



Centre for Energy Research

The moderator test facility at the Budapest
Research Reactor

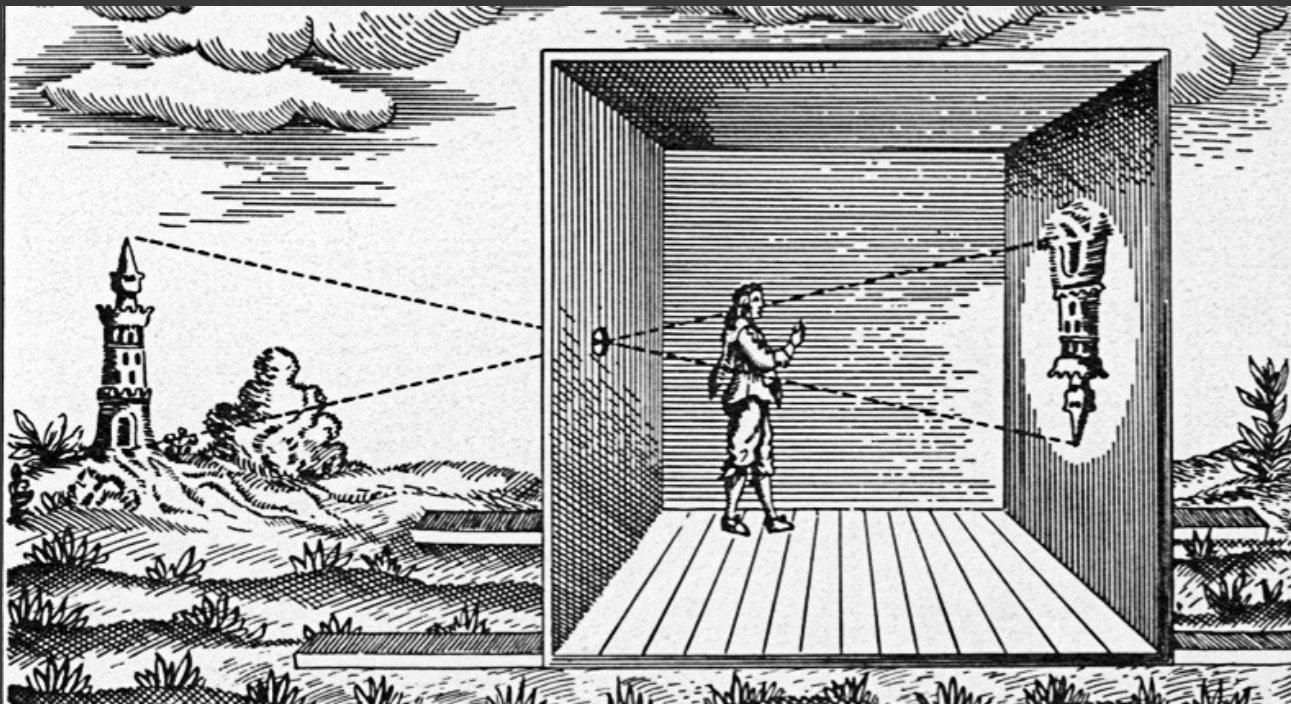
Alex Szakál





- BNC runs a cold source which was commissioned in 2000.
- Rebuild of the cold source will be necessary soon
- MCNP calculations showed that a 1D cylindrical para-H moderator could increase brightness by two times compared to the existing 'volume' moderator.
- The aim of the project to validate the low-dimensional moderator concept and open the possibility for other collaborations e.g.: VCN/UCN sources, CANS moderators





Imaging the moderator using “camera obscura” method

TOF is used for recording the wavelength

Moderator cell



S – flight length

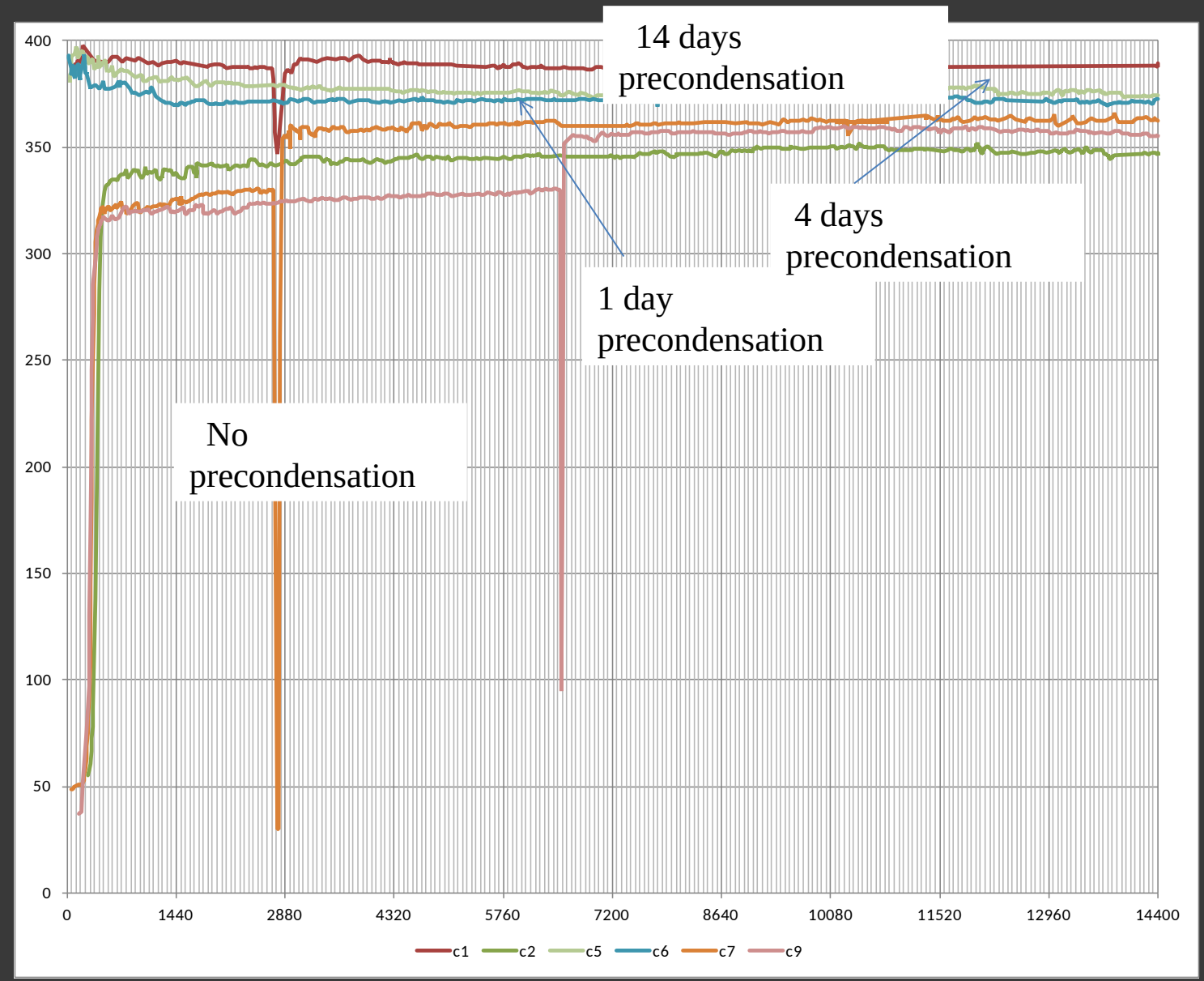


$$v = S / t$$

$$\lambda [\text{\AA}] = 3956 / v [\text{m/s}]$$

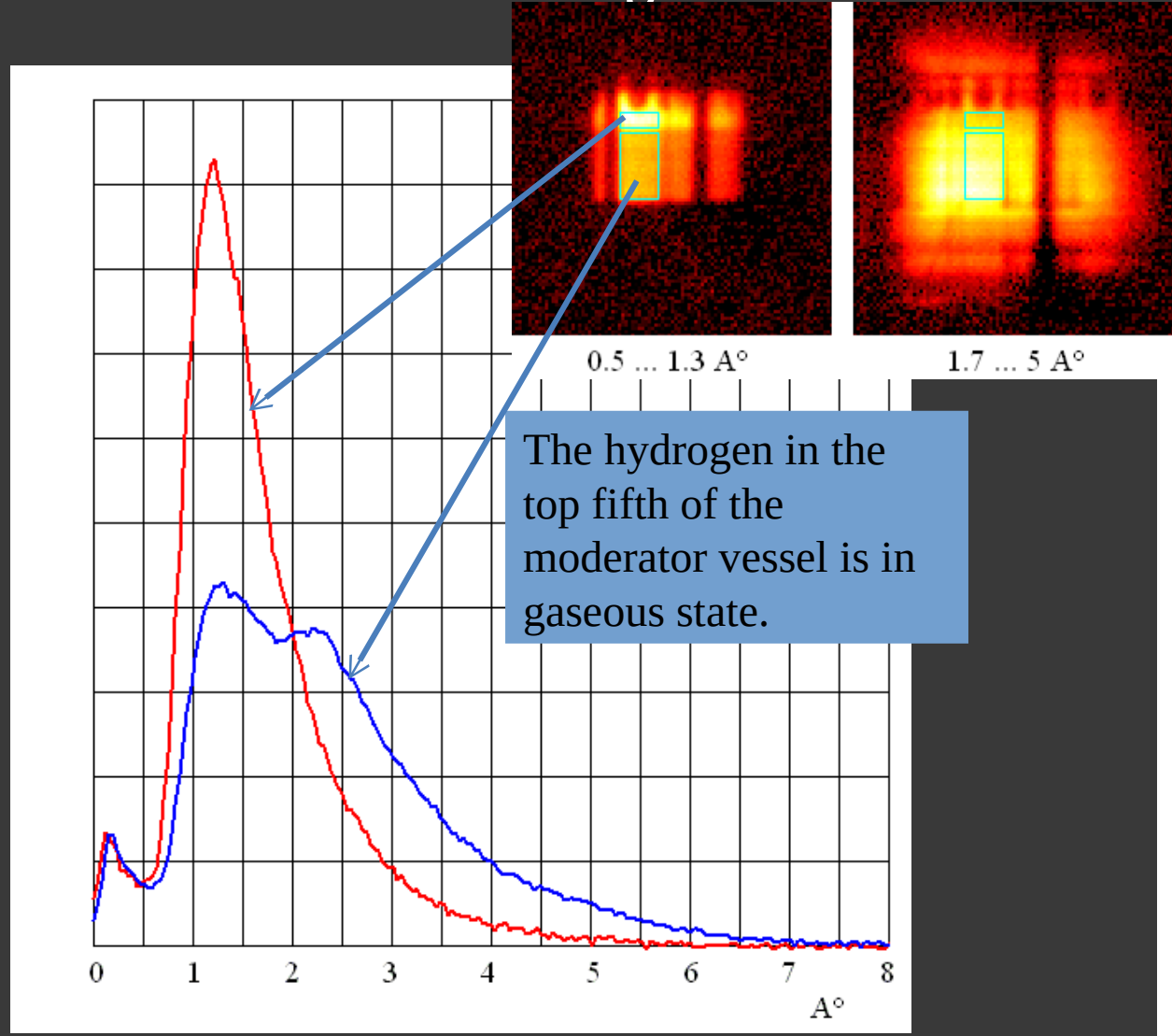
Pinhole and chopper

Position Sensitive Detector

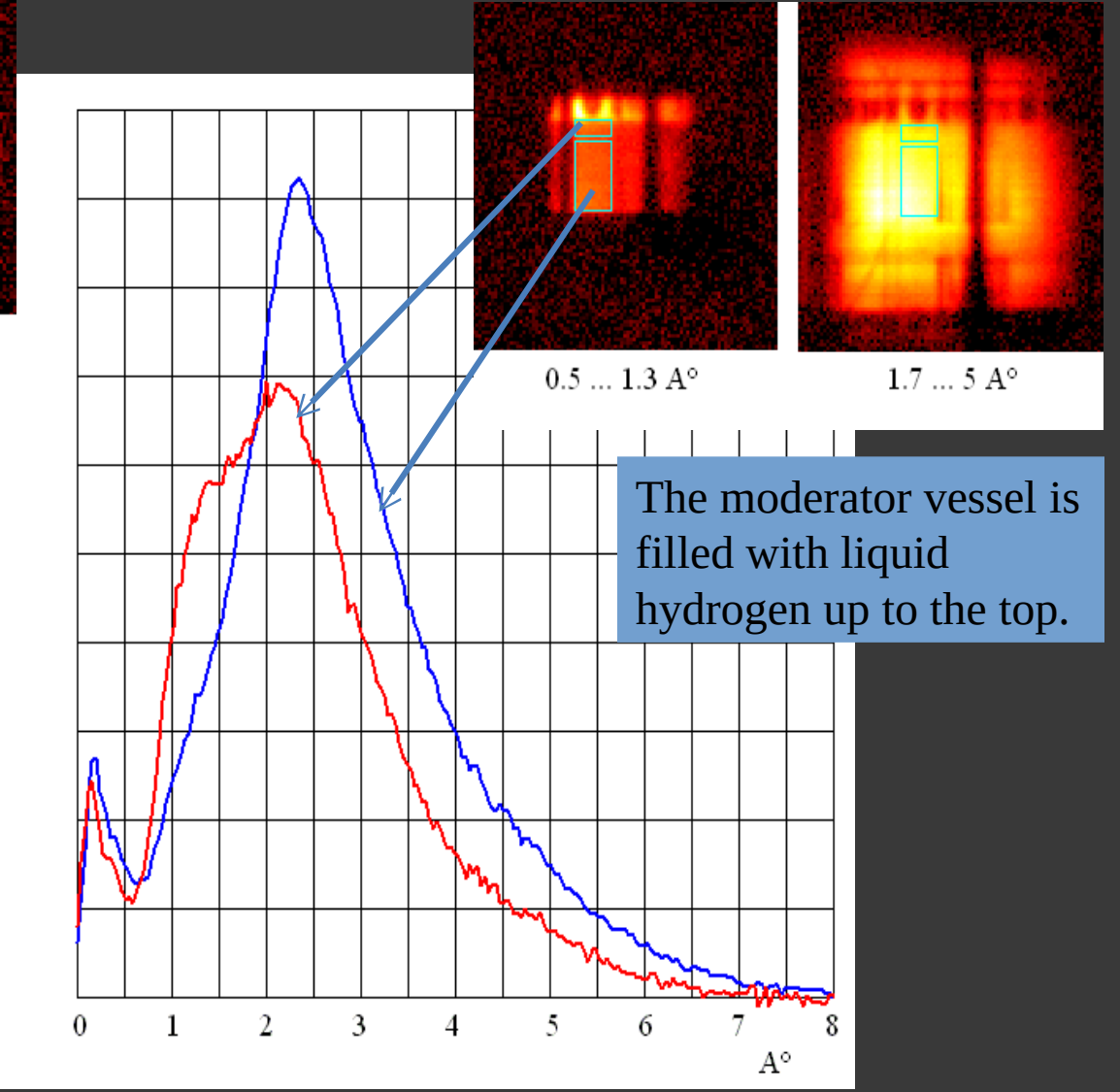


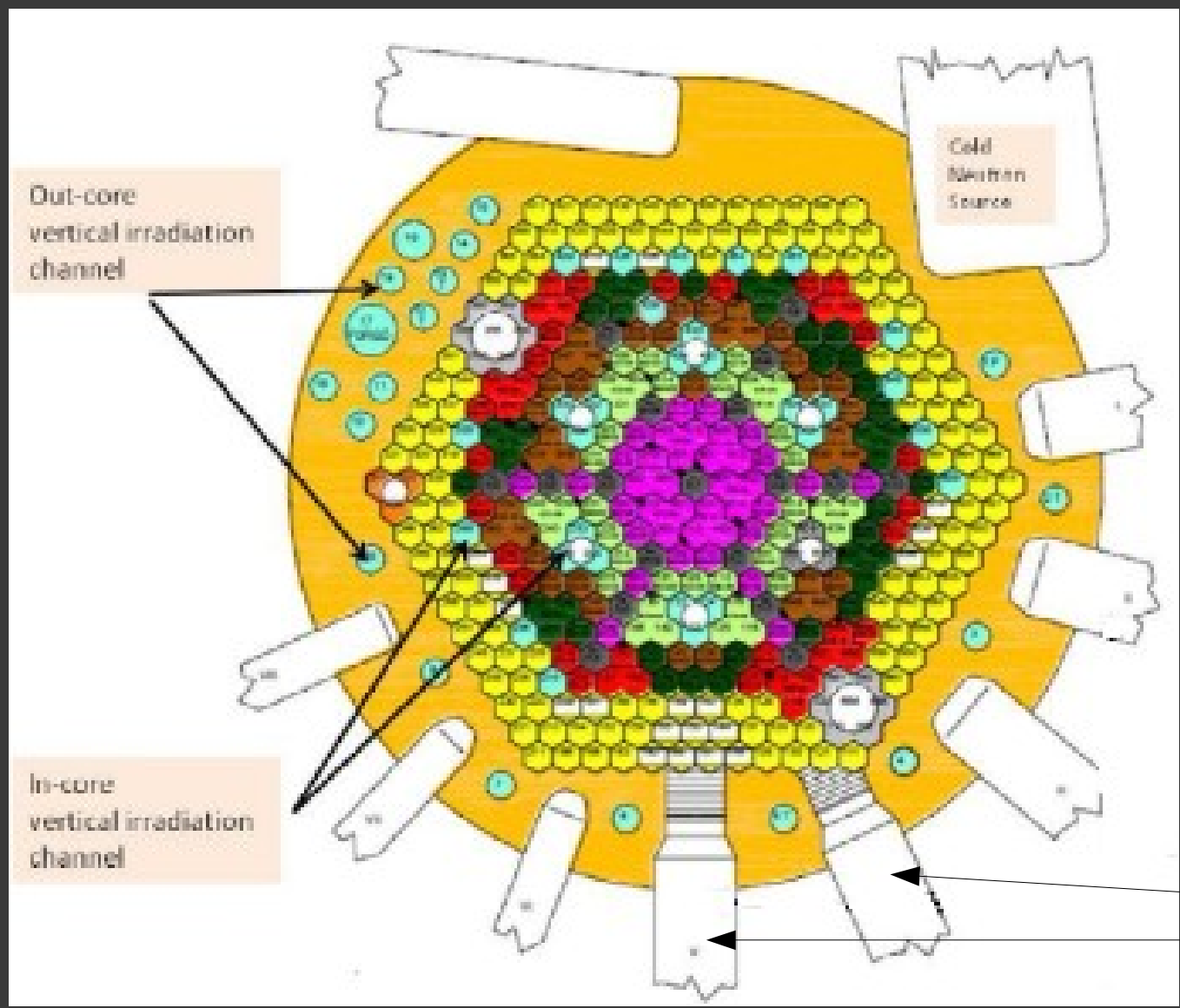


Condensation with running reactor



Condensation with stopped reactor





Aim of the instrument

- Model the moderation process outside the reactor core
- Flexible operation
- Relatively easy change of moderator geometry

Channel 4 was selected for the test station

- Radial channel
- Aluminum blocks between the channel and the fuel elements
- Fast neutrons can escape with less attenuation

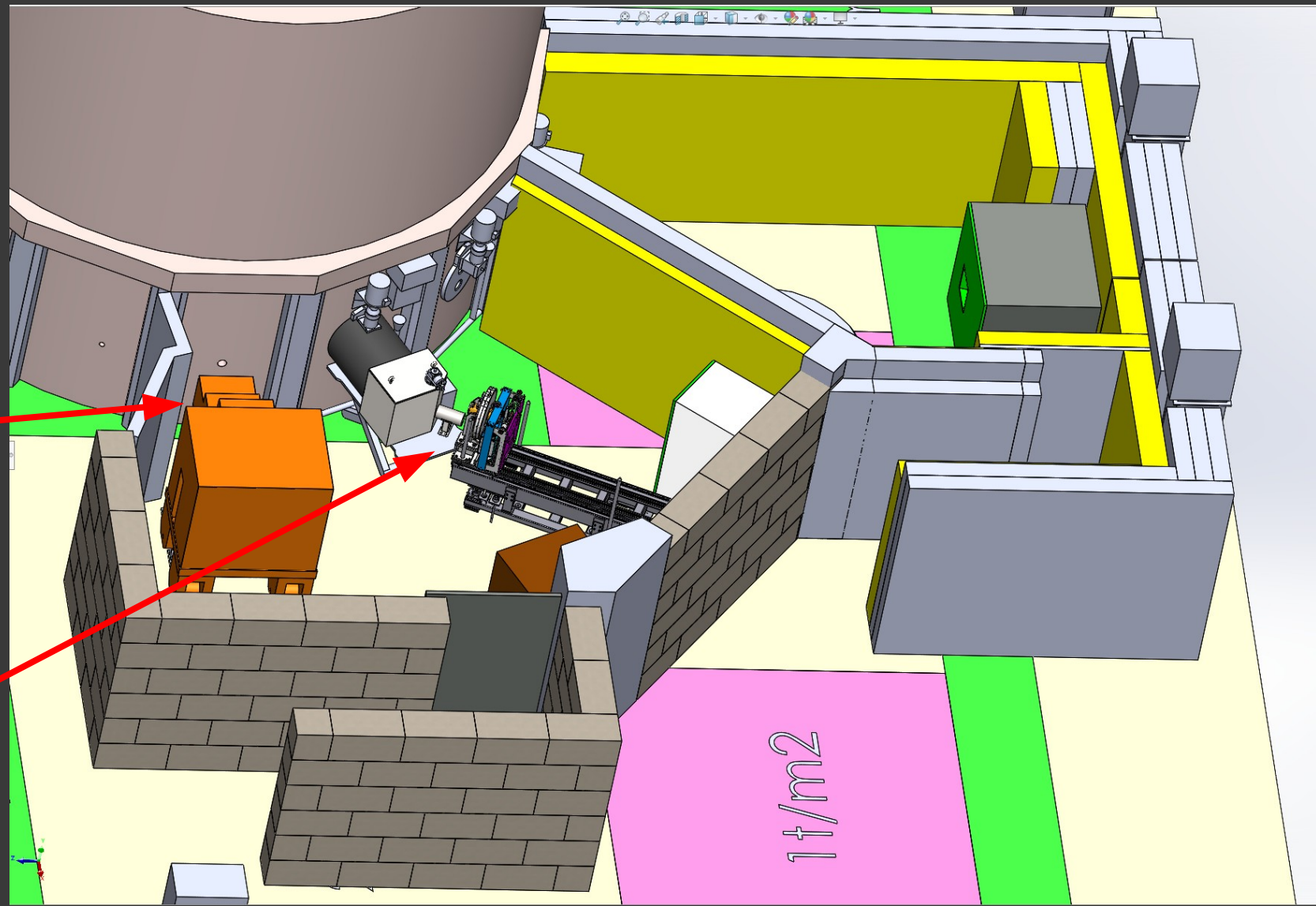
Fast neutron channels



Common bunker with the biological irradiation channel

Biological irradiation facility

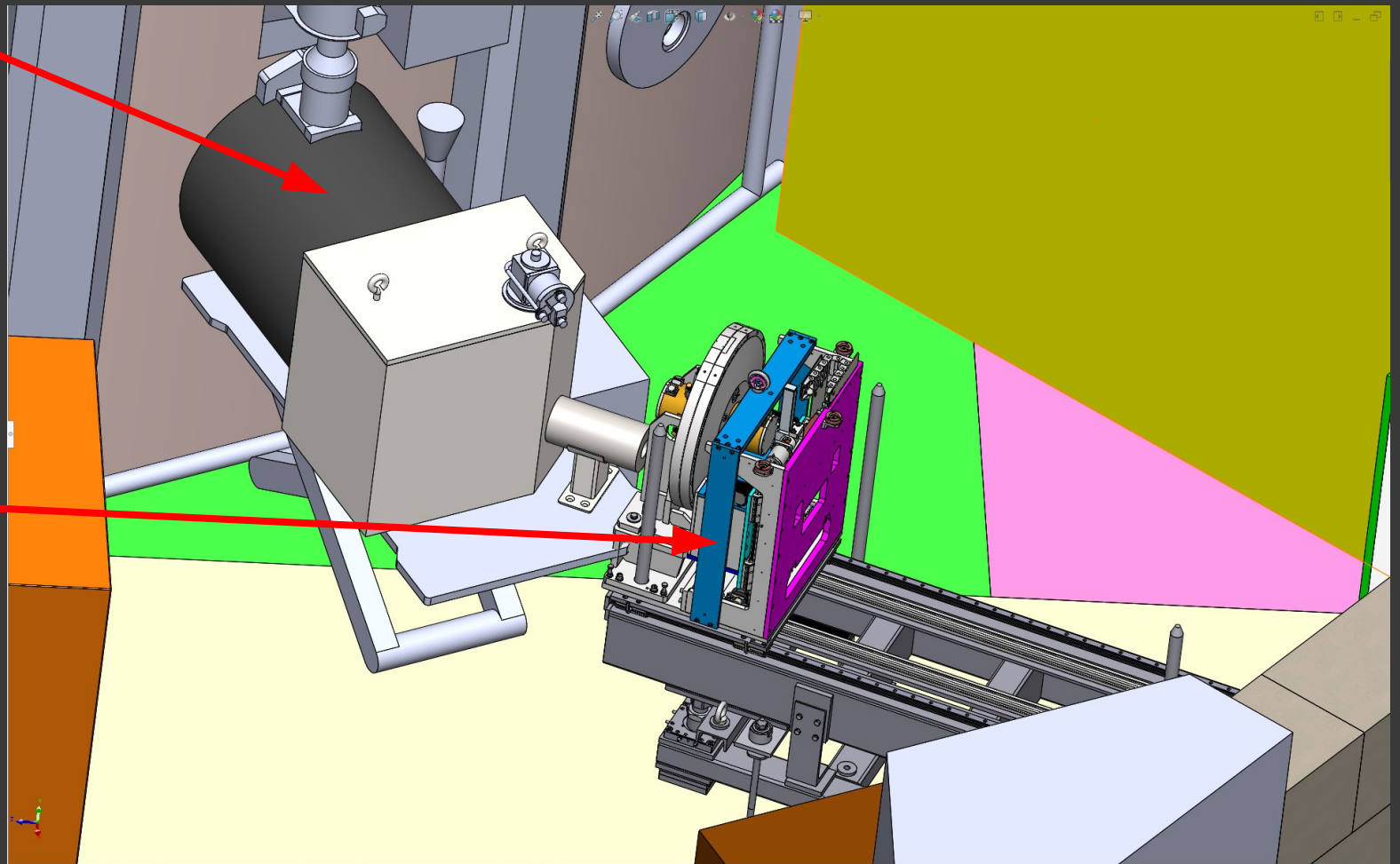
Moderator test facility





Target box with Be disk, Pb reflector and cold source

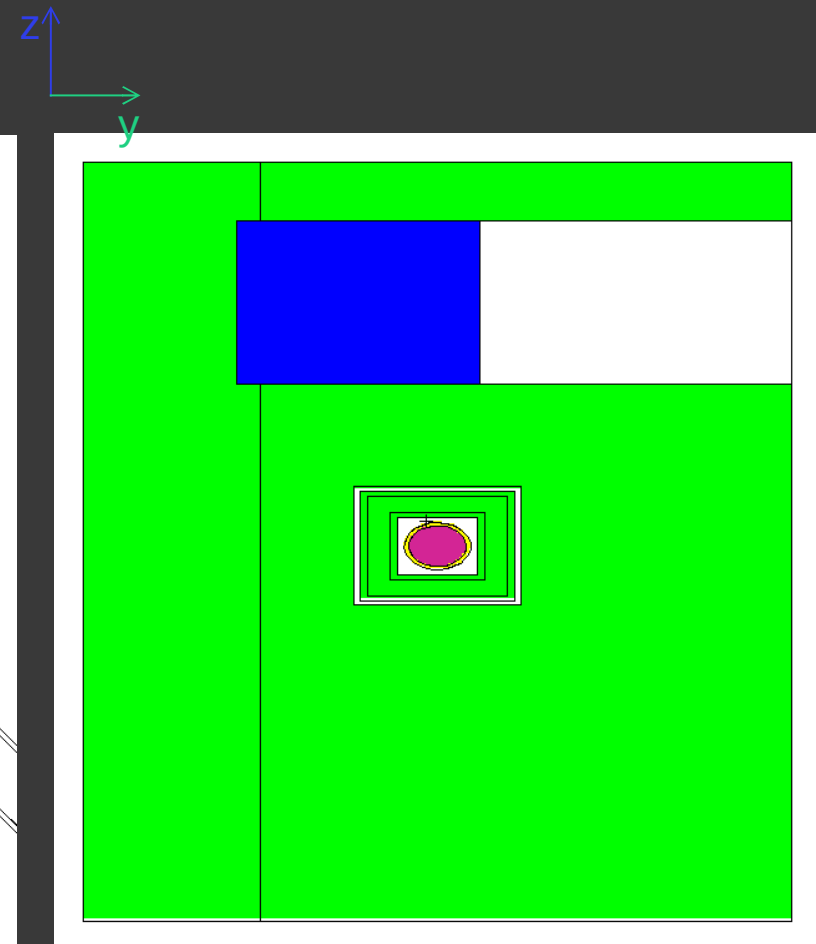
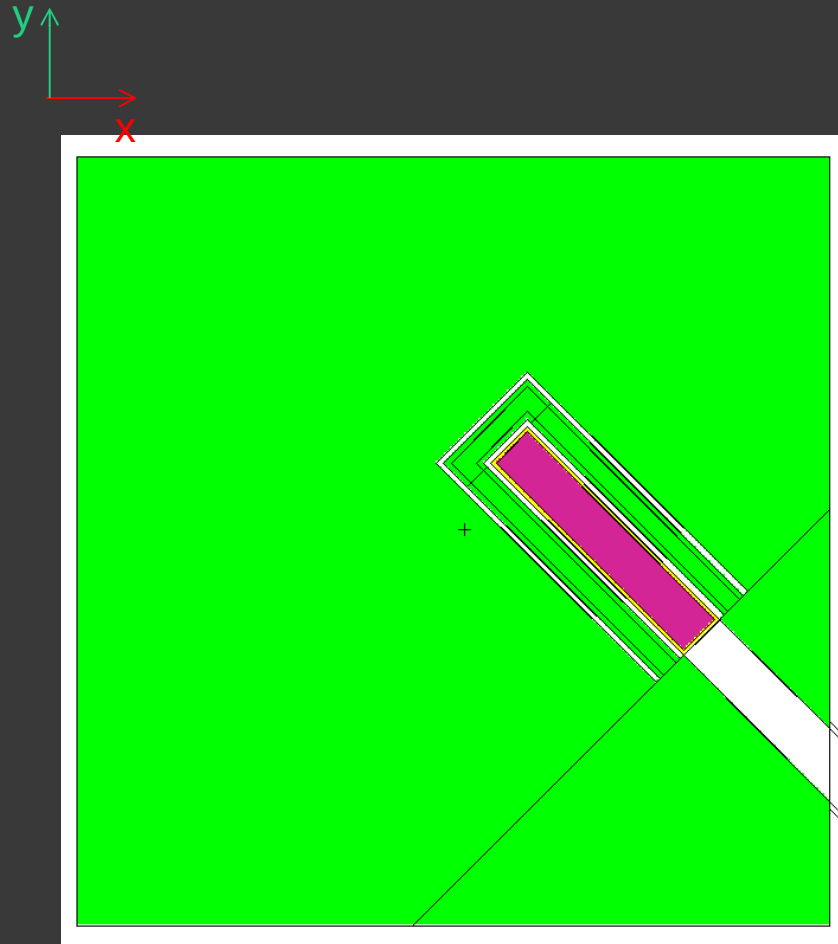
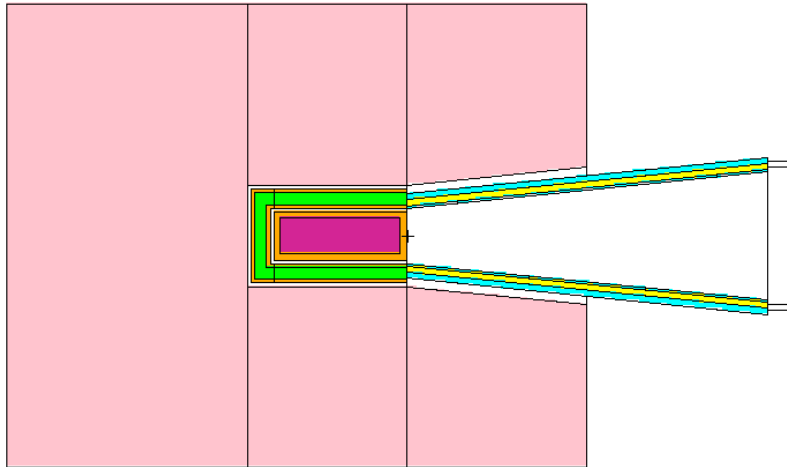
Camera obscura pinhole with chopper





The facility will have a cold source but not a VCN/UCN source.

The performance of the advanced reflectors (e.g. nano-diamonds, MgH etc.) are planned to be investigated at the facility.





Thank you for your
attention!