



Universität Hamburg

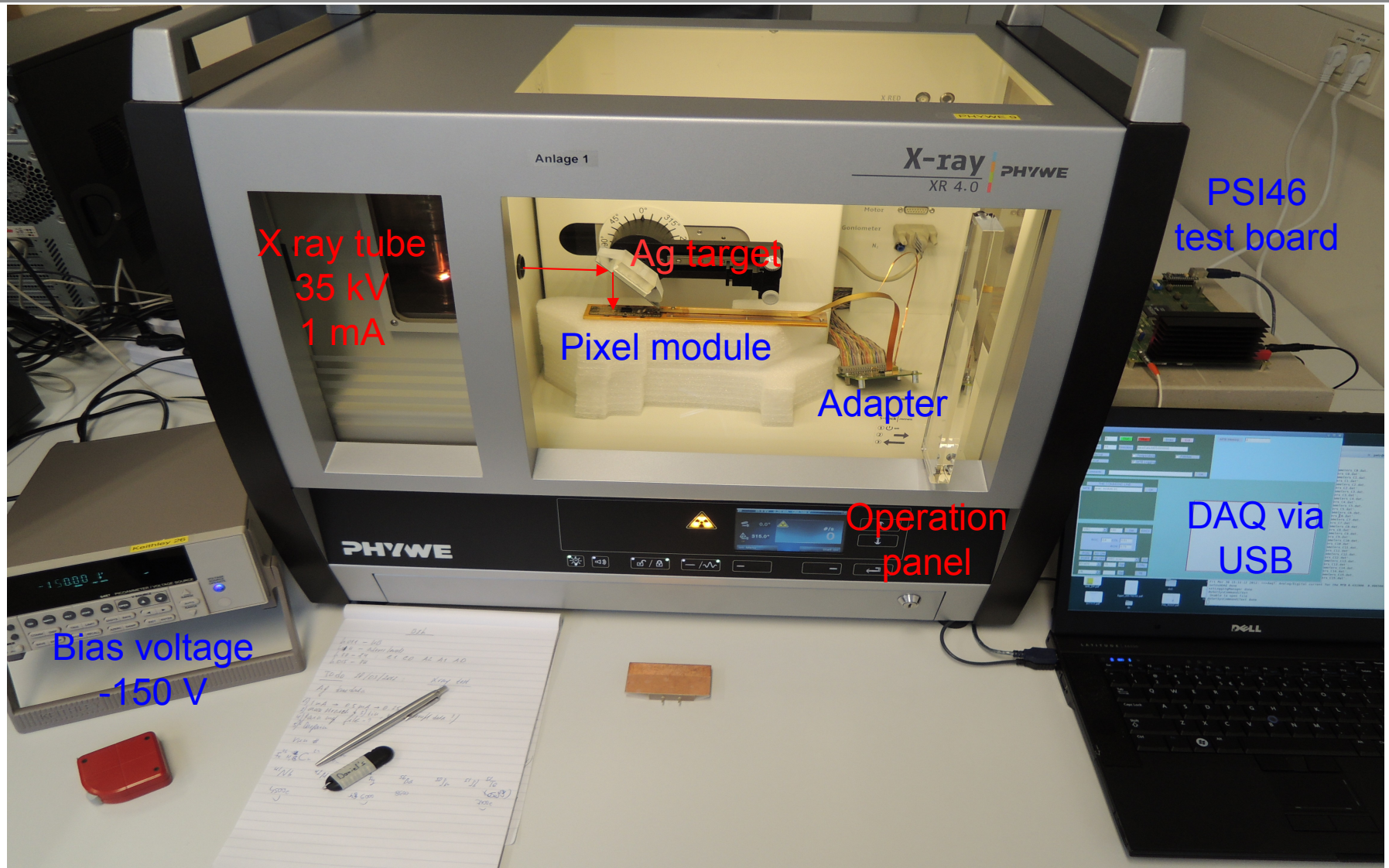
DER FORSCHUNG | DER LEHRE | DER BILDUNG



X ray setup

Matteo Centis Vignali, Tobias Lapsien, Jennifer Sibille

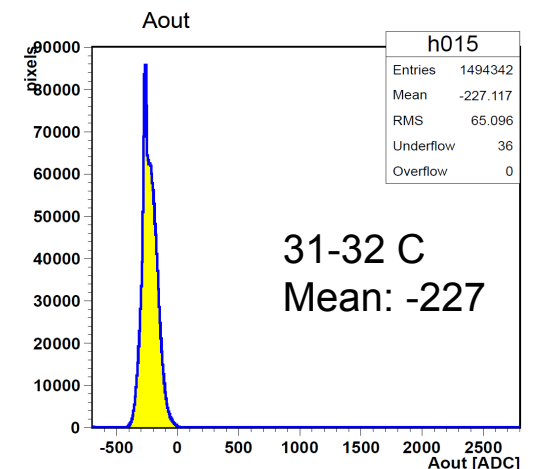
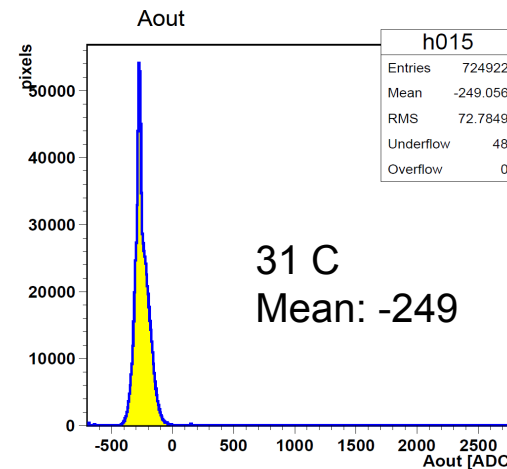
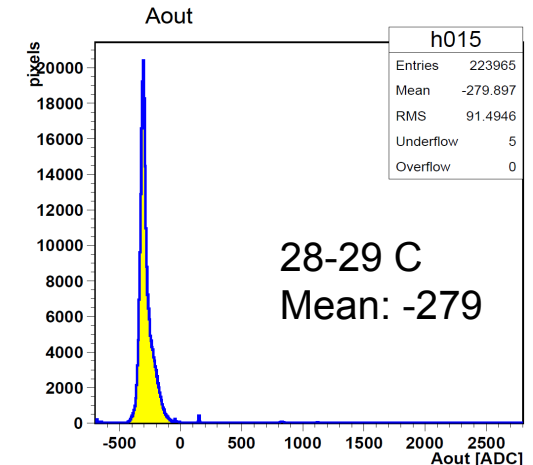
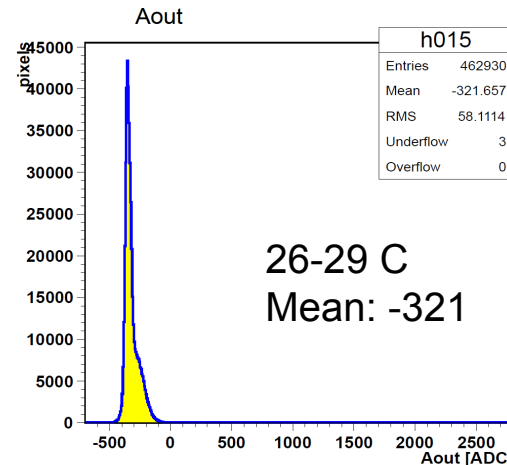
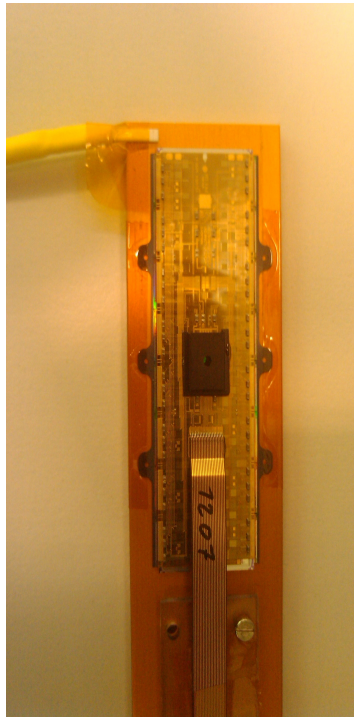
Setup (reminder)



Temperature influence

Temperature:
Pt100 + Keithley

Silver fluorescence in 15 ROCs



Very preliminary,
further investigation is needed

Rate estimation

Assumption:

Rate in the fluorescent beam is proportional to the rate in the direct beam

Fluorescence:

- $U = 35 \text{ kV}$
- $I = 0.01 - 1.00 \text{ mA}$

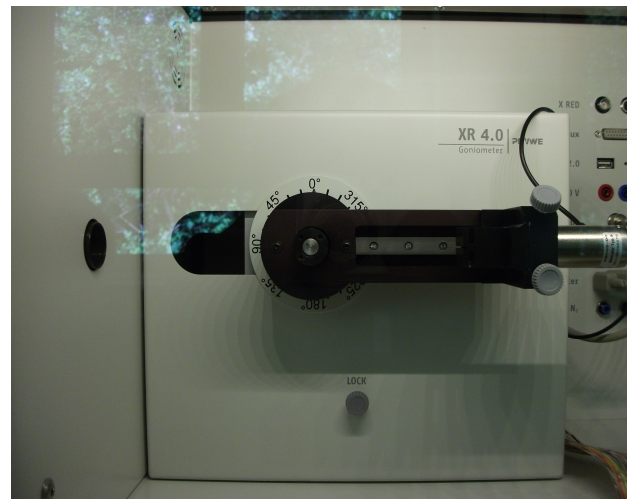
Direct beam (calibration):

- $U = 35 \text{ kV}$
- $I = 0.01 \text{ mA}$

GM:

- $\Delta V = 400 \text{ V}$
- $\tau = 100 \mu\text{s}$

$$R = \frac{R_0}{1 - \tau R_0}$$



Rate: $307 \text{ MHz} / \text{cm}^2$
@ 13 cm

Goal for the high rate test: $100 \text{ MHz} / \text{cm}^2$

To be repeated with a GM that can be put in the full intensity direct beam

Setup status

Equipment:

- 1 module with 15 ROCs working
- 1 test board
- 1 Linux machine with:
 - PSI DAQ
 - DESY DAQ
 - LabView
- 2 X ray boxes working being controlled by their panels or Windows machines
- 1 Ag target

Activities:

- Get targets (Mo and Te)
- Make the X ray box communicate with the Linux machine
- Study for the possibility of doing both fluorescence and high rate in one setup

Setup inside the box

Rotating target holder

- Exchange fluorescence targets



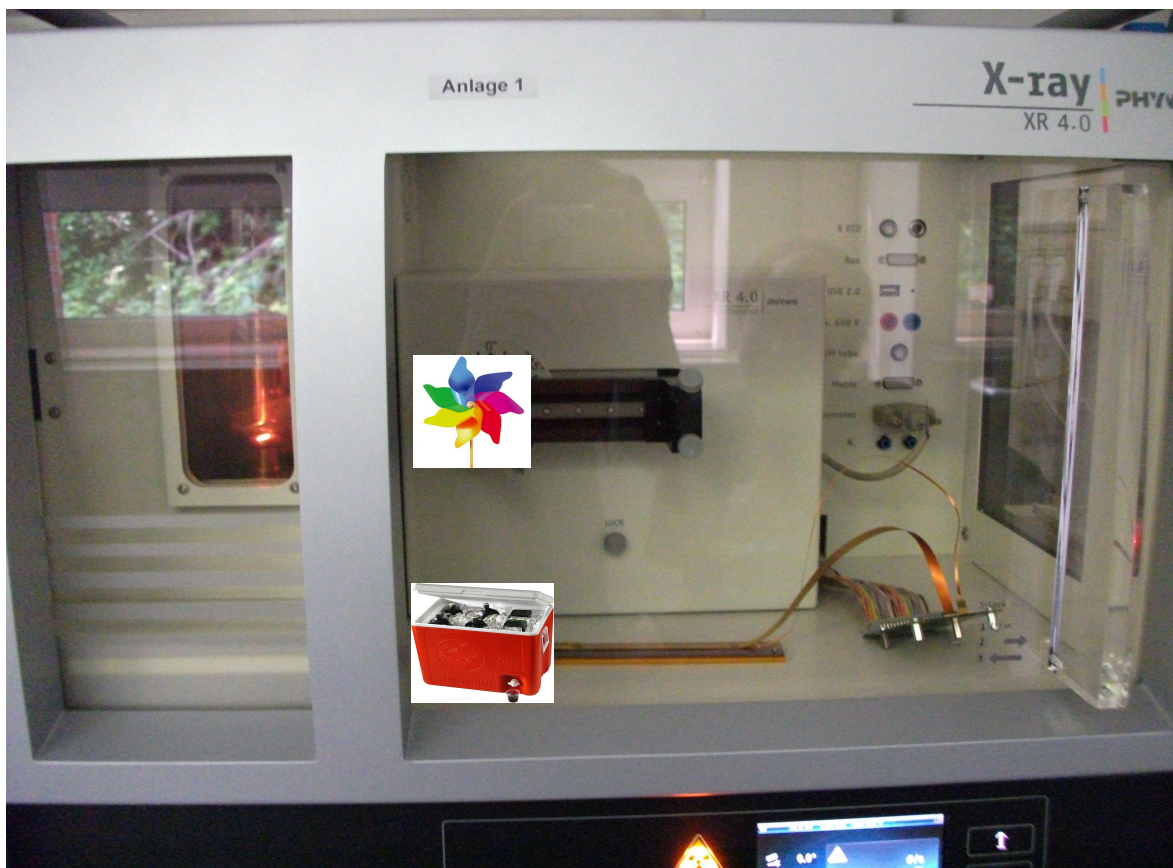
Setup inside the box

Rotating target holder

- Exchange fluorescence targets

Temperature control of the module

- Stabilize temperature



Setup inside the box

Rotating target holder

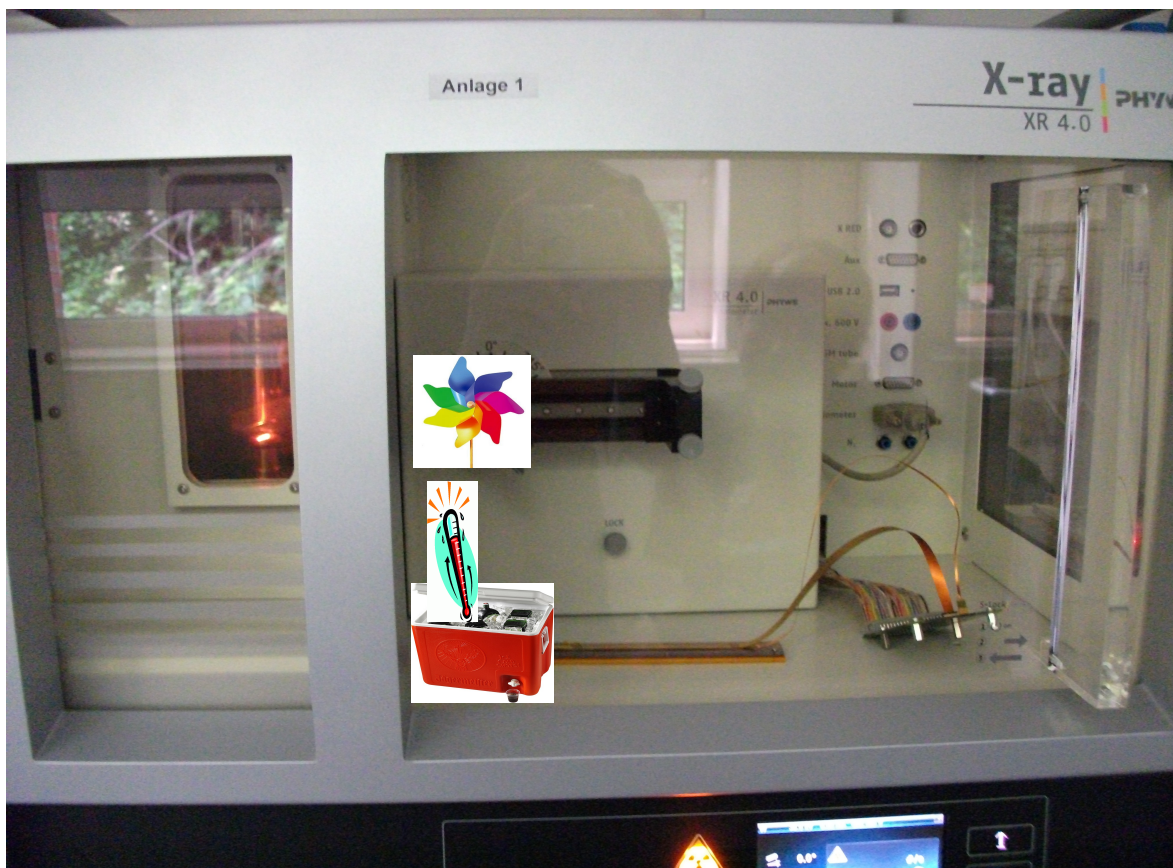
- Exchange fluorescence targets

Temperature control of the module

- Stabilize temperature

Thermometer

- Measure module temperature



Setup inside the box

Rotating target holder

- Exchange fluorescence targets

Temperature control of the module

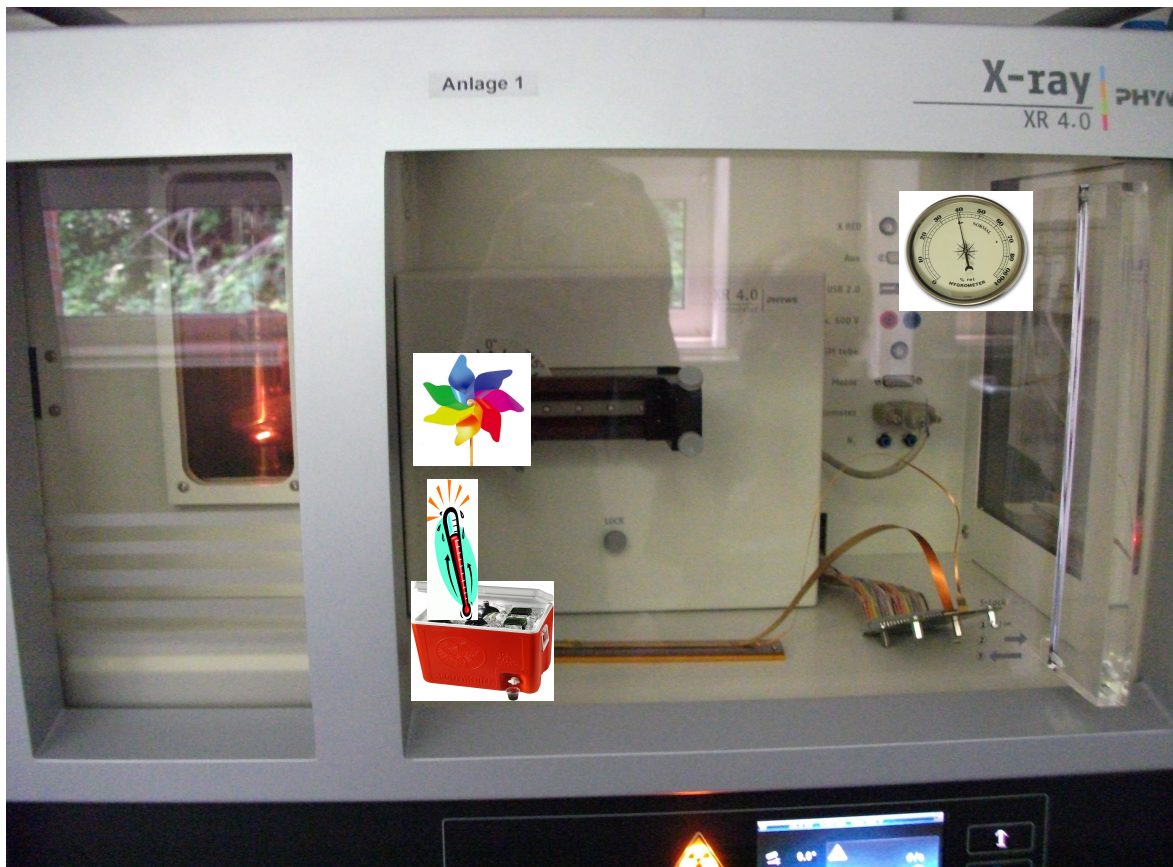
- Stabilize temperature

Thermometer

- Measure module temperature

Hygrometer

- Monitor box humidity

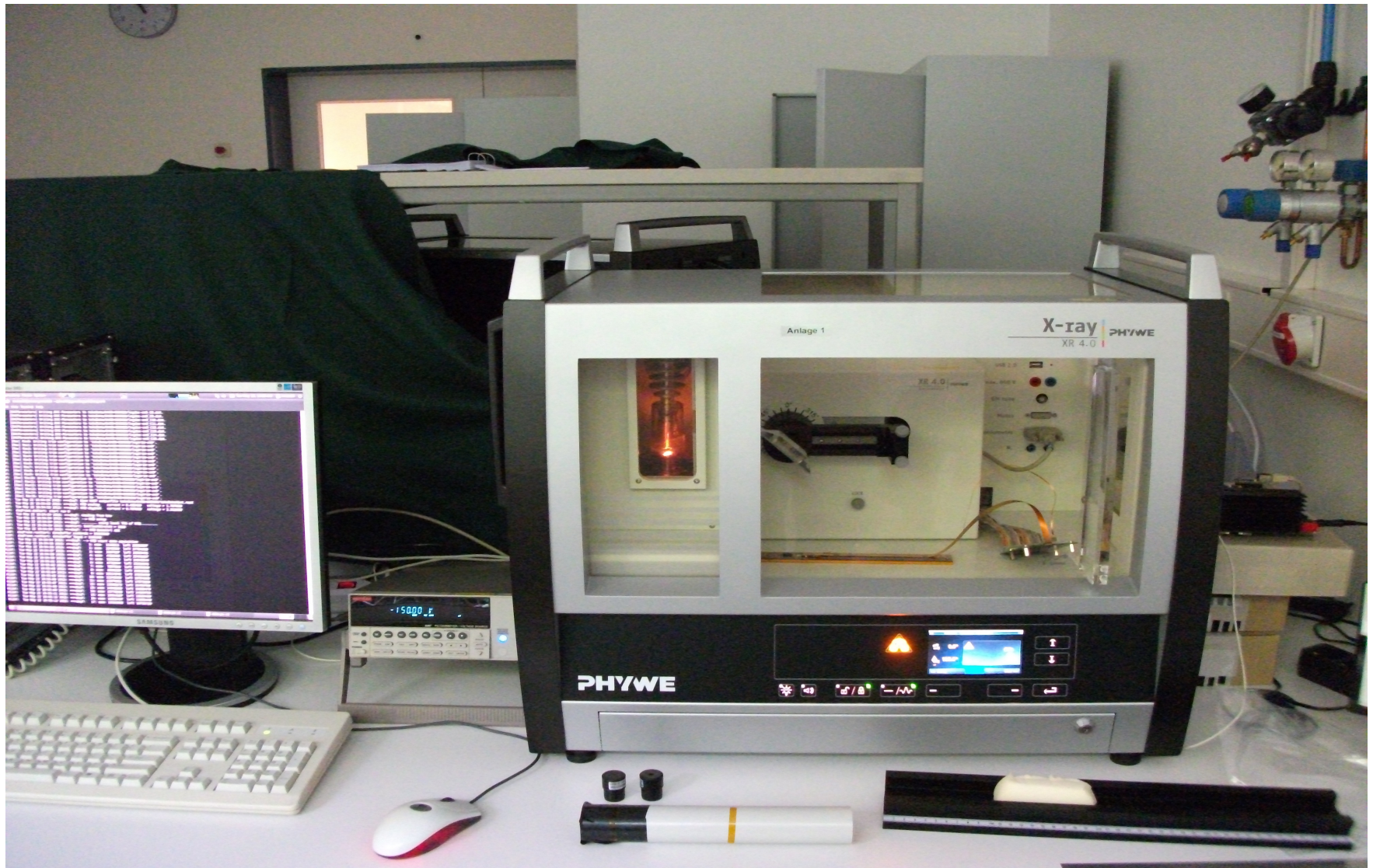


Outlook and plans

- One operating X ray box can be used to take fluorescence data with silver
- Studies ongoing:
 - Integration of the X ray box with the Linux computer
 - Temperature issues
 - 1 vs. 2 setups
 - Calibration software

Next Steps:

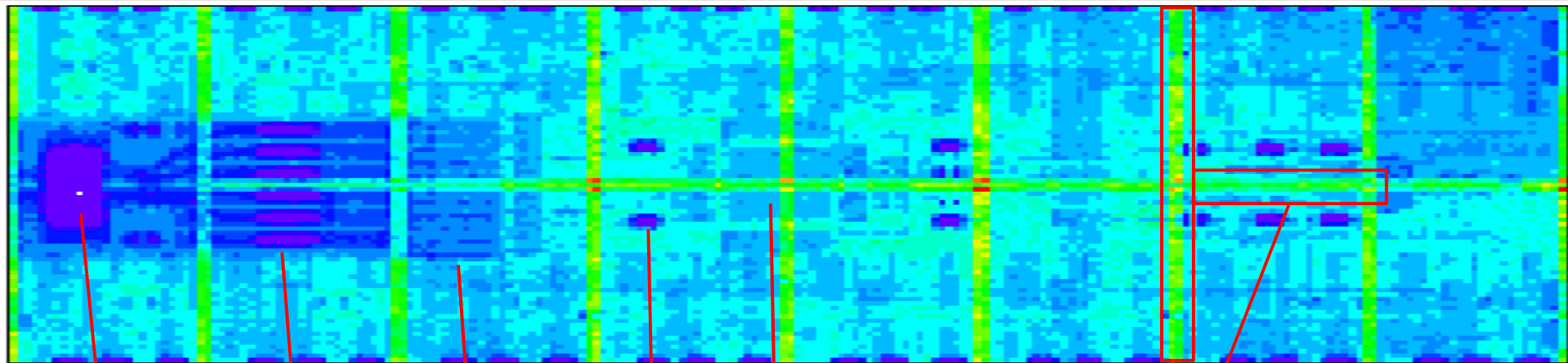
- Get the Mo and Te targets
- Design the mechanics
- Comparison of different versions of the DAQ
- ...



Photos

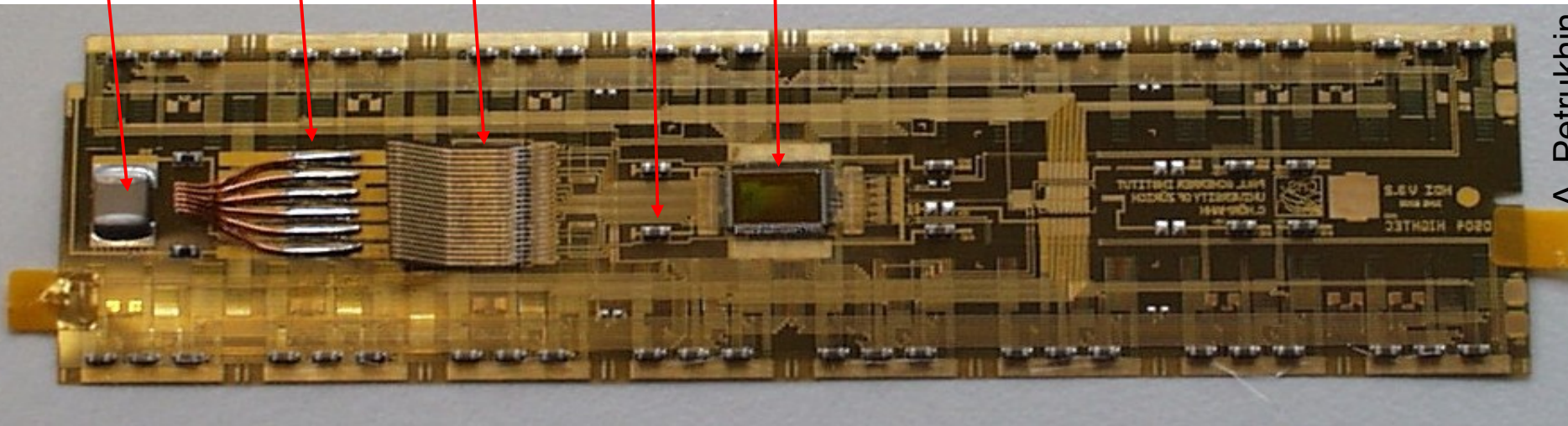


X ray map through the HDI

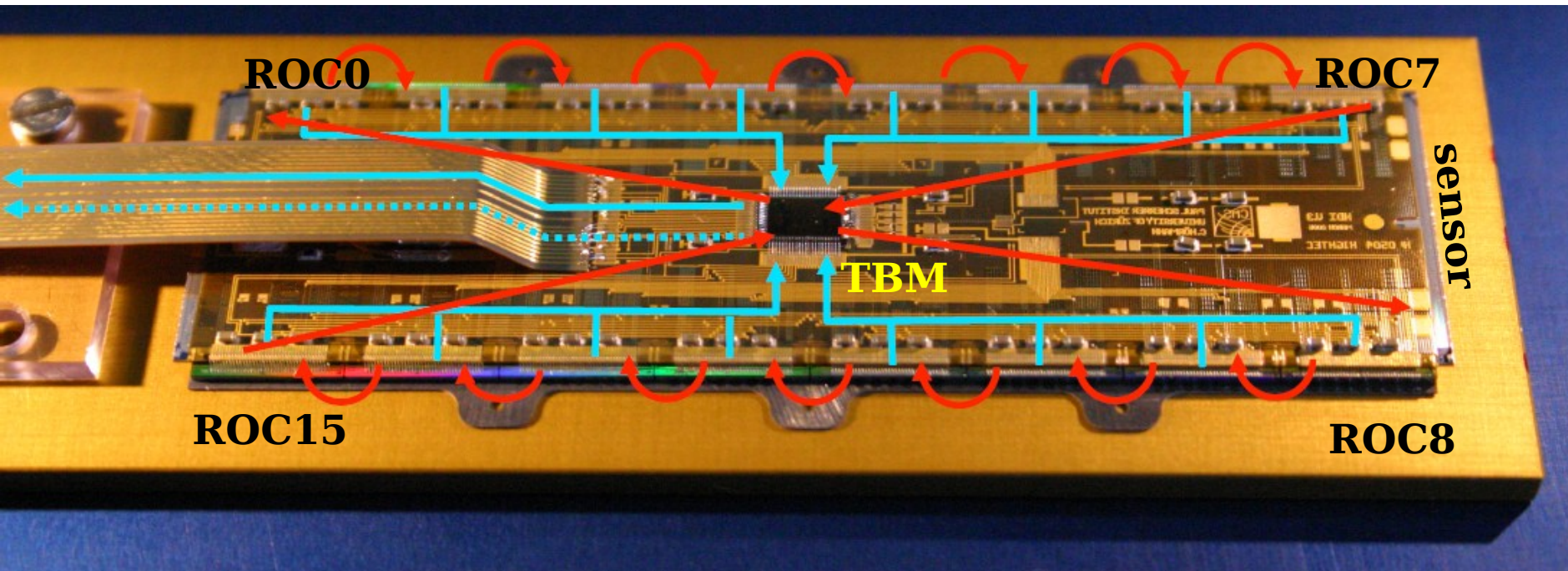


Edge pixels are bigger
→ more entries

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TBM



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