

# My visit to PTB – New experiences for the biology beamline

PITZ Physics Seminar 28.04.2022

Felix Riemer

Ph.D. student (Detector development)



# About PTB (Physikalisch-Technische Bundesanstalt)

- PTB is the German national metrology institute
- HQ is in Braunschweig (countryside)
- Approx. 1500 employees
- Responsible for precise measurements of everything (units, time, etc.)



# About the measurement campaign

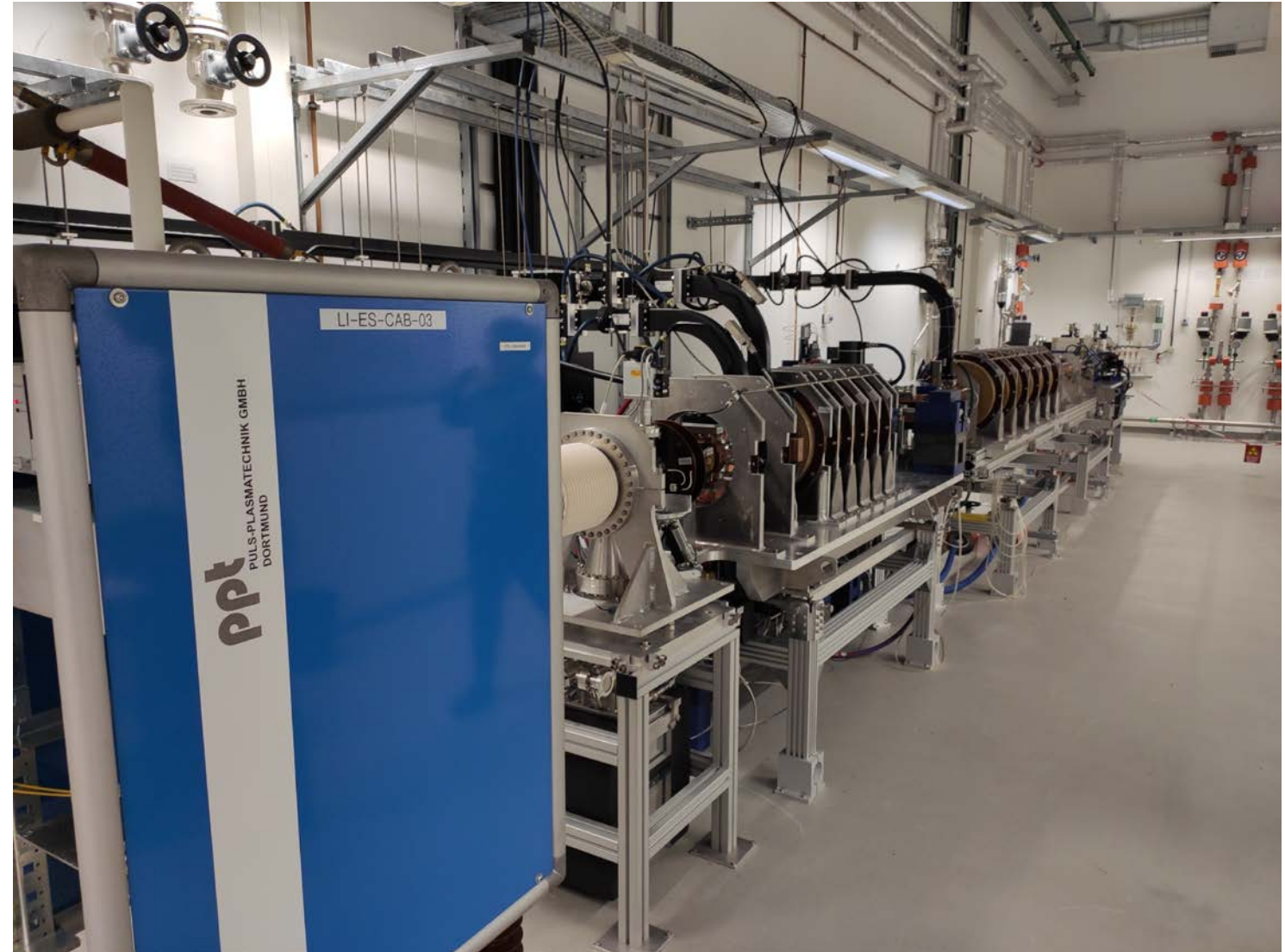
- Reason for my journey:  
Measurement campaign together with Advacam
- 1 day preparation/test of setup and 2 days of measurement
- Goal: Measurements of stray radiation field, field composition, in-beam measurements
- Test of different detectors on top of the naked chip



Custom Timepix design from Advacam

# About the accelerator

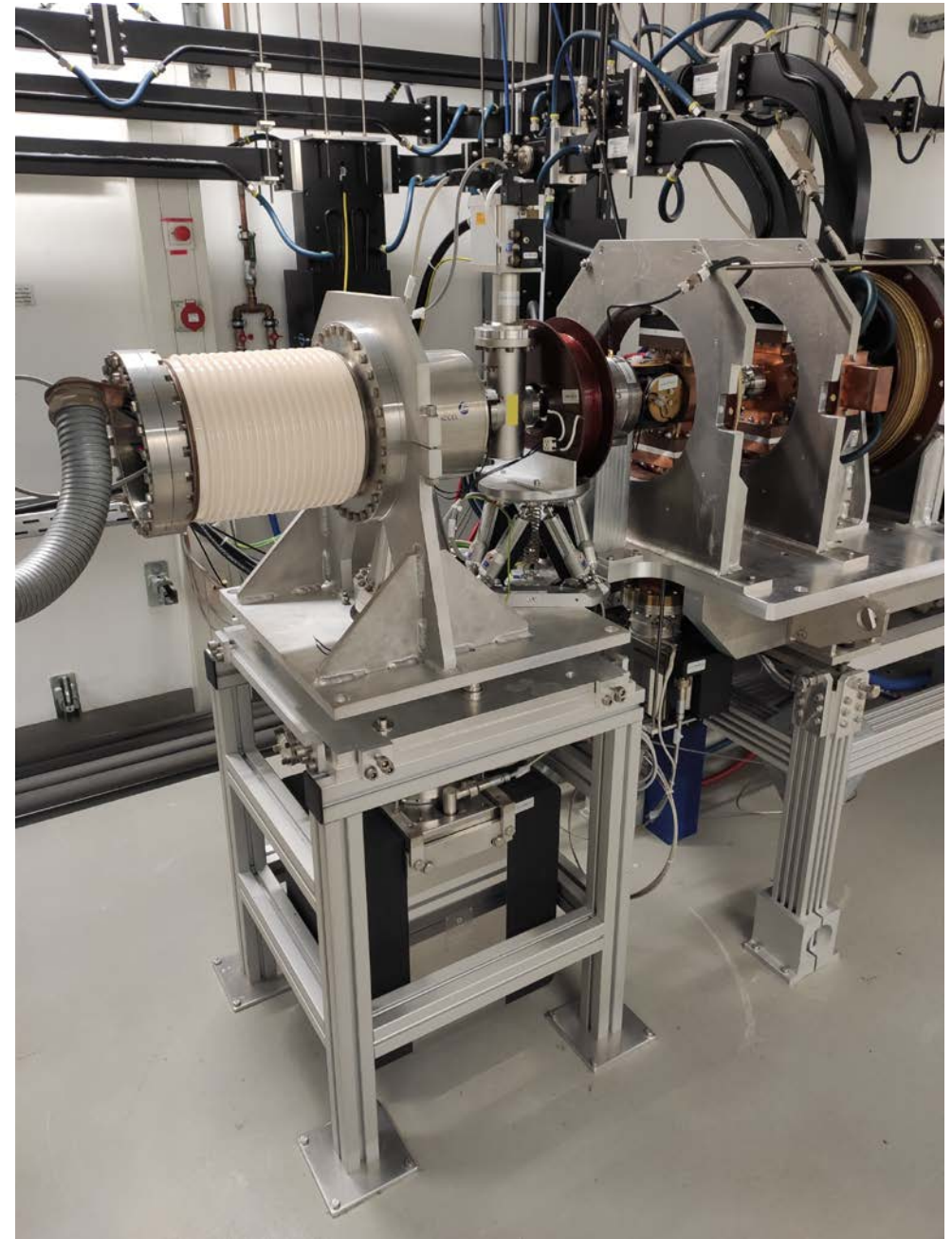
- Monoenergetic electrons between 0.5 and 50 MeV
- 2.5  $\mu\text{s}$  pulse width at 5 Hz
- Adjustable beam size using a slit
- Two experimental areas: low & high energy
- 20 MeV was used for all measurements

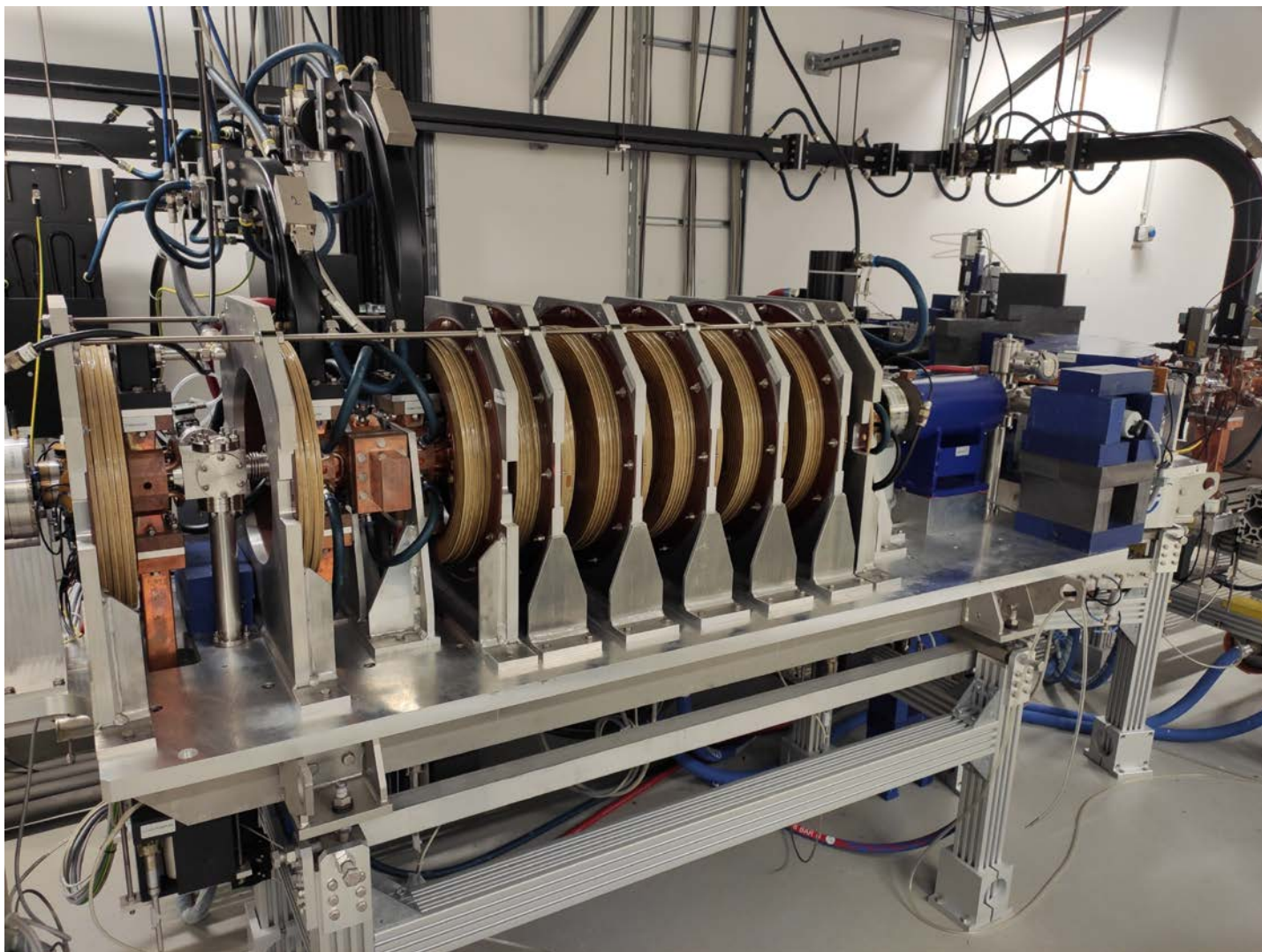


# Some pictures of the accelerator

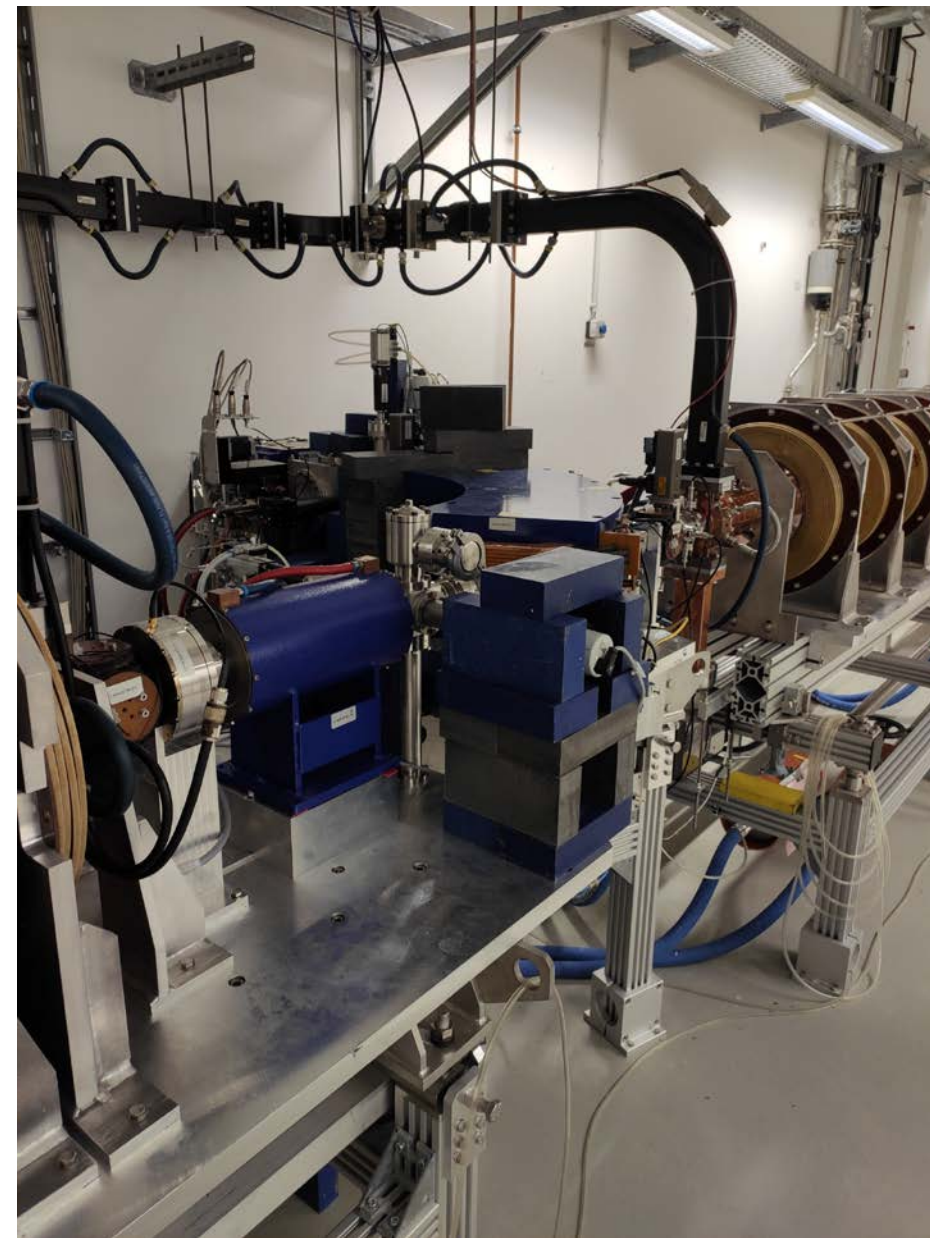


→  
Gun





Booster for low energy section



Dipole to low energy section

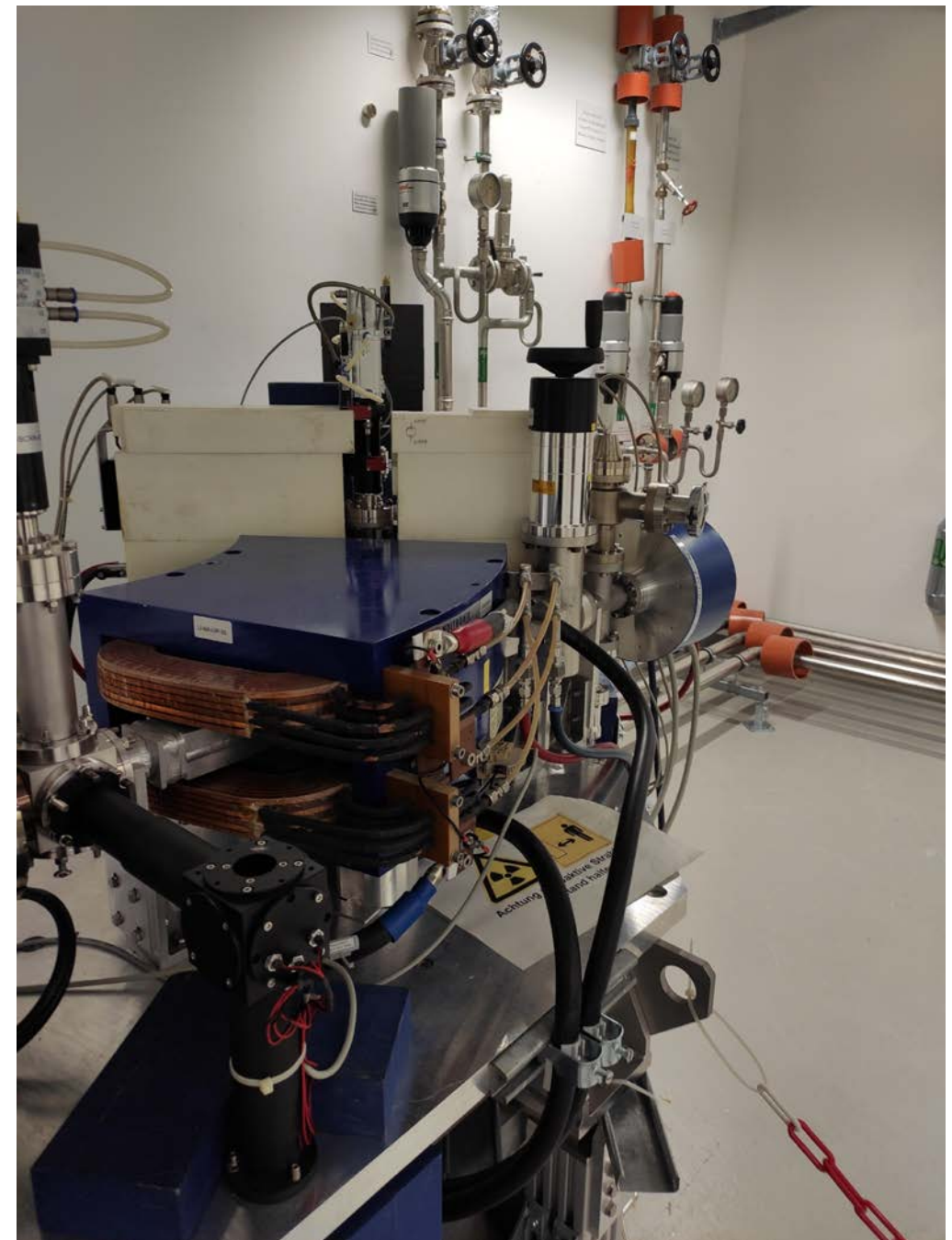
## Booster for high energy section





←  
Focussing

→  
Dipole to high  
energy section





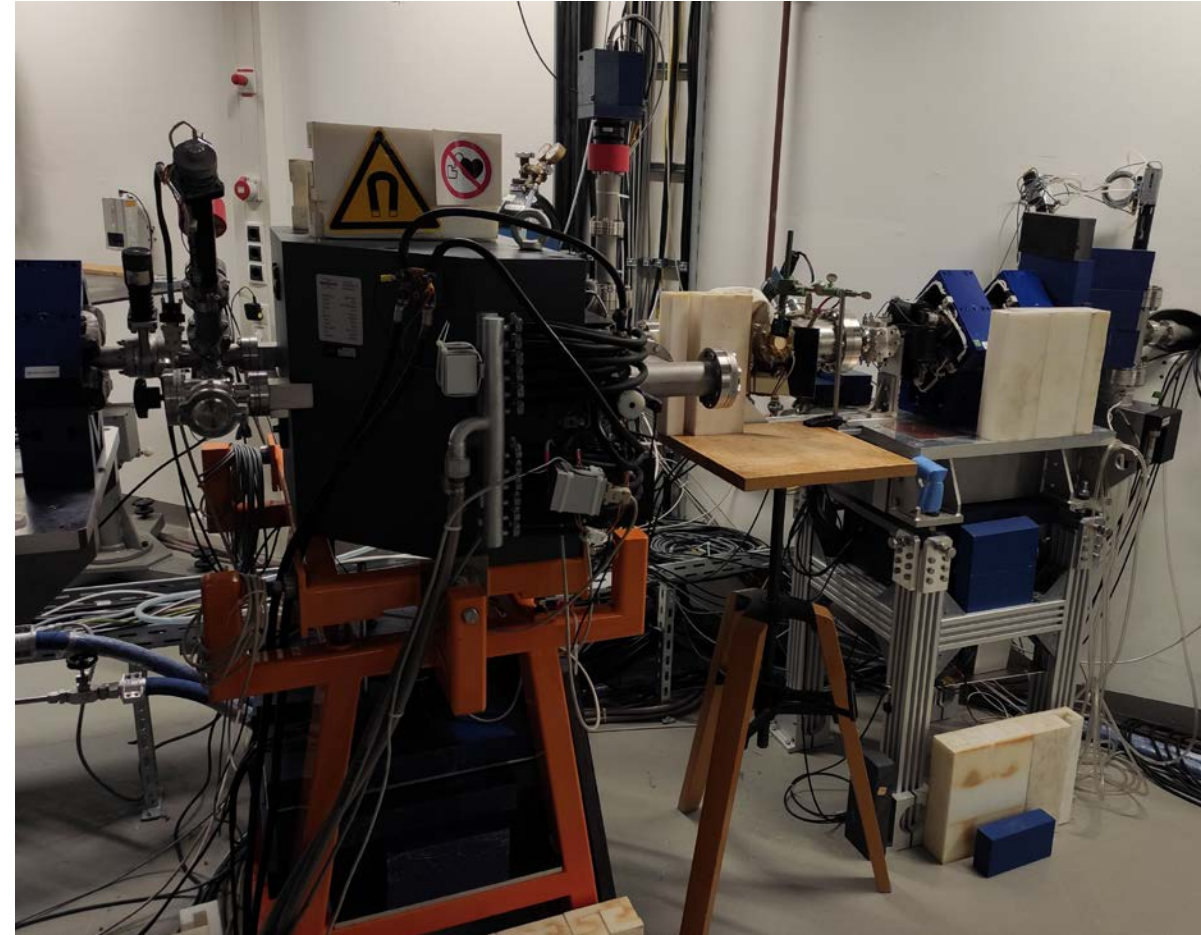
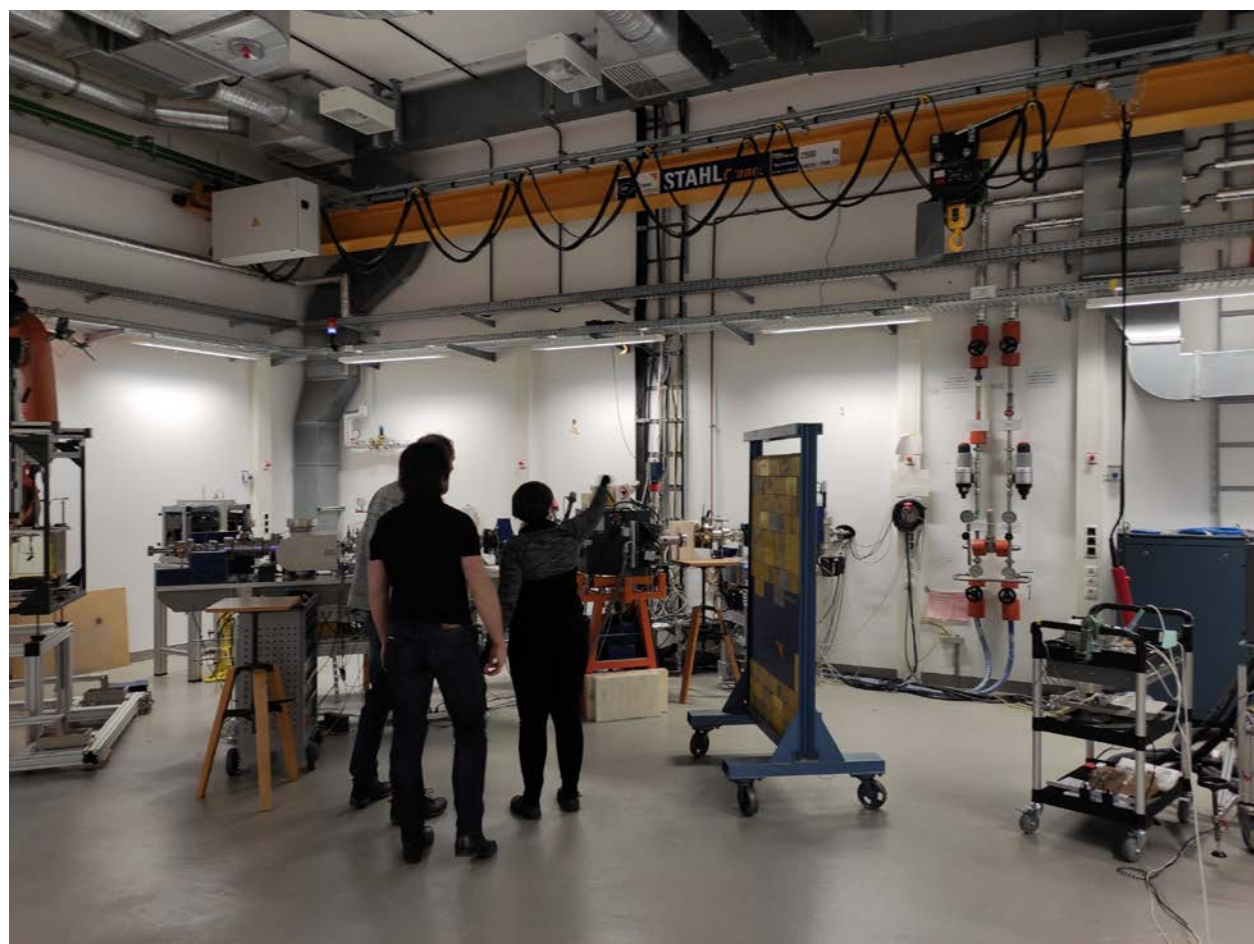


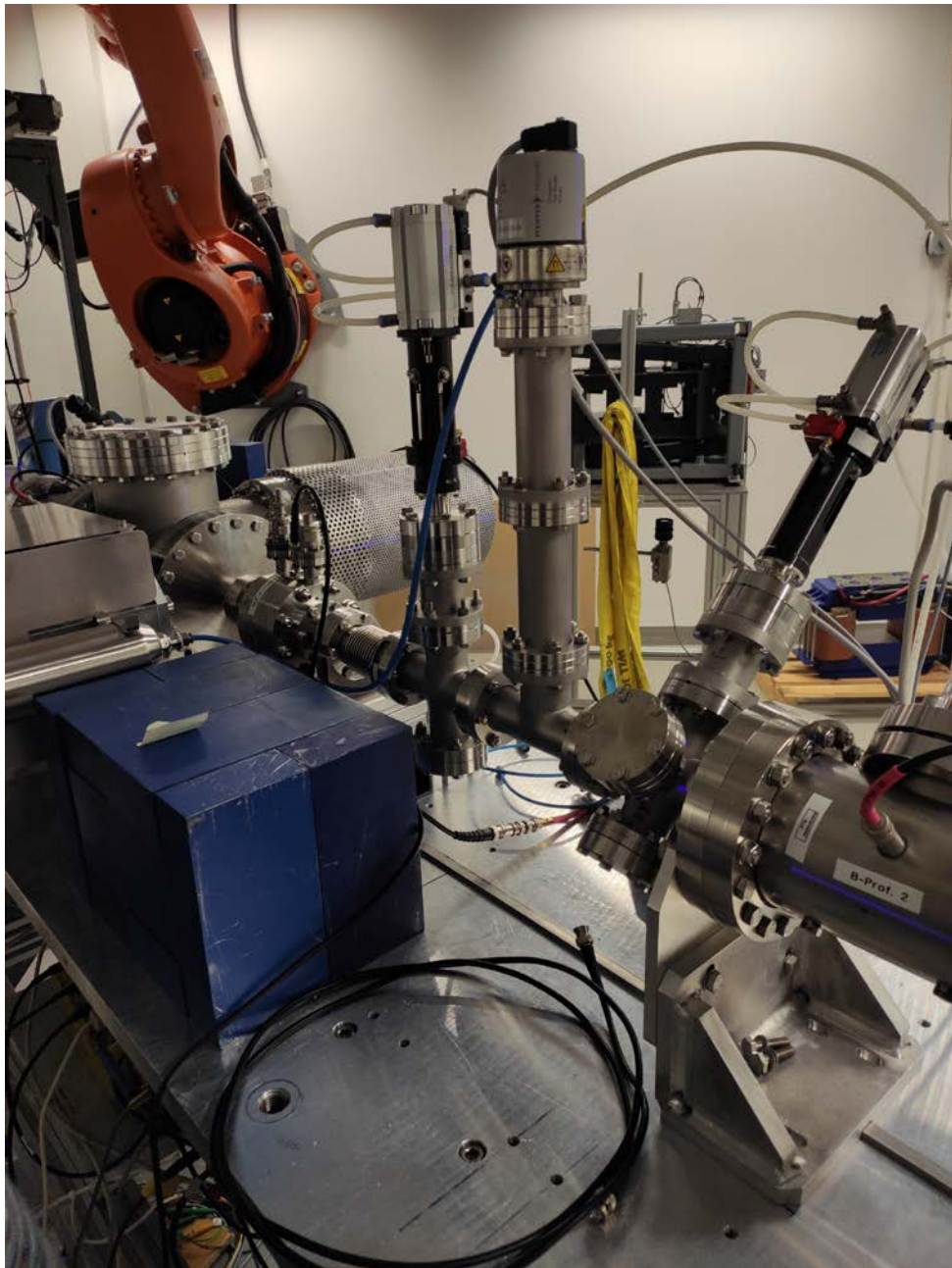
Accelerator door

Control room



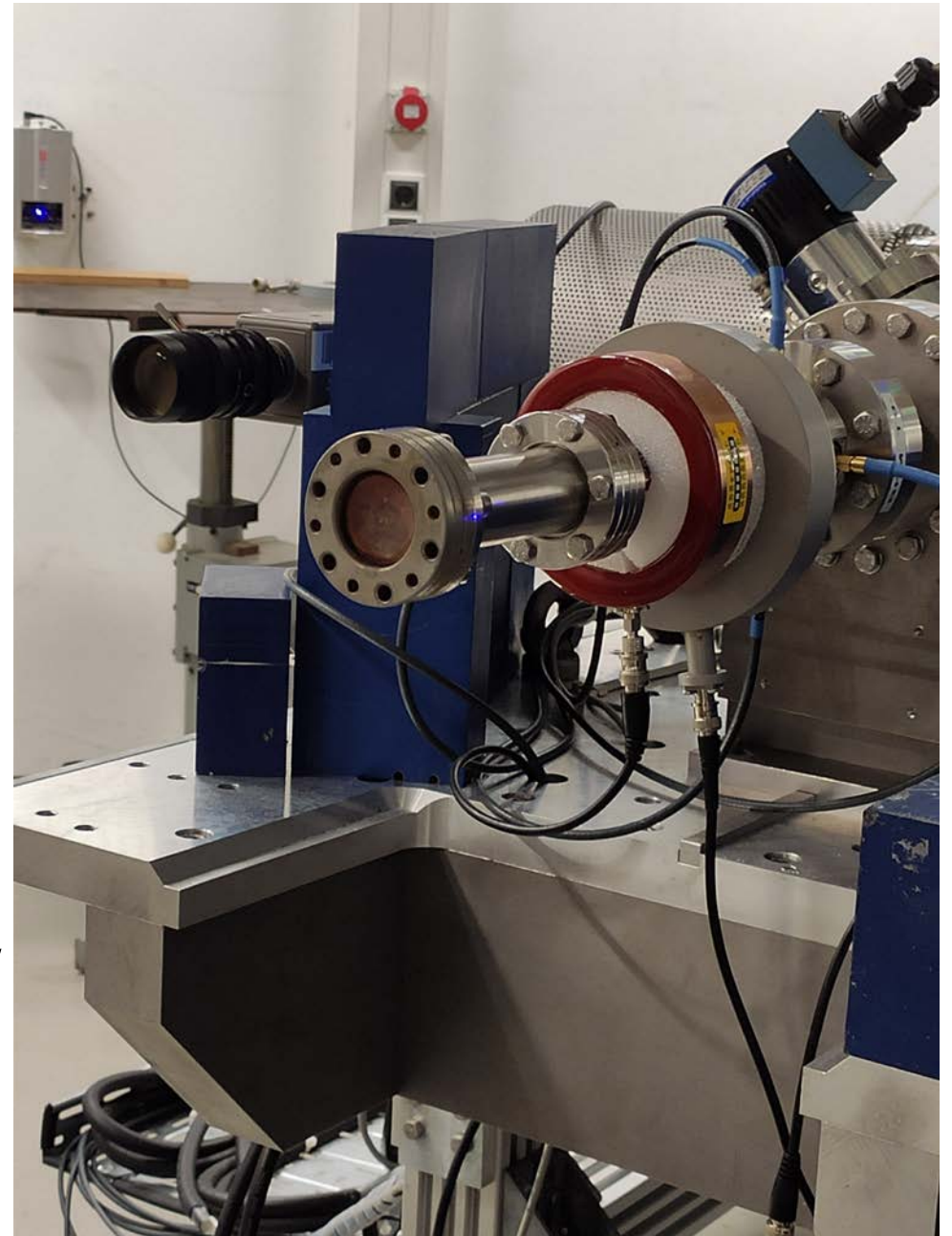
# Experimental hall





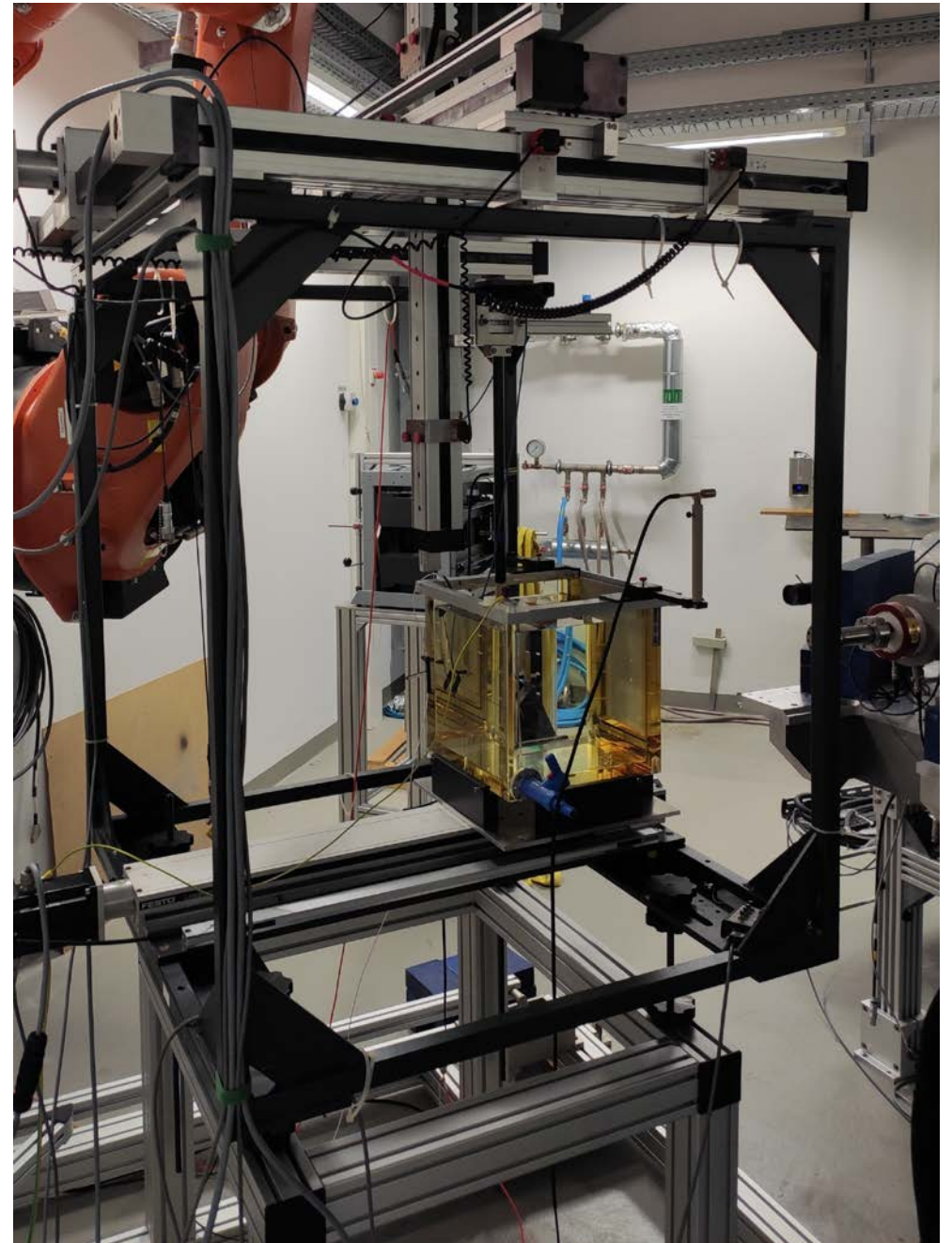
←  
Diagnostics

→  
100  $\mu\text{m}$  Cu  
exit window

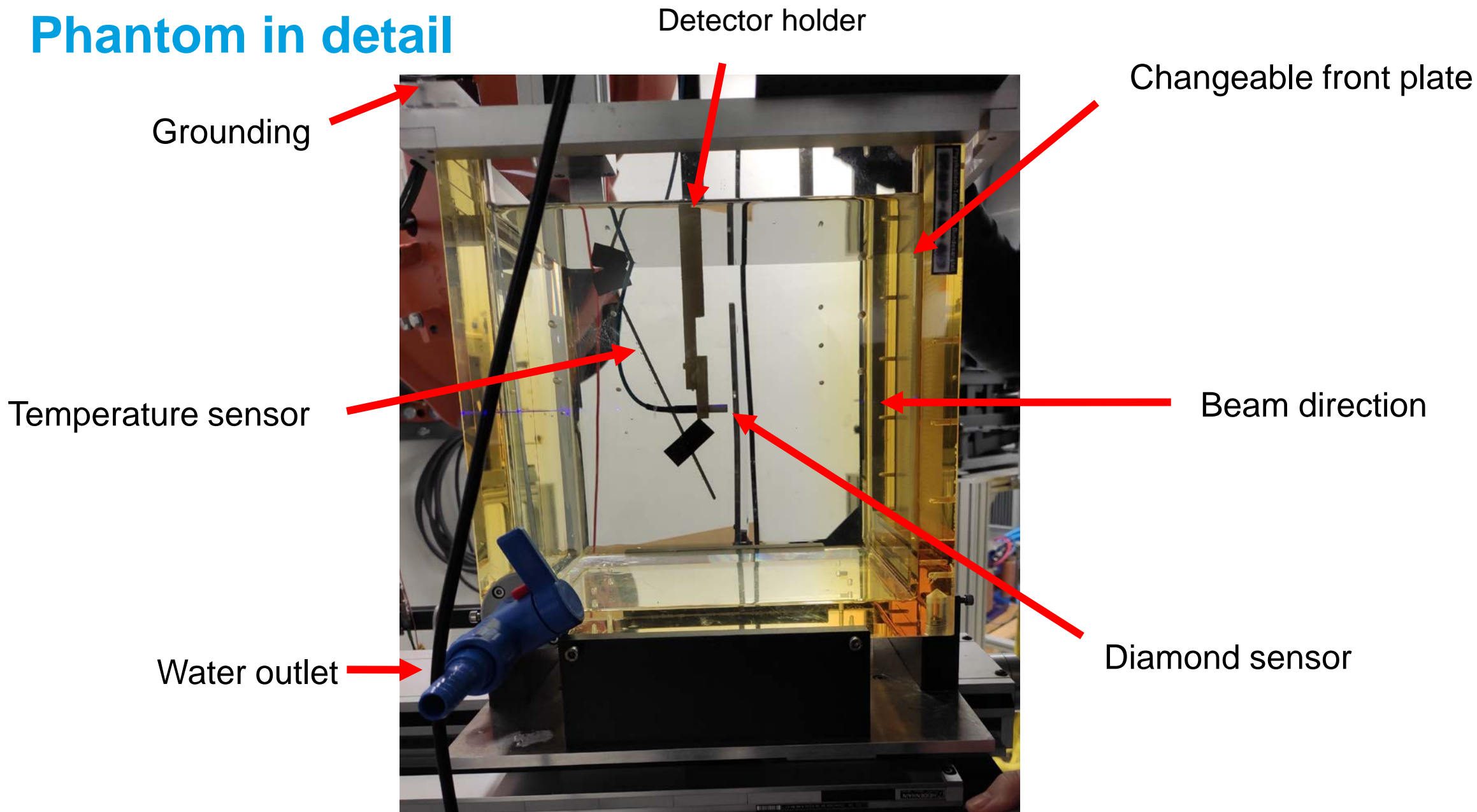


# Experimental setup

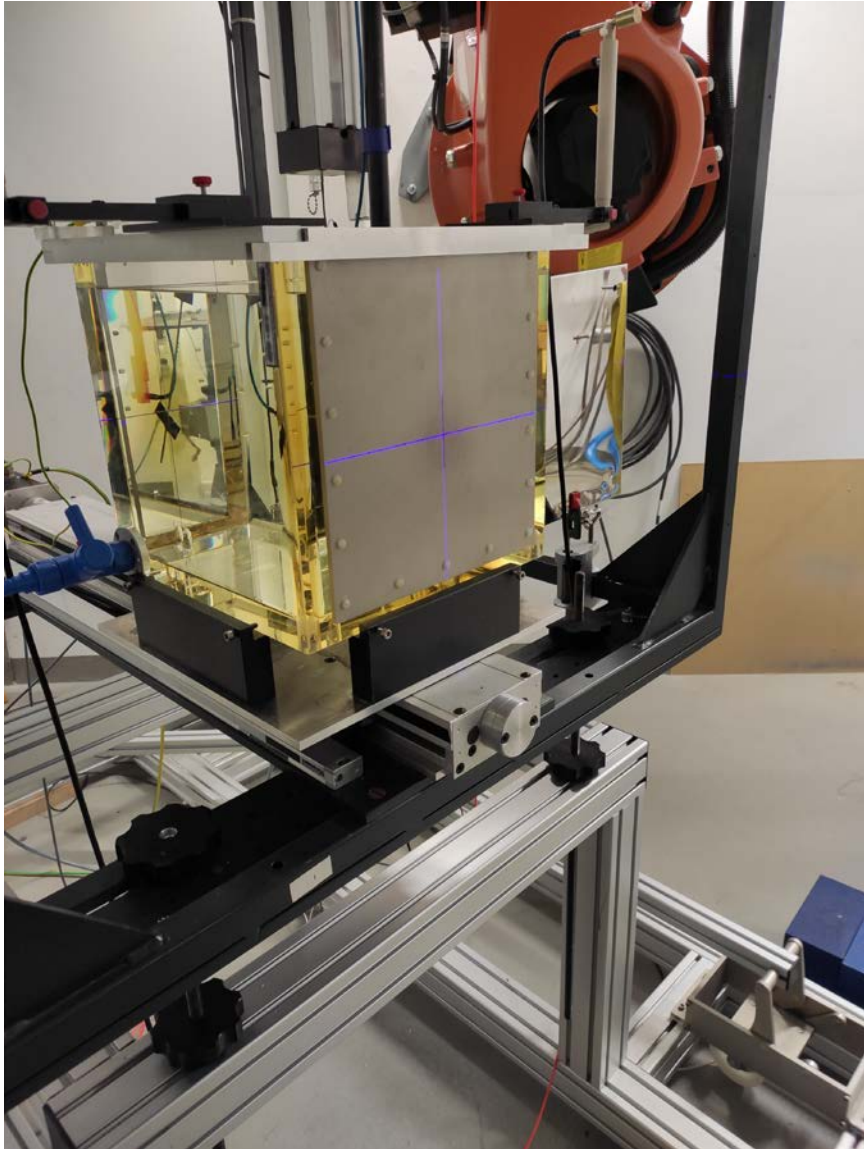
- XYZ motorised positioning system
- 30x30x30 cm<sup>3</sup> water phantom
- Changeable front plate
- Detector holder coming from the top
- Water outlet
- Temperature sensor (PT100)



# Phantom in detail



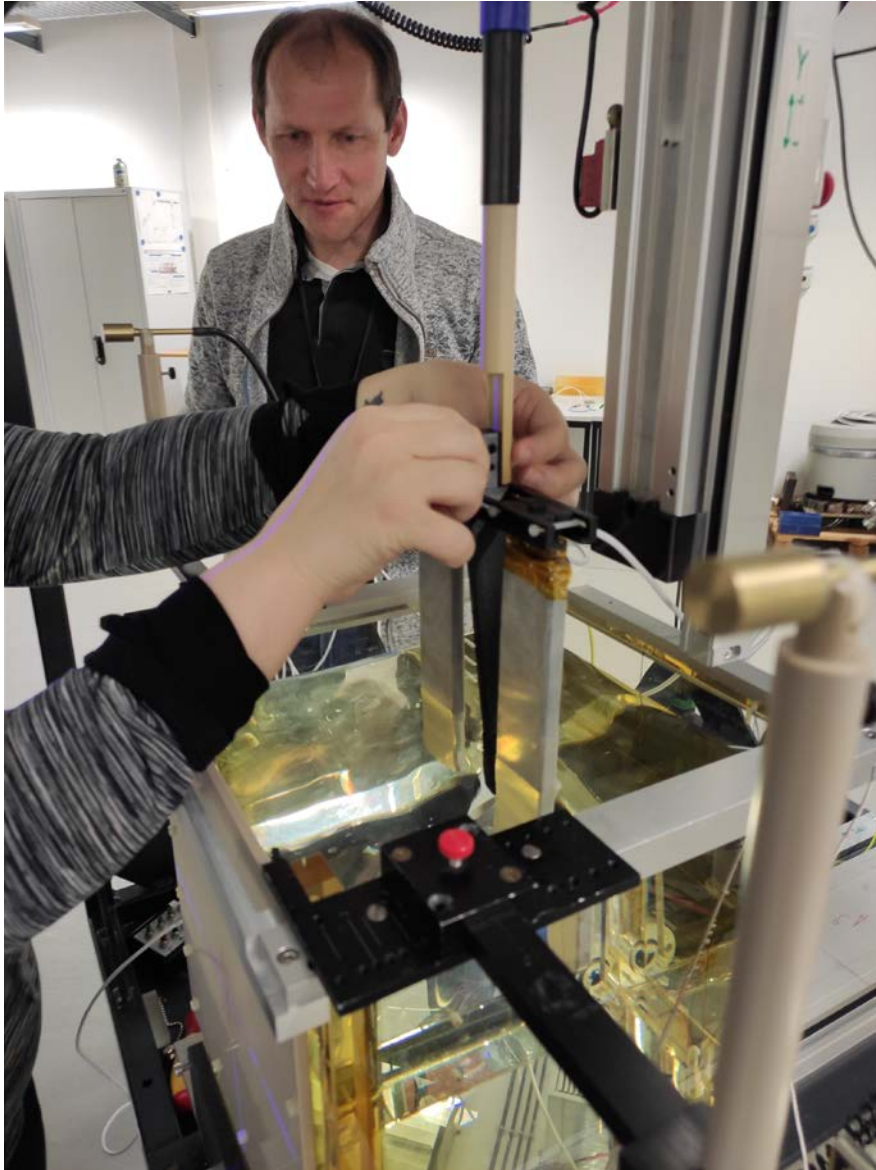
# Laser positioning system



- Two laser systems at the wall
- For by-eye positioning of the detectors inside the water tank
- Changeable front plate



# Setup of Advacam



- 3D printed holder
- Two Advacam sensors and diamond detector in the middle
- Waterproof
- 2 m USB cables to a mini pc (behind lead wall)
- 30 m Ethernet cable to control room

**Thank you!**