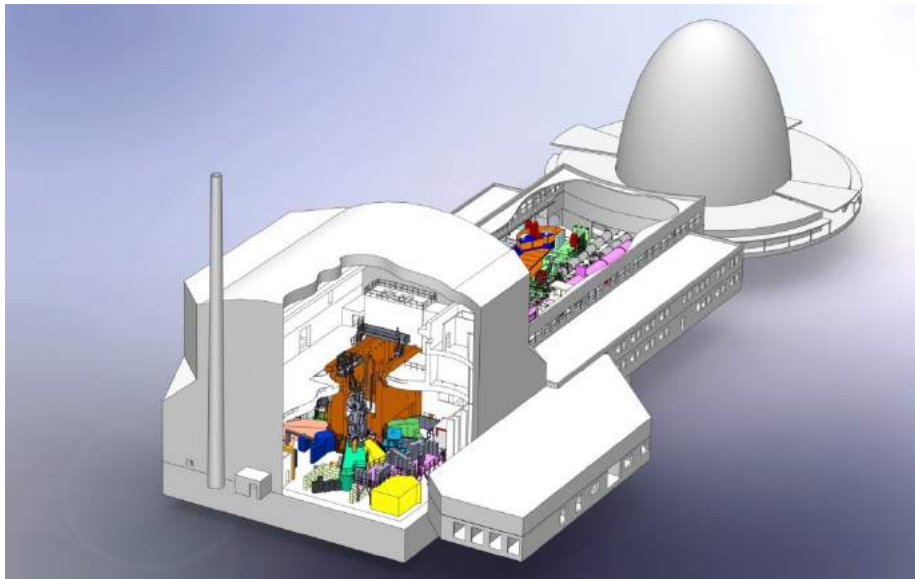


Development of gaseous detectors with solid ^{10}B Boron converter at FRM II



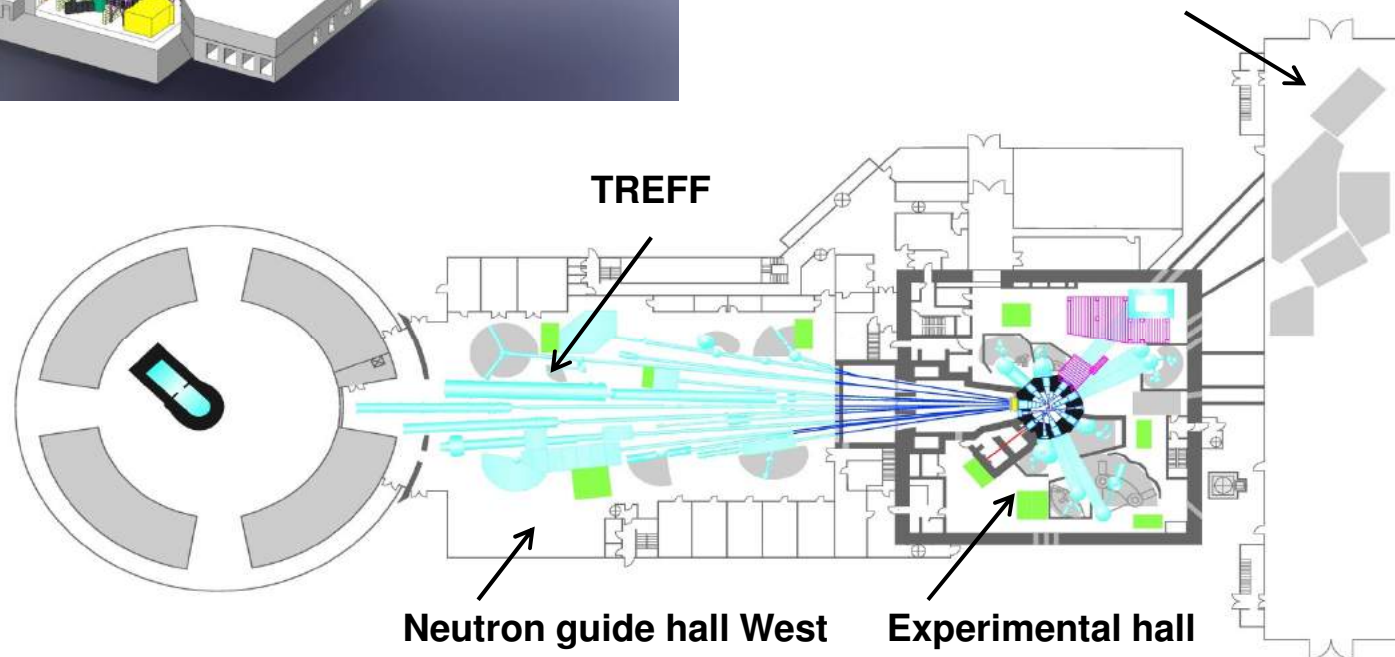
Experimental Areas



20 MW high flux reactor

- $8 \cdot 10^{14}$ n /cm² · s therm. flux
- thermal, cold, hot neutrons
- 30 instruments in user operation
- 4 cycles (60 days) /year

Neutron guide hall East (operation in 2018)

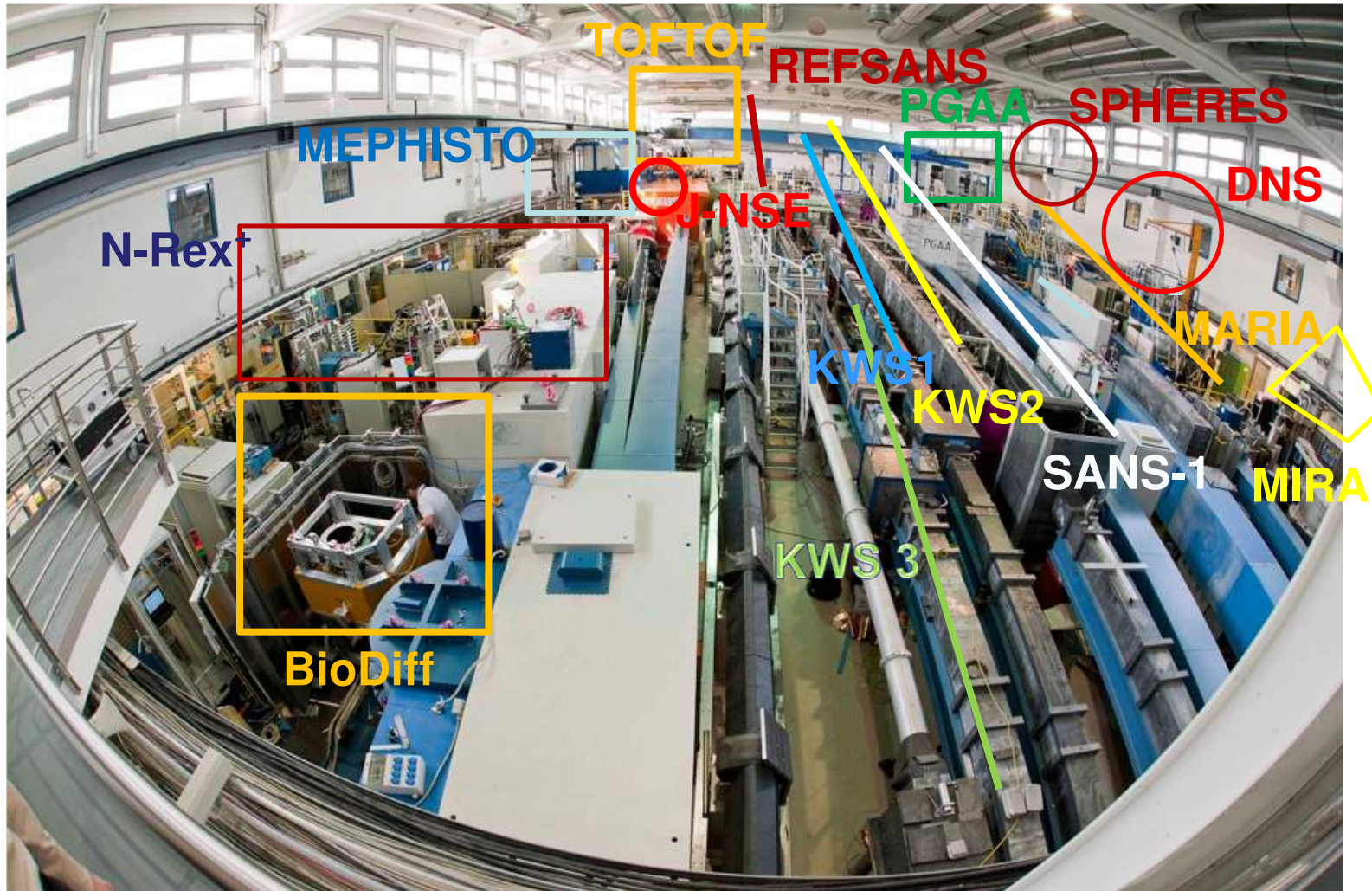


Experimental Hall



- 1 UCN
- 18 cold
- 8 thermal
- 2 hot
- 1 fast
- 1 positrons

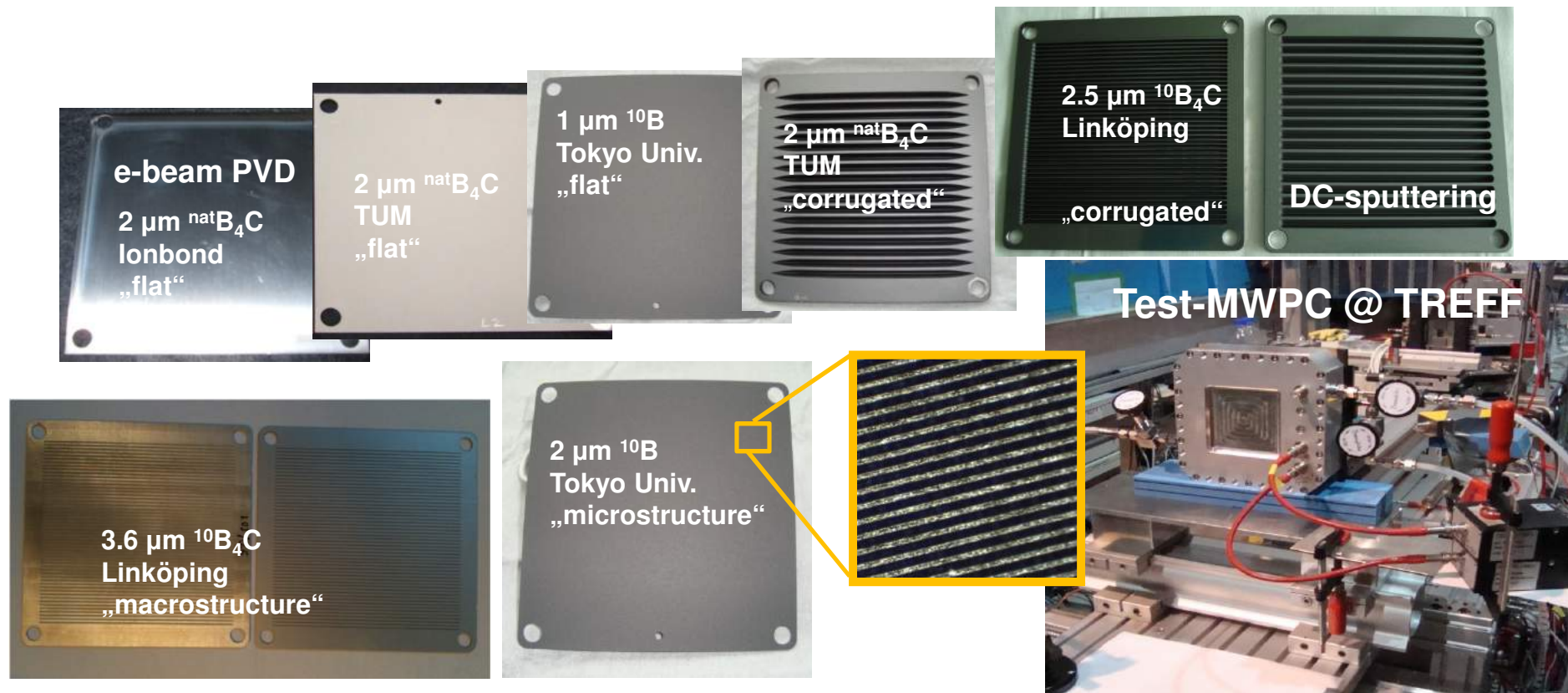
Neutron guide Hall West



Gaseous Detector with solid ^{10}B converter

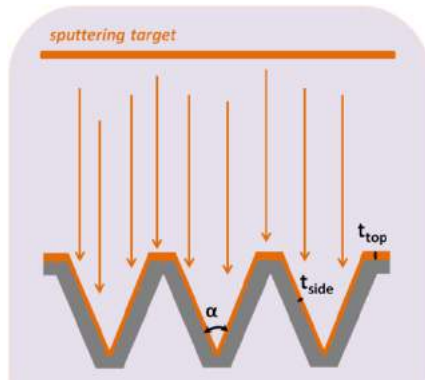
Driven by the ^3He crisis FRM II was involved in several programmes related to Gaseous Detectors with solid Boron-10 converter

- NMI3- FP7-II
- International Collaboration for Neutron Detector Development (ICND)
- German contribution to ESS Design Update Phase

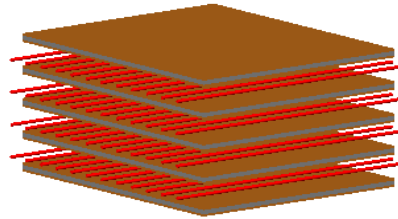


Gaseous Detector with solid ^{10}B converter

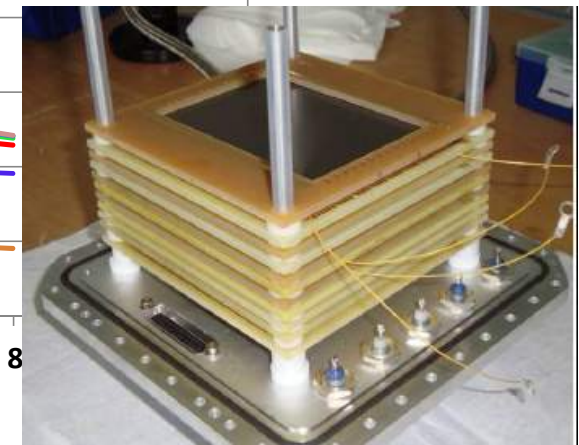
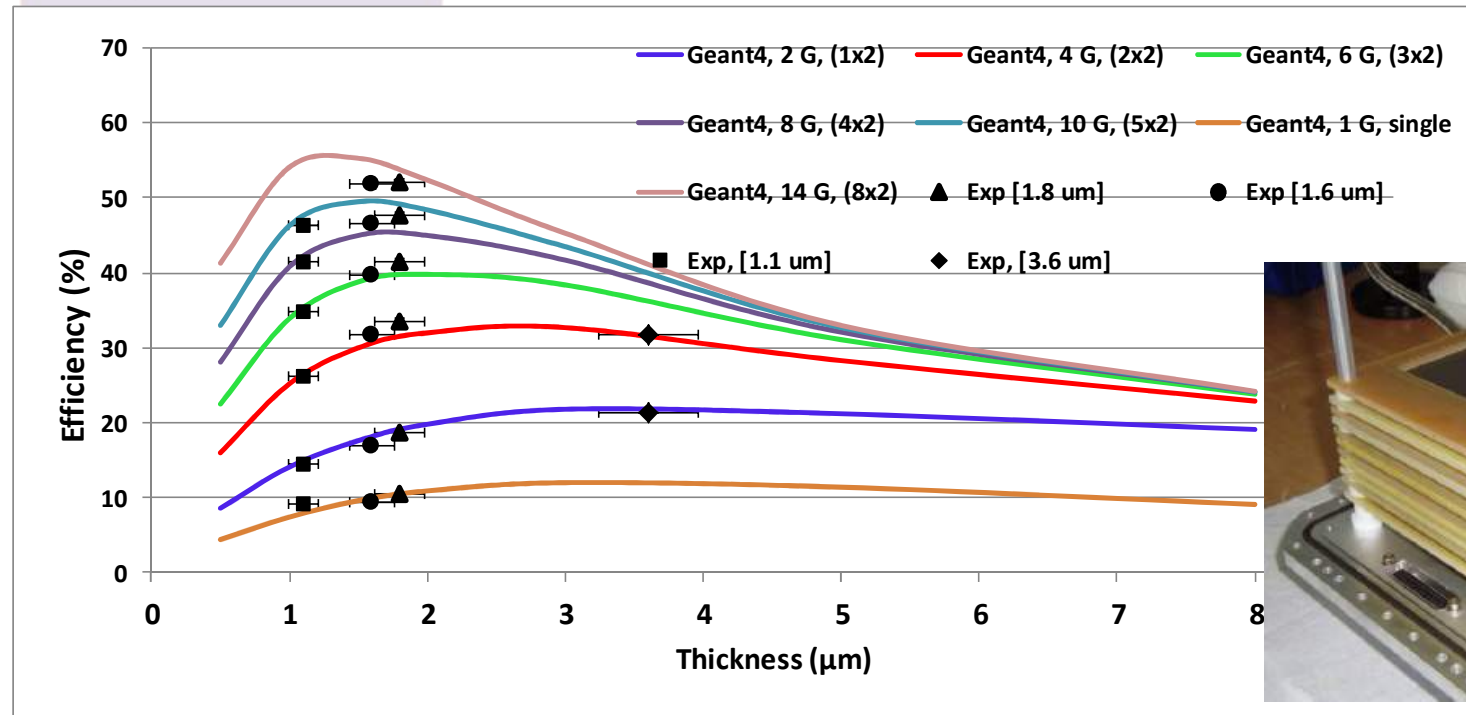
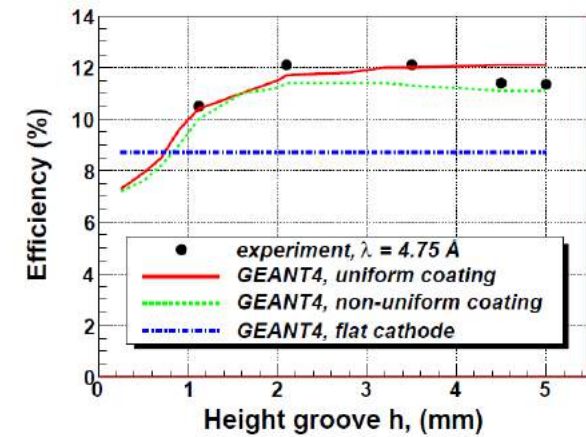
The “Grooved converter” concept *



e.g. multiple MWPC design

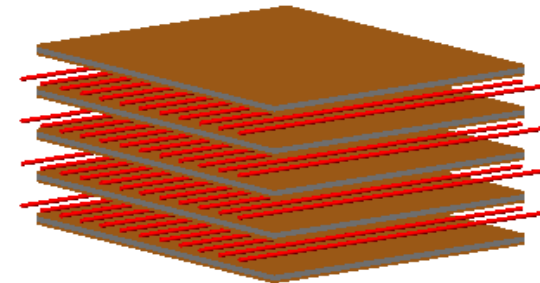


* I. Stefanescu, NIM A 727, 2013



Concept study for a large area detector

- Evaluate medium size detector based on a multiple MWPC with grooved converter for medium resolution



Multiple MWPC stack *



* detector transferred to ESS for further evaluation

Demonstrator design:

- Active Area 40 x 40 cm²
- fully modular design
- up to 5 MWPC
- Anode wire pitch: 5mm
- Anode – Cathode Gap: 7mm
- 0.5mm Al-Cathode: 2.1 mm grooves
1.4 μm B₄C coating
- Resistive anode wire readout for 2D - position resolution

Final Goal for a B10-based detector:

- Efficiency \approx 50% for 1.8 Å (10 MWPC)
- Position resolution \approx 5 x 5 mm

FRM II task in SINE 2020:

- Assist LIP Coimbra in RPC detector evaluation carried out at FRM II in close collaboration with ESS and Linköping University

Experimental Infrastructure at FRM II

New 40 MBq ^{252}Cf source



$\lambda = 4.7 \text{ \AA}$ neutron test beam @ TREFF

