

ThomX diagnostics stations



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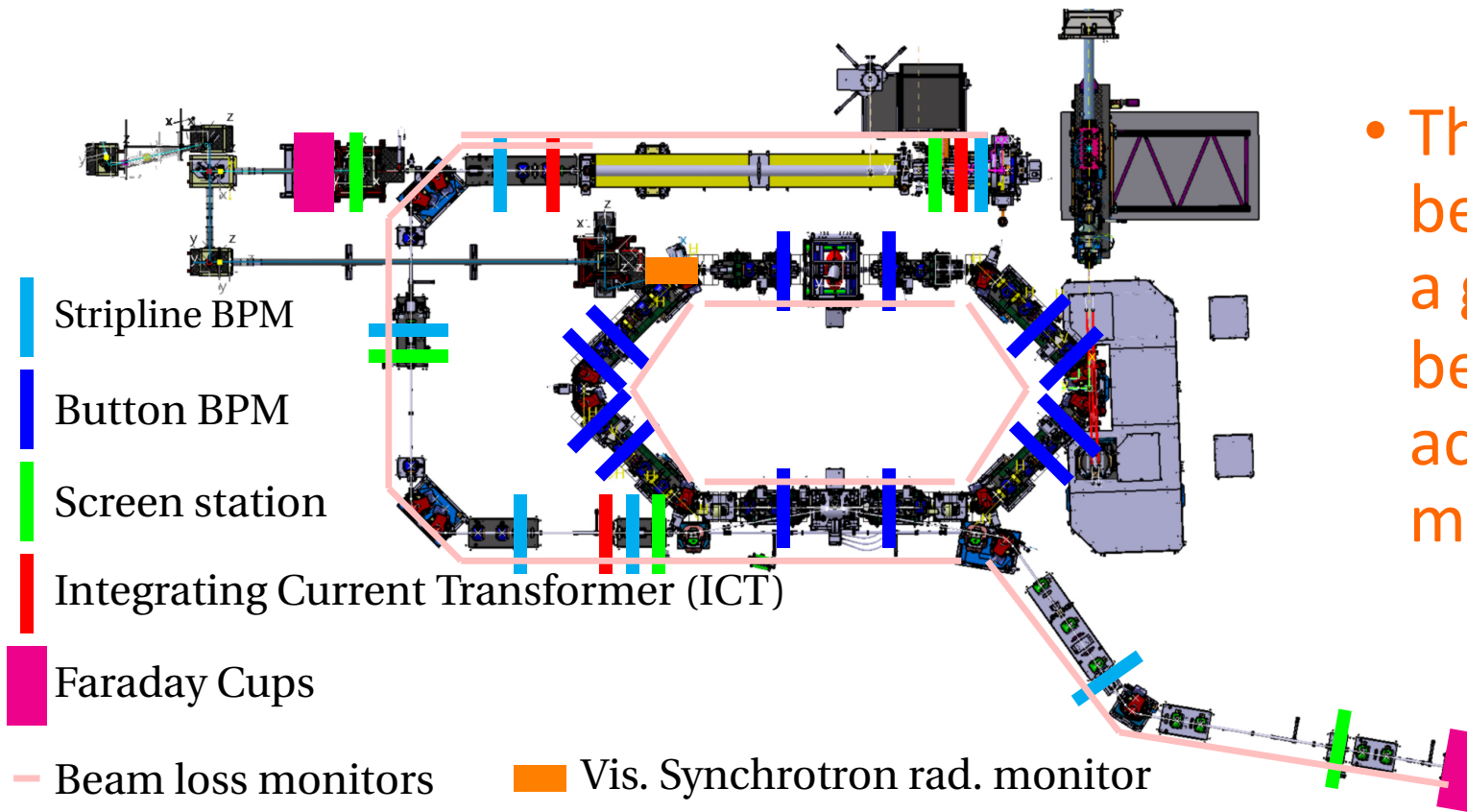


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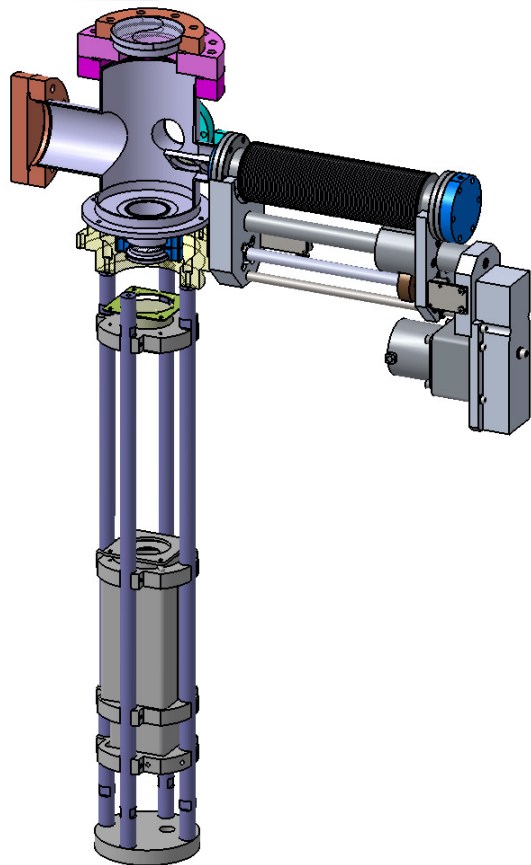




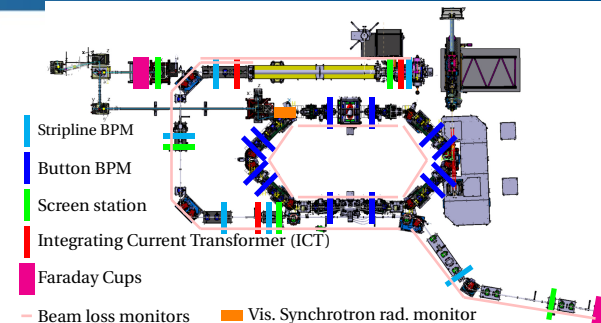
- ThomX is an accelerator built at IJCLab.
- Similar to the Nestor project in Kharkiv
- First beam a few weeks ago.
- Detailed presentation on Friday.
- This presentation focusses on work done on the diagnostic station in collaboration with Ukraine.
- Contributions and material from: Iryna Chaikovska, Vincent Chaumat, Slava Kubytskyi, Alexandre Moutardier, Vlad Rusakov, Scott Williams and the ThomX commissioning team.

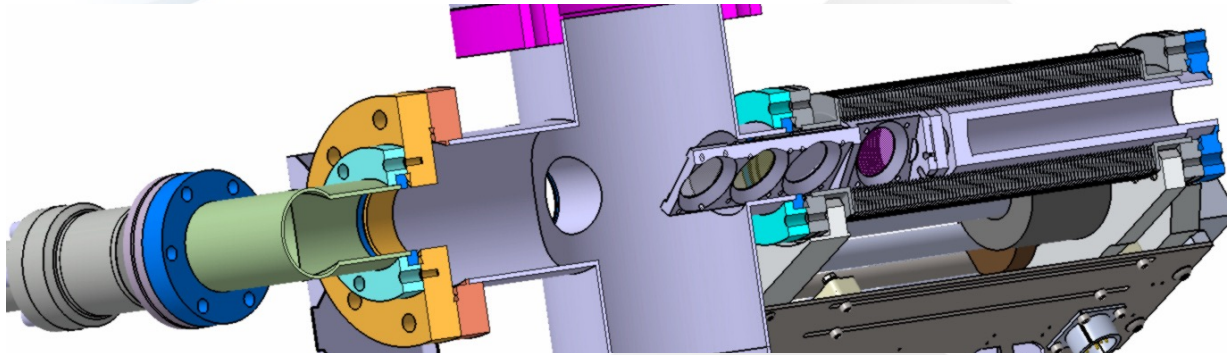


- The diagnostics have been designed to give a good overview of the beam in the accelerator with minimum interception.



- **Location**
 - 5 Stations on Linac and transfer lines
- **Purpose:**
 - Beam size, emittance and energy measurement
- **Principle:**
 - Screen translation stage
 - ▶ Calibration plate
 - ▶ YAG (Ce): 25 mm diameter, 100 μm thick
 - ▶ OTR : 25 mm diameter, 100 μm aluminised silicon wafer
 - ▶ Sapphire screen (station 2 @ end of Linac)
 - View port: Fused Silica DN 60 CF
 - Imaging system
 - Gigabit Ethernet triggered CCD

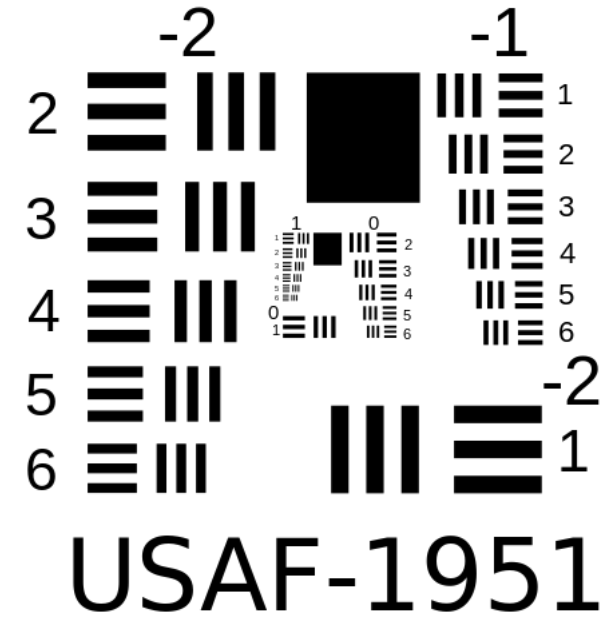




- Each screen station is equipped with 3 to 4 screens:
 - Target
 - YAG:Ce
 - OTR (Aluminium foil)
 - Cerenkov (only on one station)

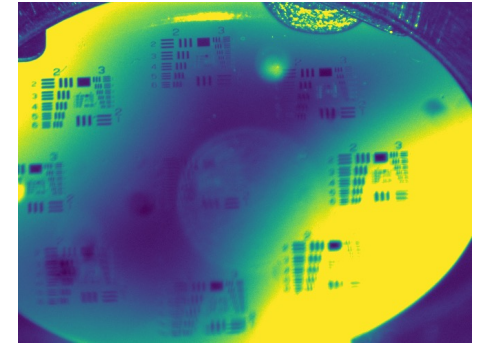
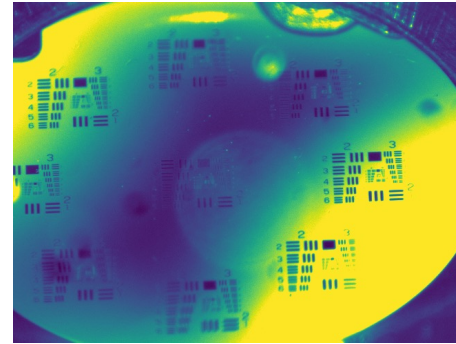
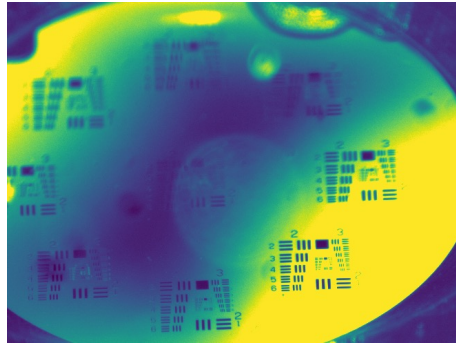
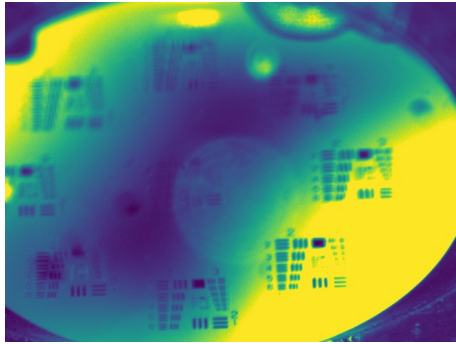


- All station have optical zoom based on commercial lenses.
- Magnification can be adjusted easily.
- Focus can be adjusted thanks to an Arduino located near the lens.
- To allow an inline calibration (magnification, resolution) of the optical system, all stations are equipped with USAF-1951 calibration targets.





Adjusting the focus on a screen



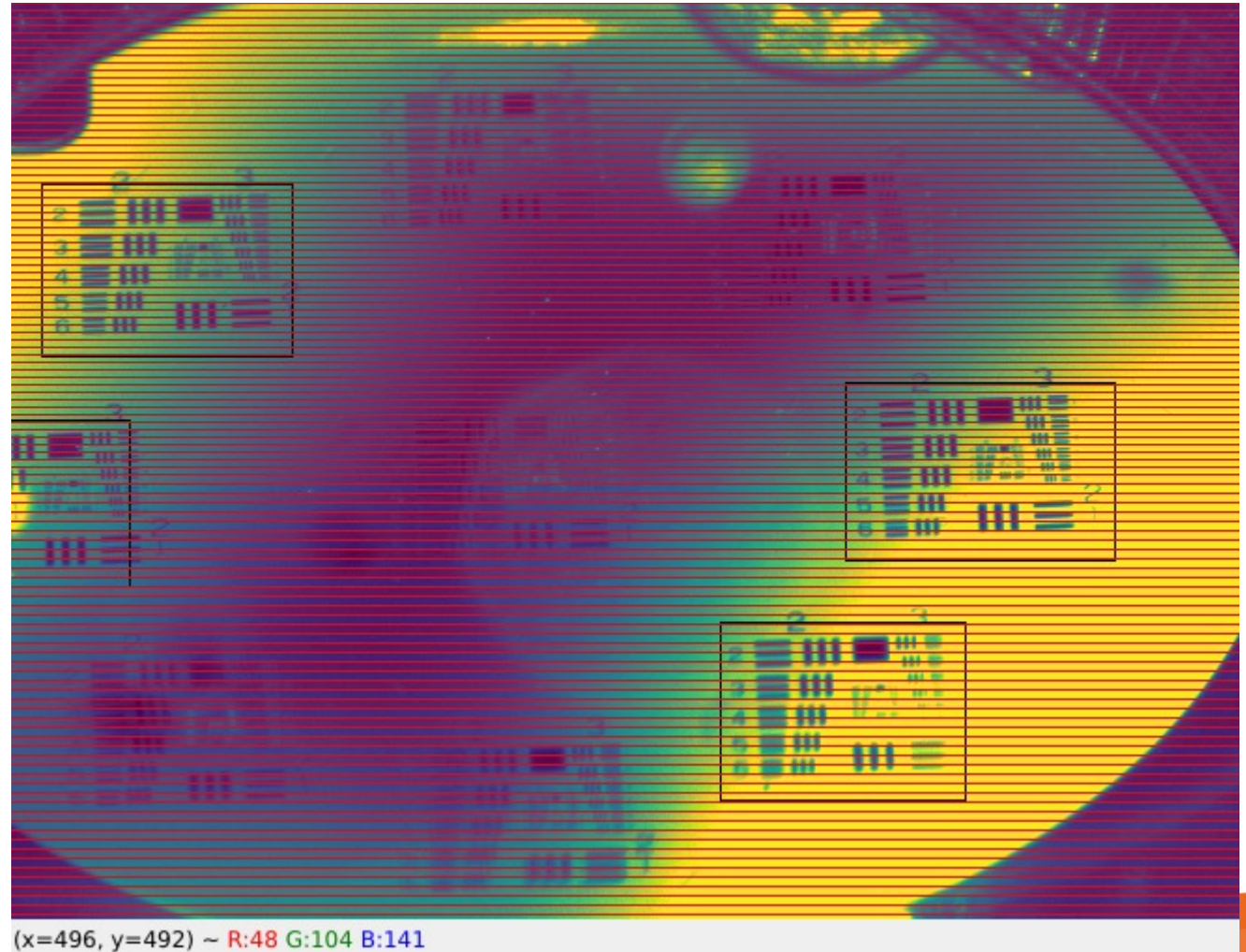
- Example of screen resolution adjustement
- An automated software is then used to find the position of the targets.



Screen calibration

- Once the magnification is known we can add equally spaced lines on the screens.

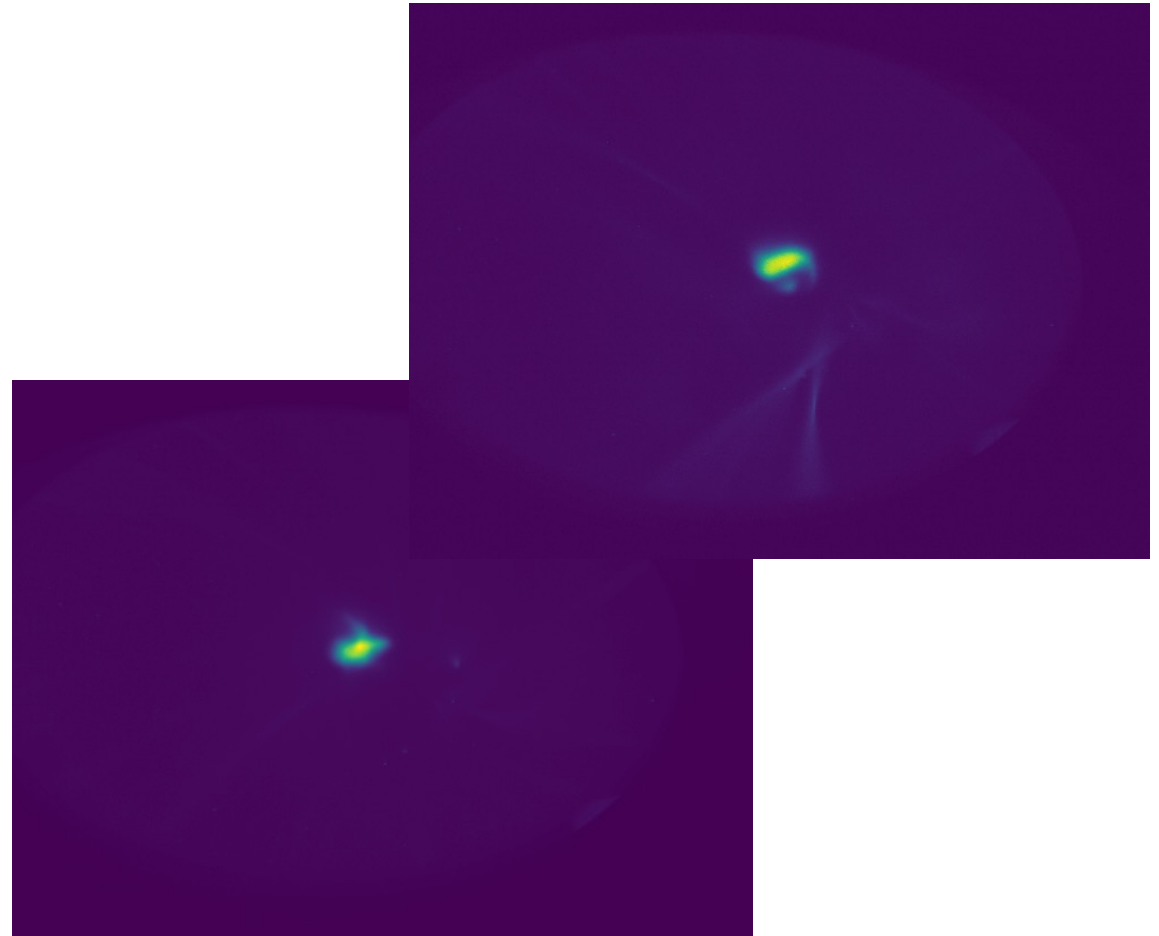
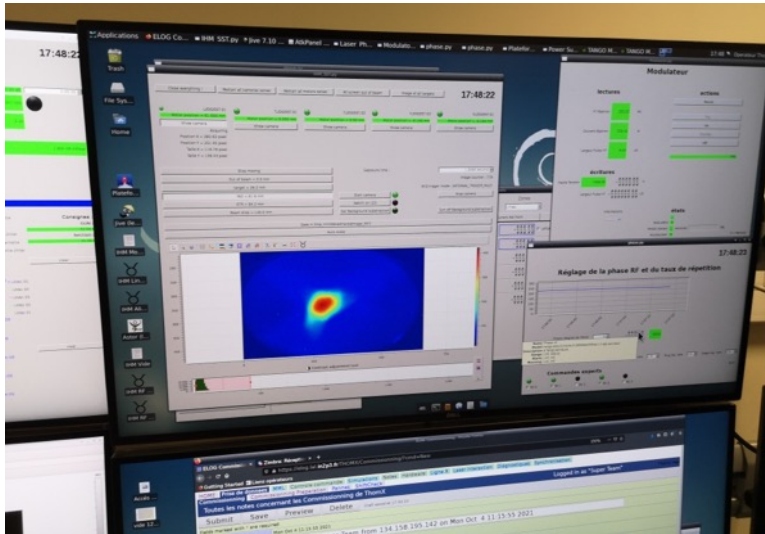
Work by Vlad Rusakov





Real beam measurements

- Some real beam measurements at ThomX





- ThomX saw its first beam a few weeks ago.
- Screen station are critical to the measurement of beam properties (size, transverse emittance,...)
- Work in progress to have online calibration and image sizes.