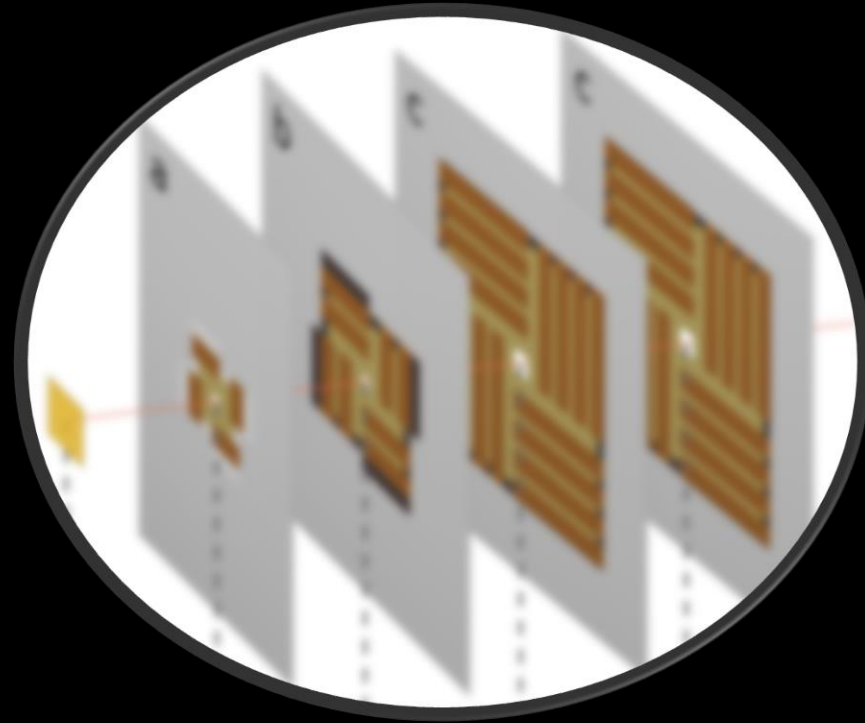
Our deliverables:

D7.6 Design of demonstrator MAPS tracker for fixed target geometry – the end of the 1st year

Know-how transfer:

D7.7 Prototype CREMAPS sensor system – the end of the 2nd year

D7.8 Technical design report CREMAPS tracker – the end of project



... thank you for your attention.