

DREAM update for STAP

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Schedule update

DREAM will be ready for first neutrons in March 2024*:

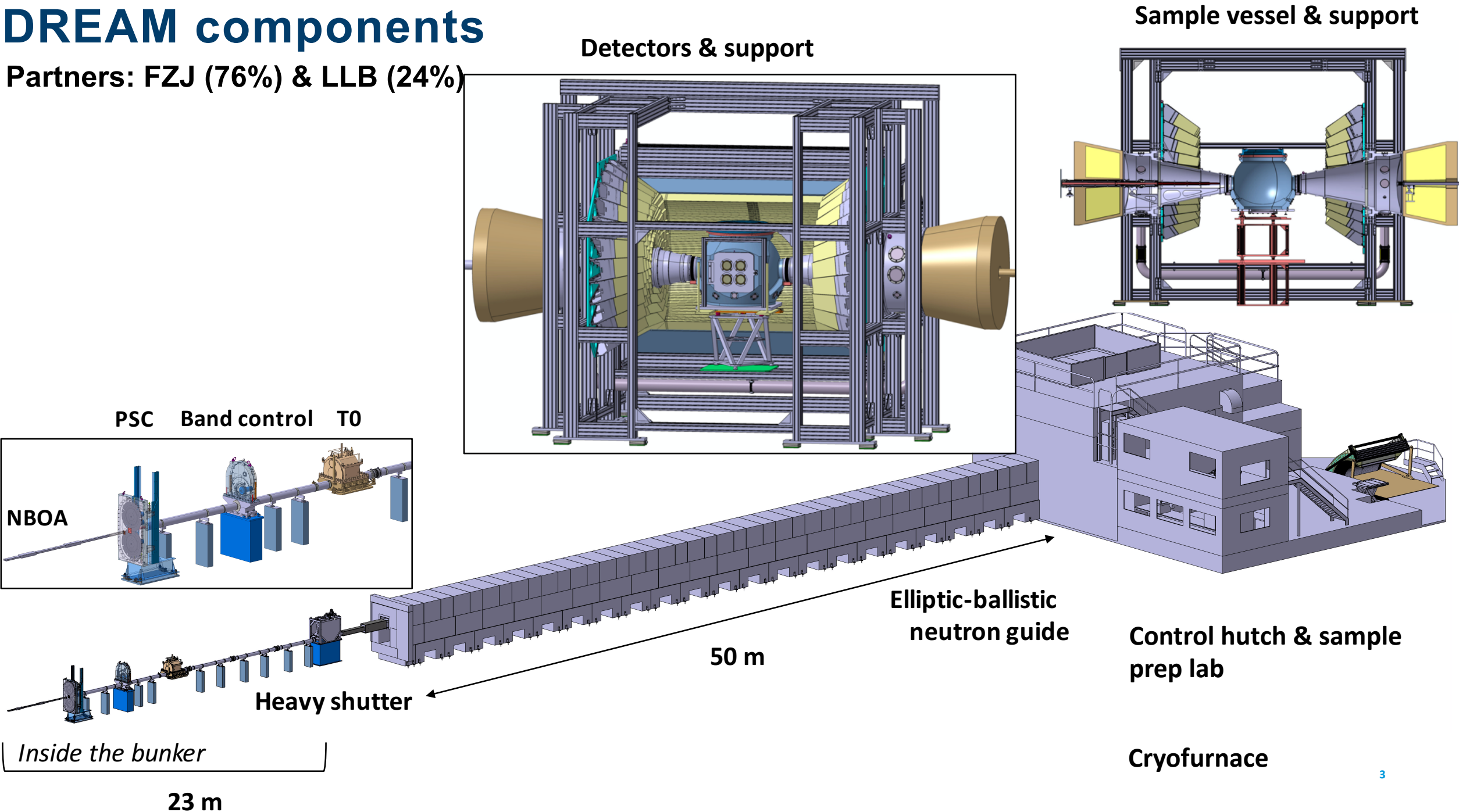
- Completion of the final design phase (TG3) is in June 2022 (cryofurnace delays)
- Access date to the bunker is delayed to August 2022
- Access to experimental hall is on schedule (available now)
- Instrument construction is completed by December 2023 (TG5)
- Beam-on-target is on March 2024*

* to be confirmed after re-baselining

Installation complete	Expected date
NBOA	Q3/Q4 2022
Bi-spectral switch + BBG	
Neutron guides inside the bunker	
Heavy Shutter	
Choppers	
Caves	June 2022
Hutch + sample prep. lab	July 2022
Neutron guides outside the bunker	August 2022
Guide shielding	
Detector Support	September 2022
Sample Vessel	November 2022
Detectors (including SANS)	September 2023
Beam on Target / Hot commissioning	March 2024

DREAM components

Partners: FZJ (76%) & LLB (24%)

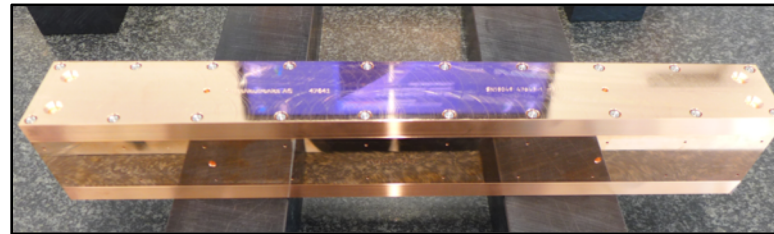


Neutron Beam Optics Assembly / Bridge Beam Guide / Bi-spectral Switch

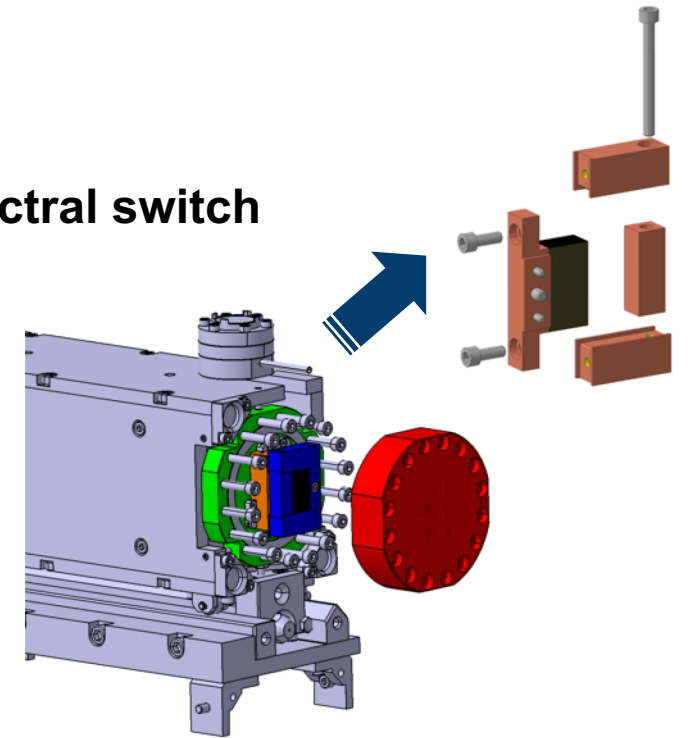
NBOA (lifting tests)



BBG



Bi-spectral switch



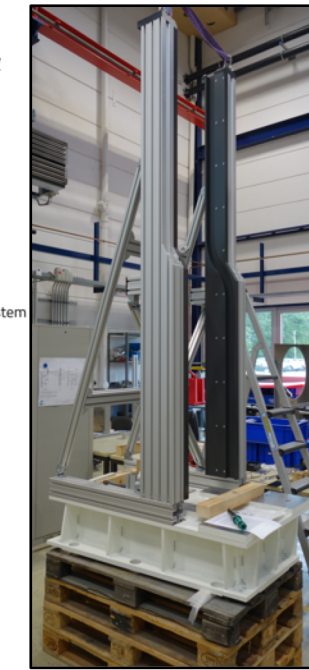
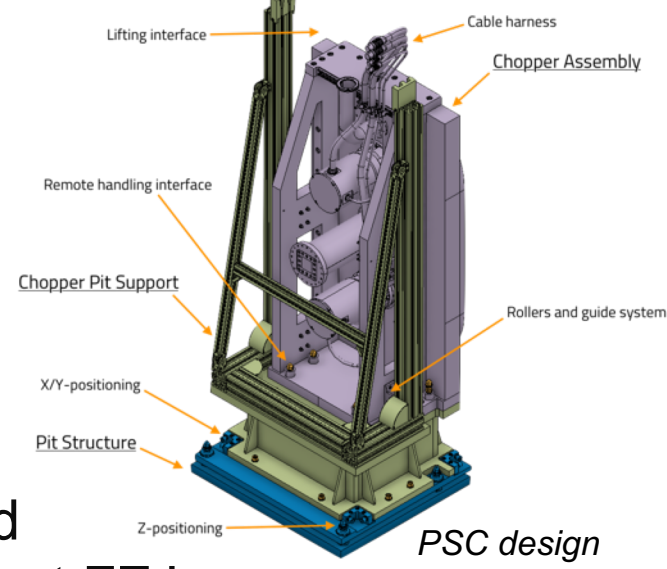
- NBOA & BBG are delivered to ESS & FZJ (neutron tests at ILL & PSI)
- Si wafers for switch are delivered to FZJ
- Neutron tests of selected Si wafers of bi-spectral switch are being pursued
- Idea is to test entire switch with TOF thermal & cold neutrons (SNS, ISIS)

Chopper system

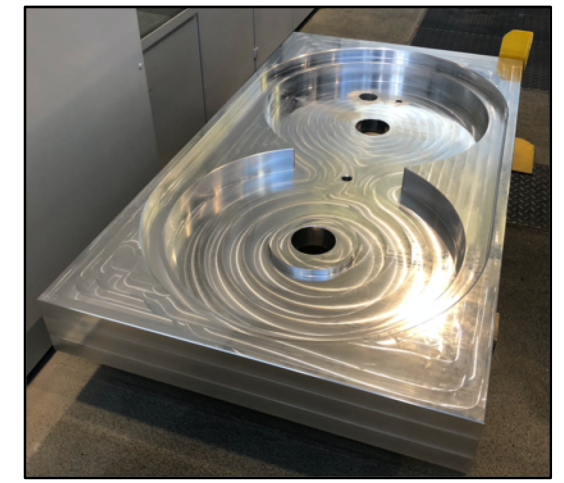
Pulse Shaping Chopper (308 Hz) & Overlap Chopper (14 Hz)

Band Control Chopper (112 Hz)

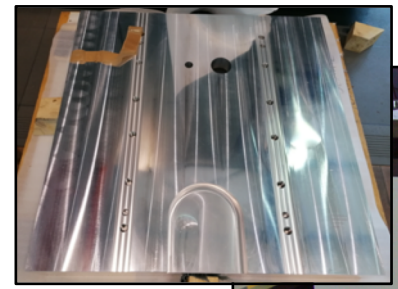
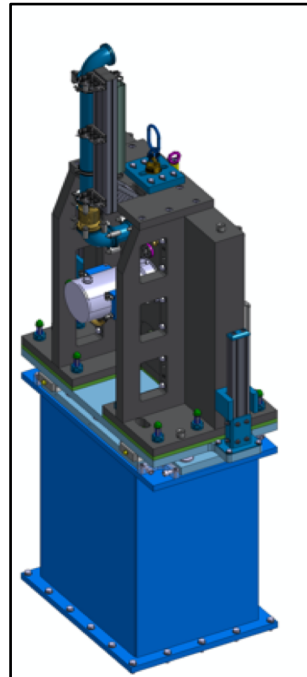
- Vendor: Jülich Chopper Group
- Disks from Airbus are manufactured
- Manufacturing of housings & bases at FZJ
- Housing and disks will be shipped to SKF in October



Remote handling rails



PSC housing



BC base

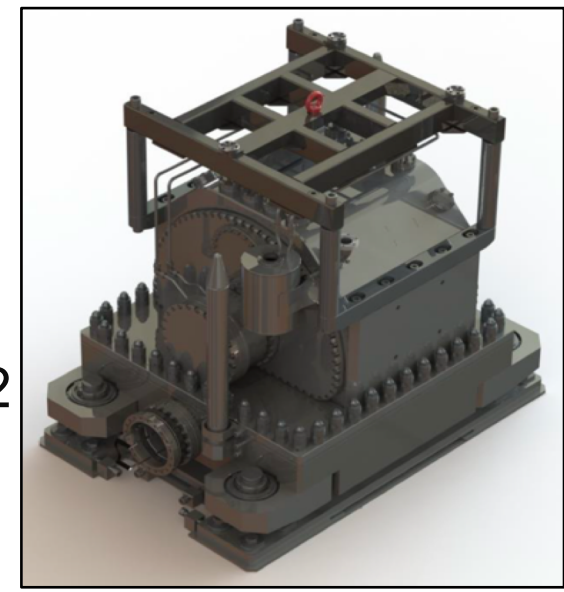
BC housing



z-Gemeinschaft

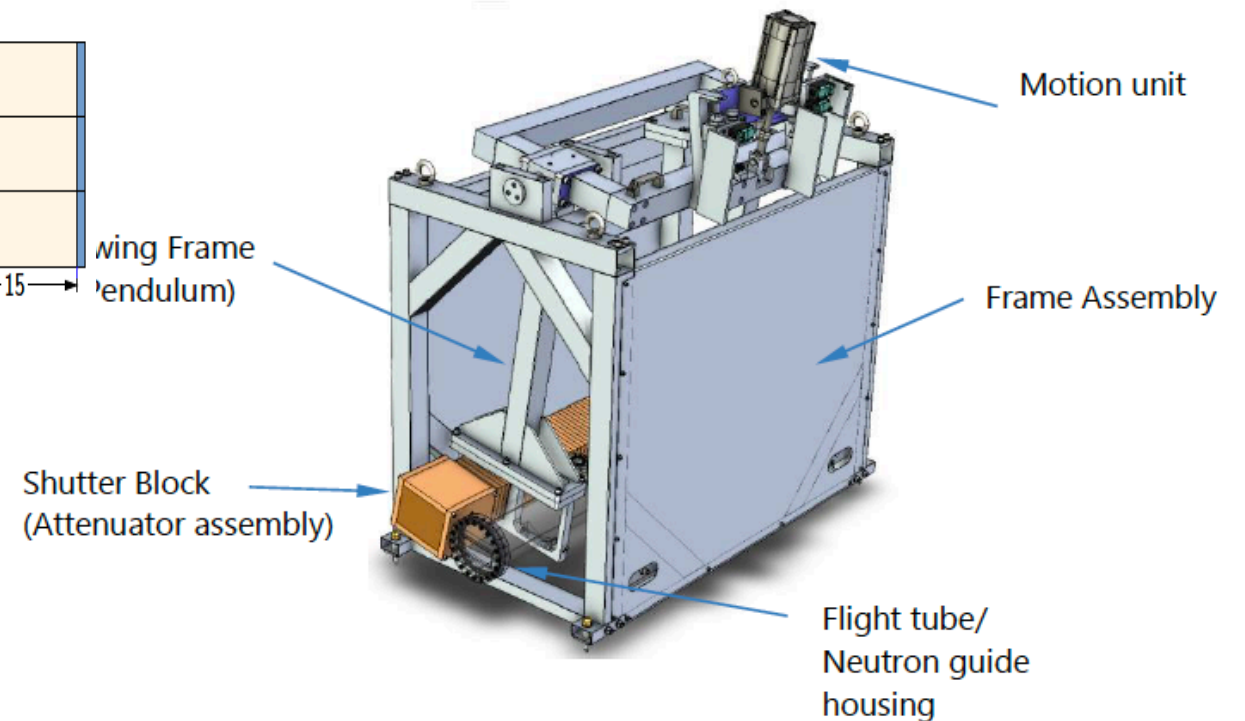
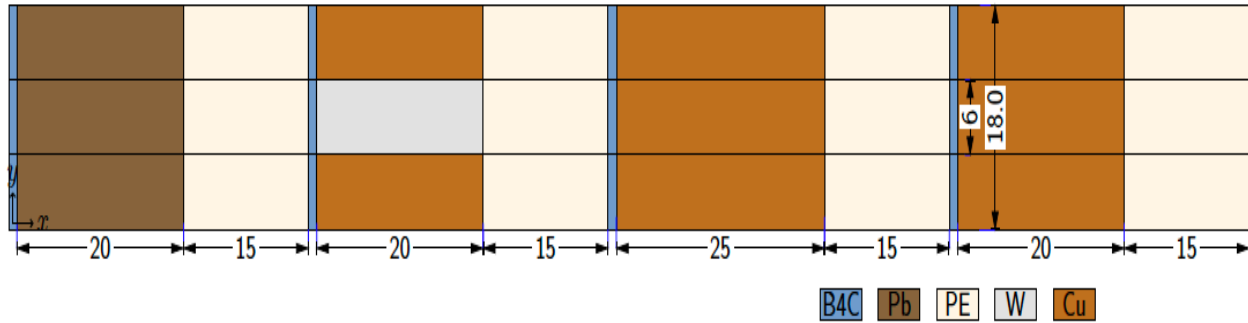
T0-Chopper (ESS)

- Manufactured
- FAT in September 2021
- SAT in October
- Ready for installation in 2022



Heavy shutter (ESS)

Shutter block composition

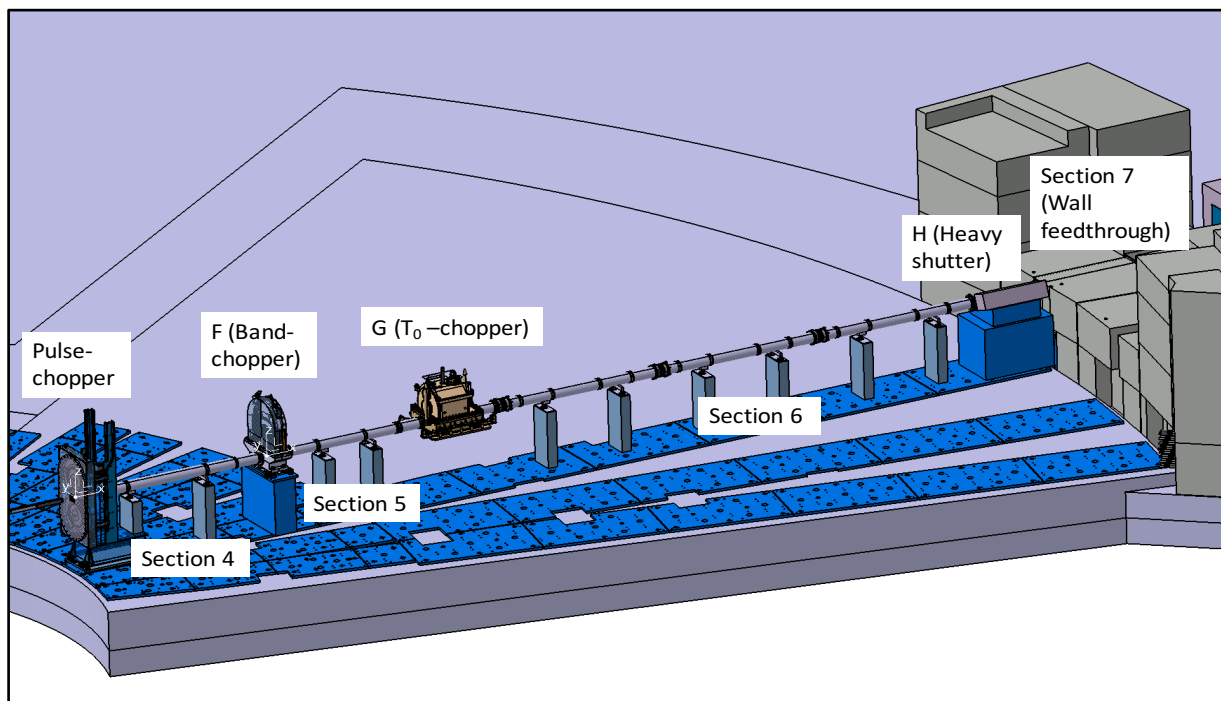


- Neutronics simulations are done by FZJ
- FAT of mechanical parts was accepted in August 2021
- ESS is designing and manufacturing the support frame
- Shielding block is being procured

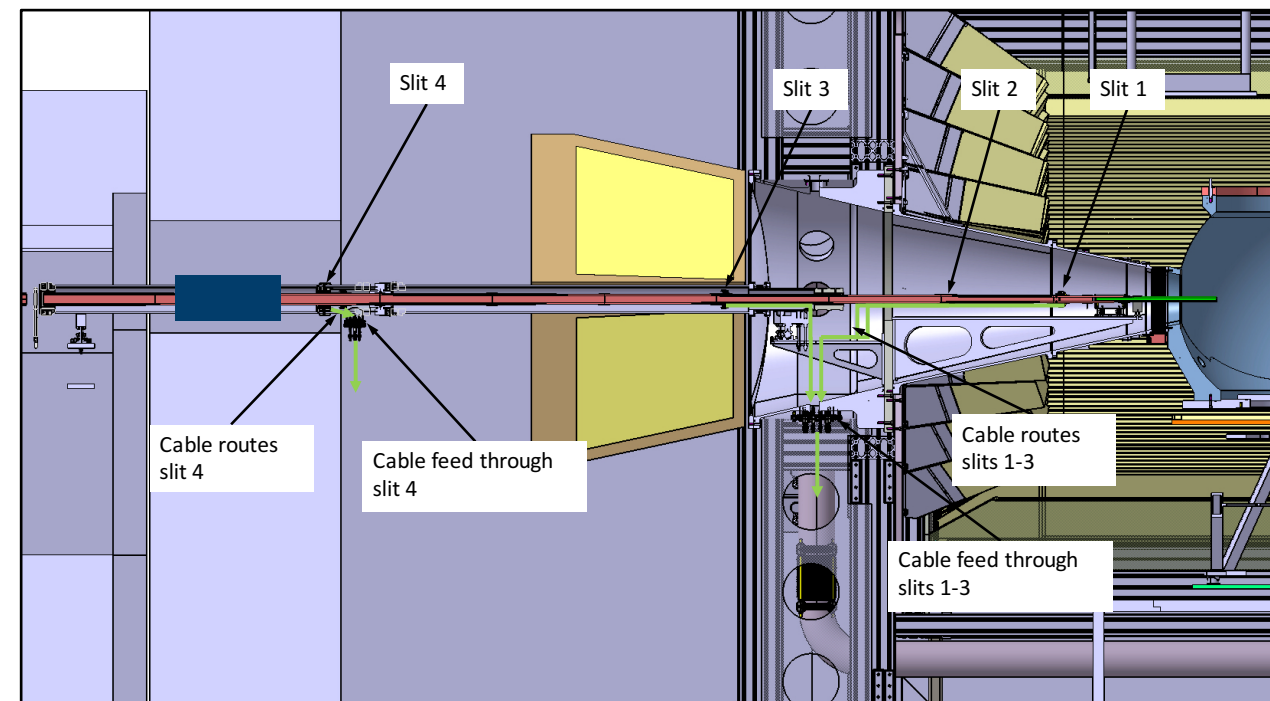
Neutron guides

- Guides will be manufactured by SNAG
- Installation of in- and out-of-bunker guides will start in summer 2022
- Installation time: 1- 2 weeks (each)
- SubTG3: Sept. 2021 (in-bunker); Jan. 2022 (out-of-bunker)
- Detailed installation plan is being developed with ODIN, ESS and SNAG for in-bunker guide

Inside bunker

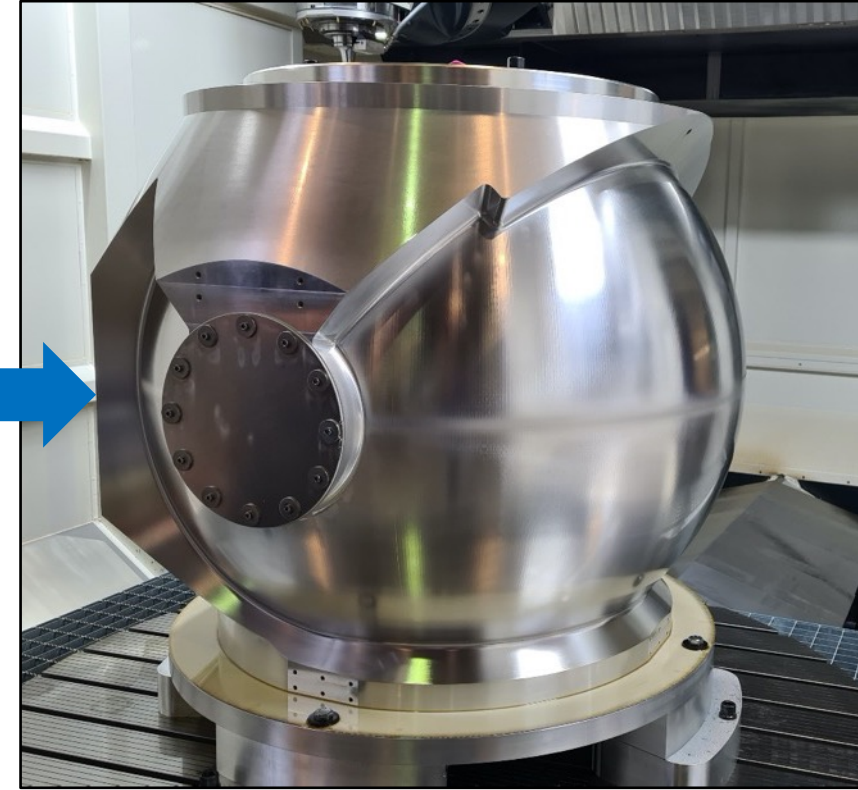
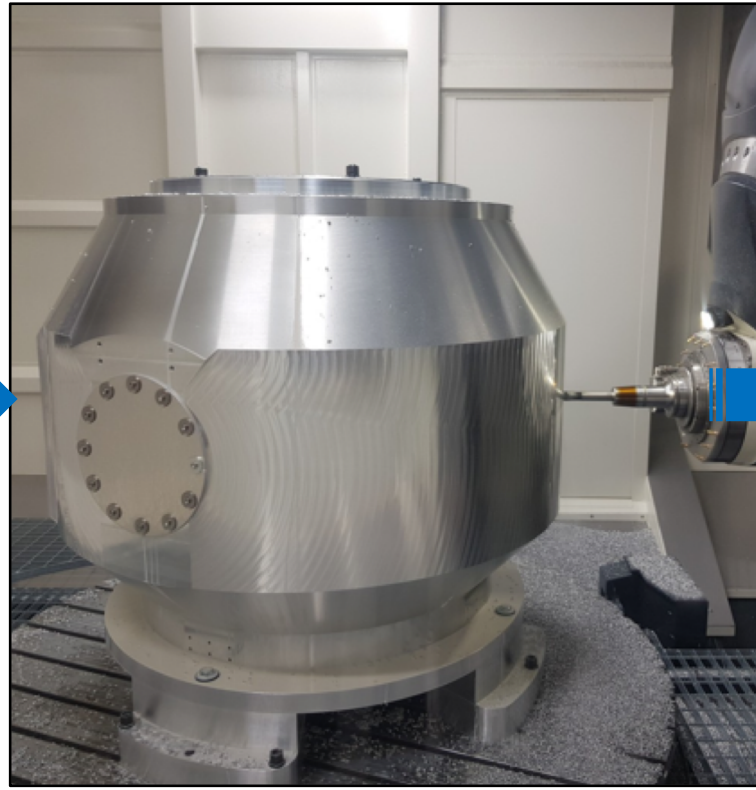
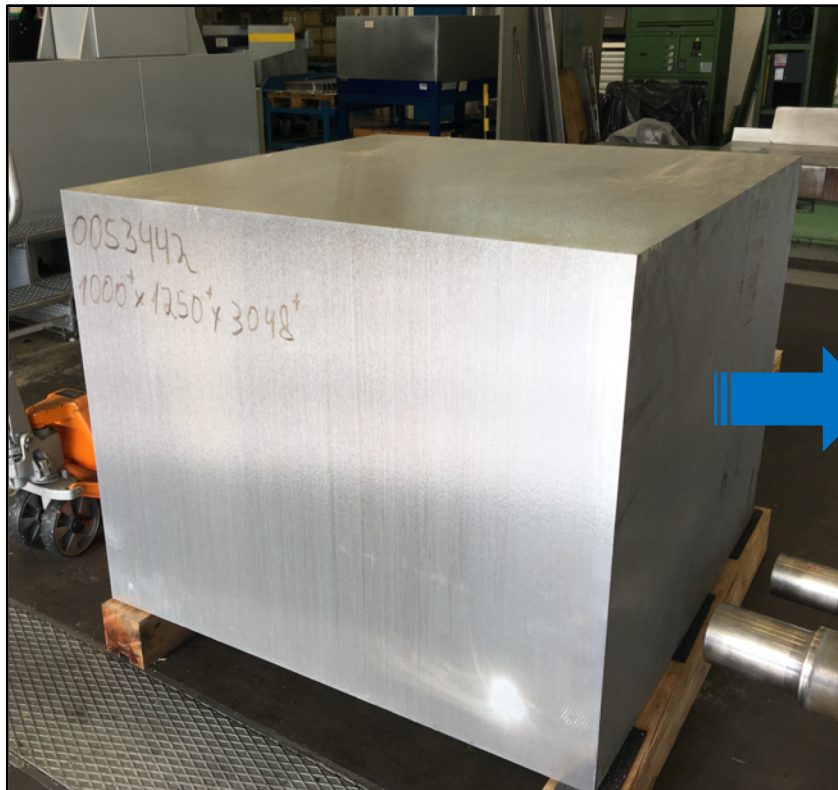


Outside bunker



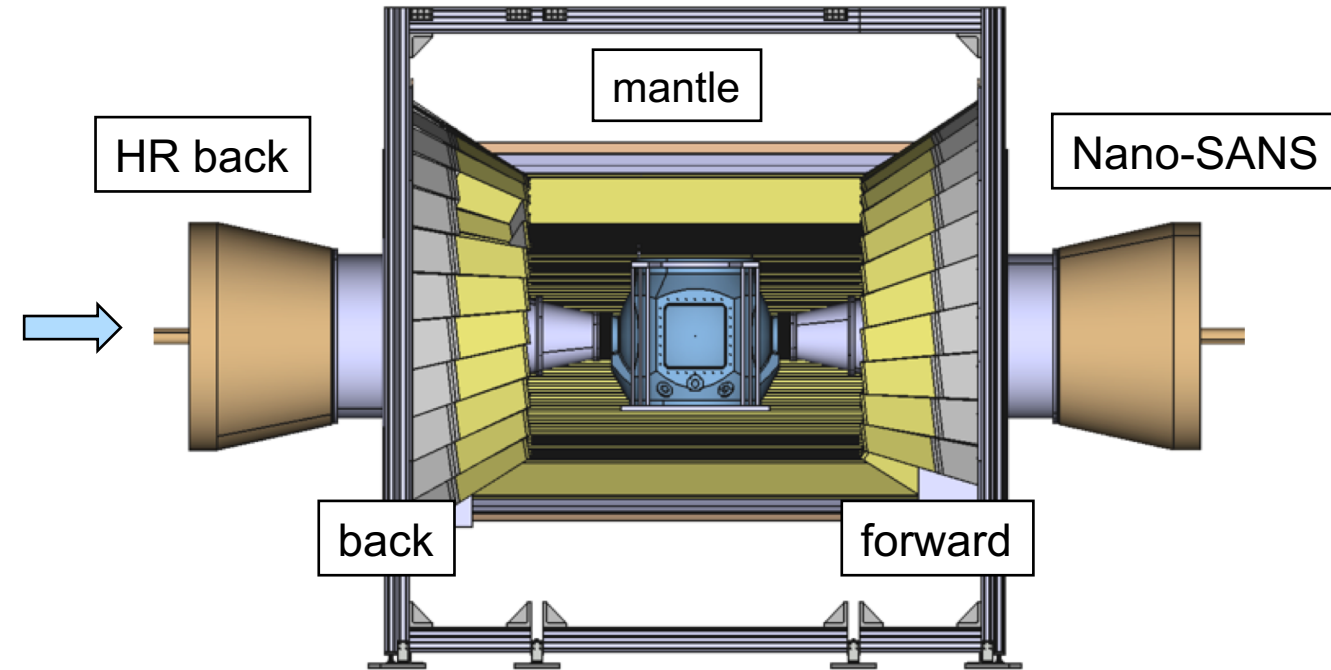
Sample vessel

- Milling is complete
- Ultrasonic measurements confirmed 2.2 – 2.3 mm thickness
- Sample vessel is shipped to Switzerland for galvanizing
- Backup Al proto-material was purchased

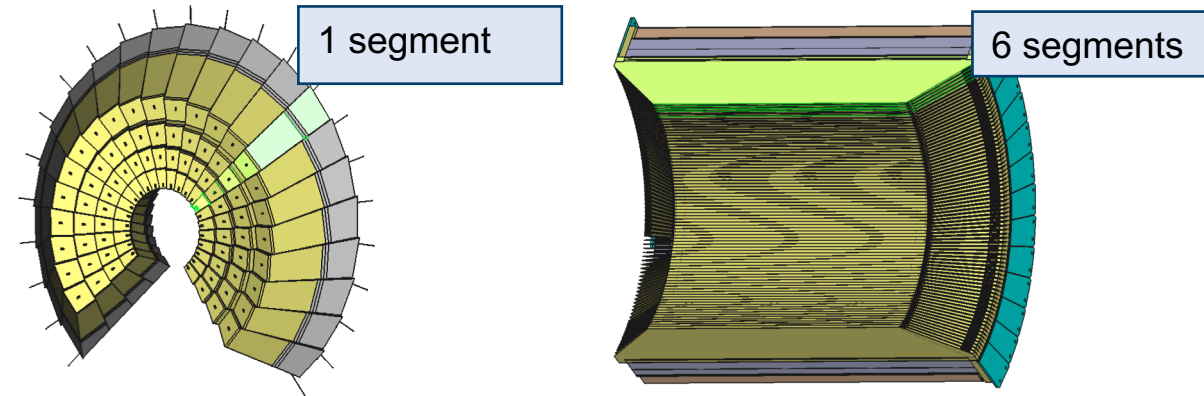


Detectors

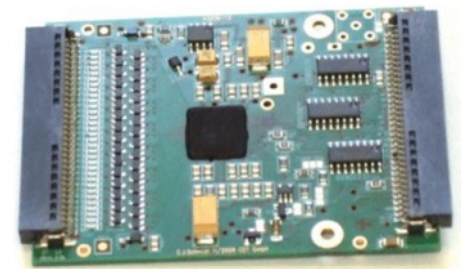
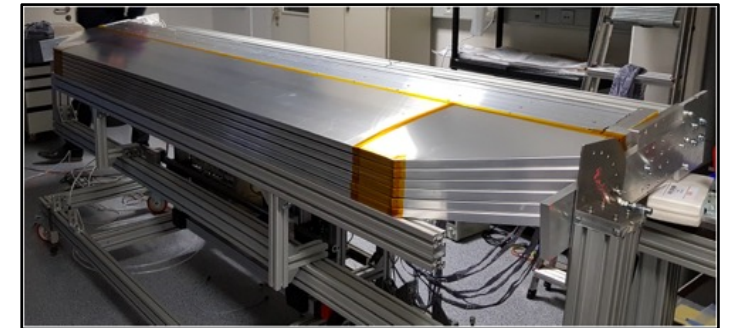
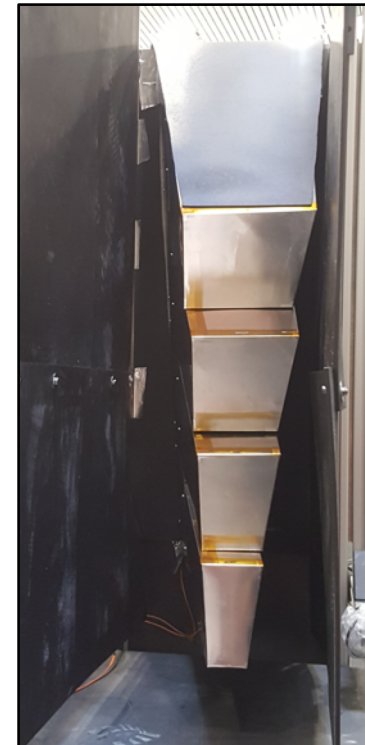
Complete detector coverage



Early procurement of first segments (0-series production)

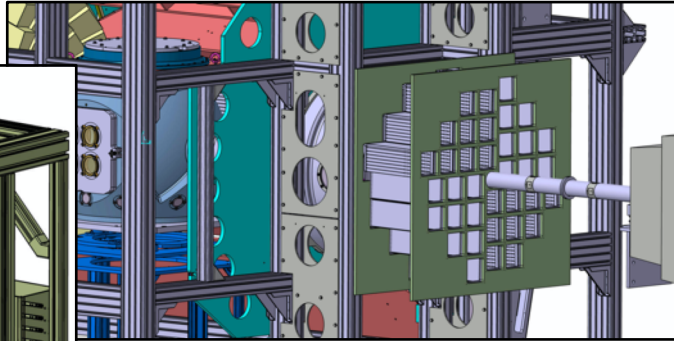
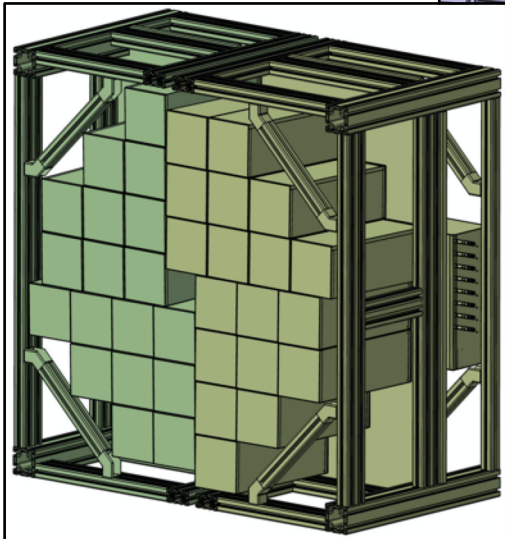


- End-cap & mantle first units are successfully tested with neutrons
- Mantle detector manual was delivered
- Coating of cathode strips for endcaps is ongoing
- Procurement of HR & Nano-SANS detectors has started



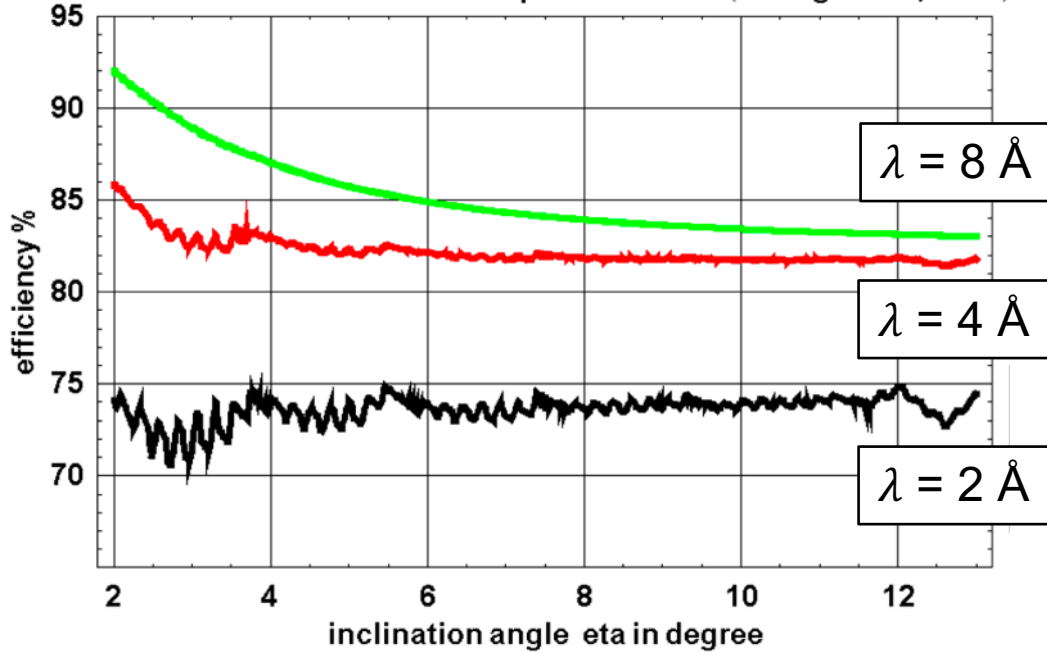
New design of HR & Nano-SANS detectors

SANS detector



Cuboids
(17 x 17 x 32 cm)

DREAM SANS Detector with 0.8 μm of 10-B4C (Divergence $\pm 0.2^\circ$)



- ^{10}B -type from CDT GmbH
- Interchangeable cuboids (HR \leftrightarrow SANS)
- Varying inclination wrt the scattered beam, i.e. no “blind” areas
- Access to the scattering near to the beam axis (SANS)
- Backscattering coverage $2\theta = 170\text{-}178^\circ$ (HR)
- Coating of both sides with $0.8\mu\text{m}$ of ^{10}B
- Detection efficiencies optimized for $\lambda > 2 \text{ \AA}$
- Designed agreed with ESS detector group
- Cost efficient solution
- Same readout electronics, same gas supply as for endcap & mantle

Detector & sample vessel support

Detector support & vacuum cones

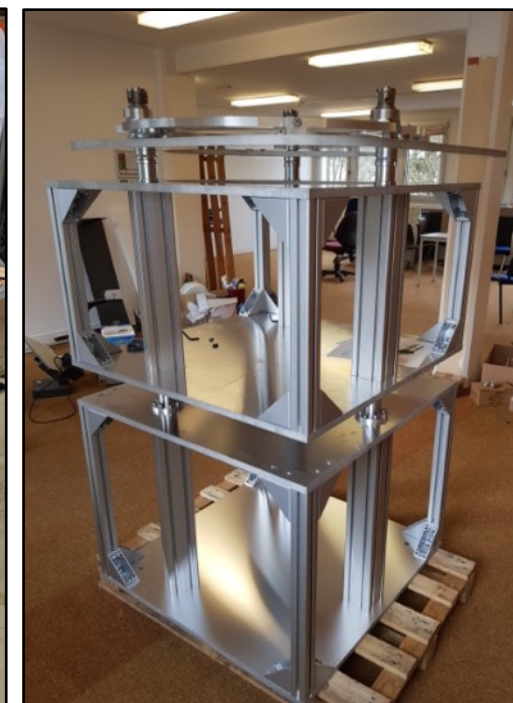
- Installation at FZJ is ongoing
- Successful leak tests of vacuum collimators according to ESS protocols
- Mantel detector assembly unit is in final stages of manufacturing
- Sample support will be shipped to FZJ from LLB
- Entire system with sample vessel and support will be pre-installed and tested at FZJ (Q3 2021)



Mantle detector assembly unit



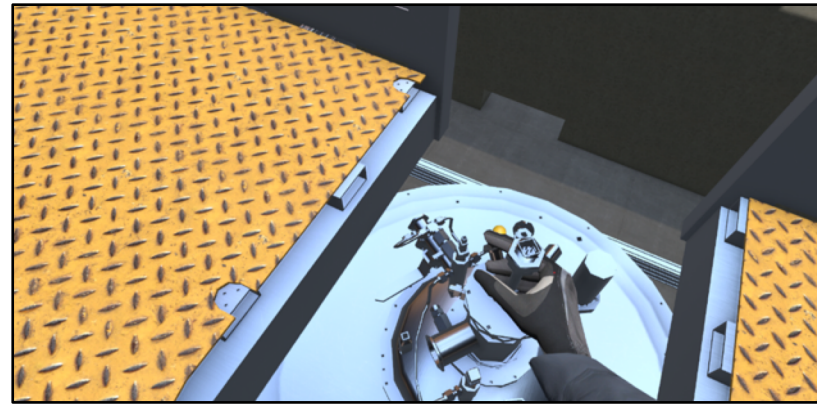
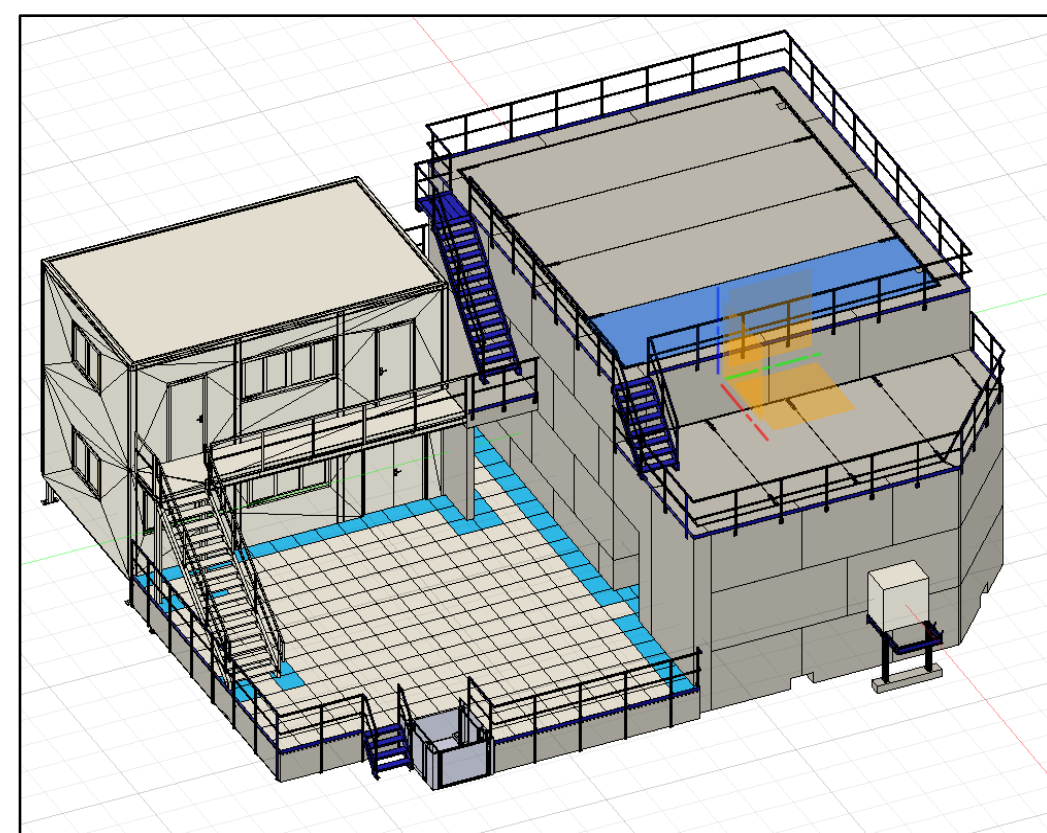
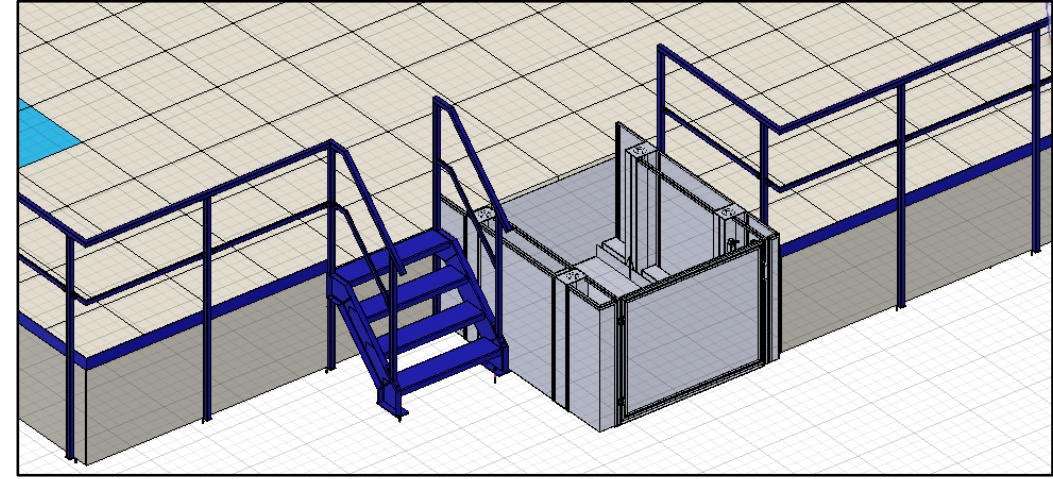
Sample vessel support (LLB)



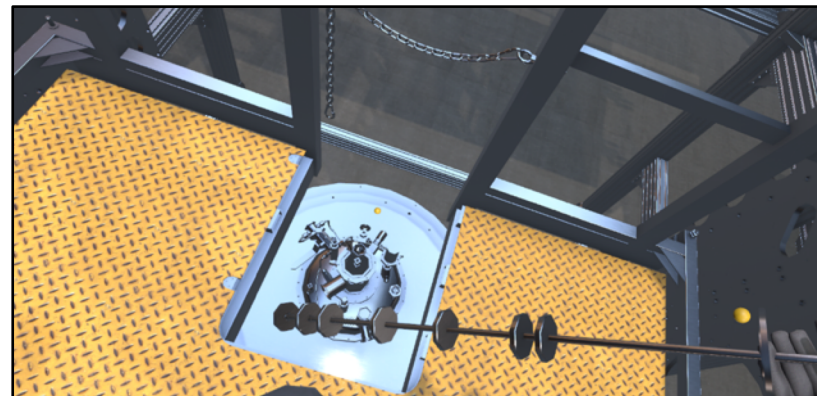
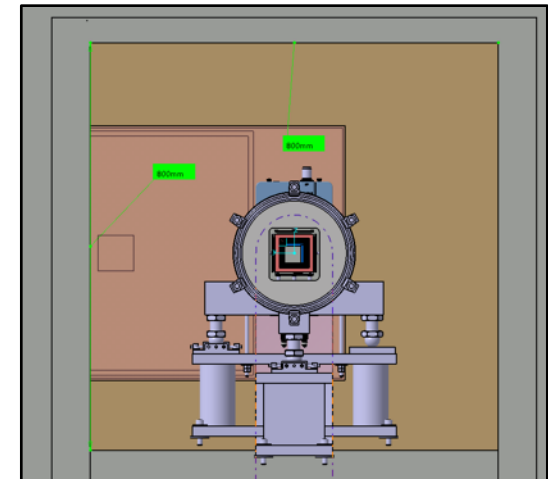
Experimental cave

- One supplier for cave and hutch (MICO)
- SubTG3 accepted in Oct. 2021
- ESS Common Electrical Project / Common Utility Project
- Construction starts end of this year

Stairs & elevator design



Neutron guide interface



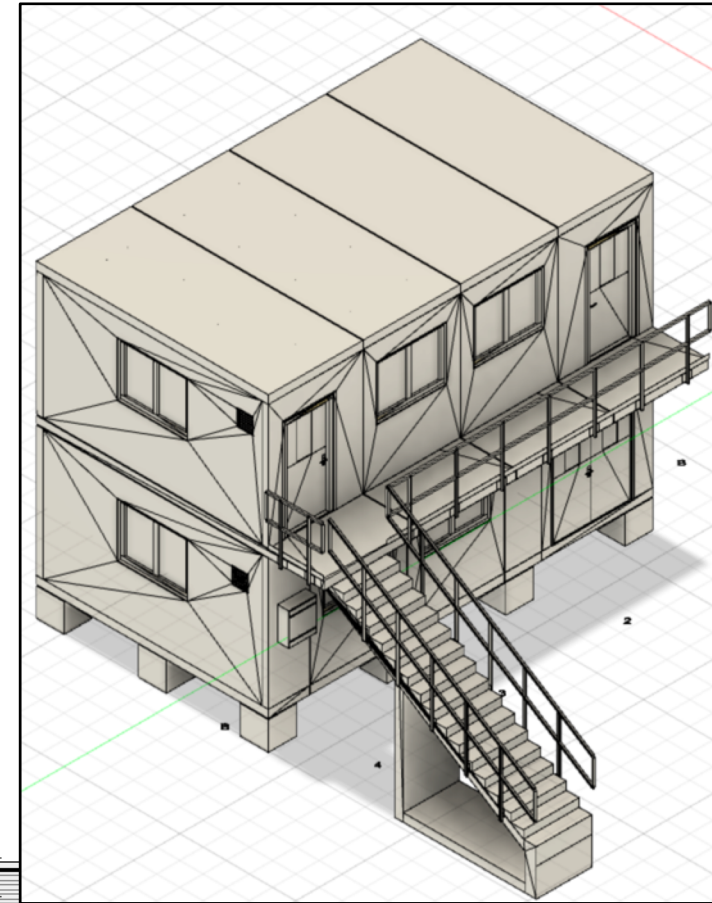
Control hutch & sample preparation lab

- IDR took place in June 2021
- New fire-safety requirement
- New precast concrete solution
- No impact on schedule, cost and requirements
- SubTG3 of hutch is in Oct. 2021
- ESS Common Electrical Project / ESS Common Utility Project

Example of ceiling

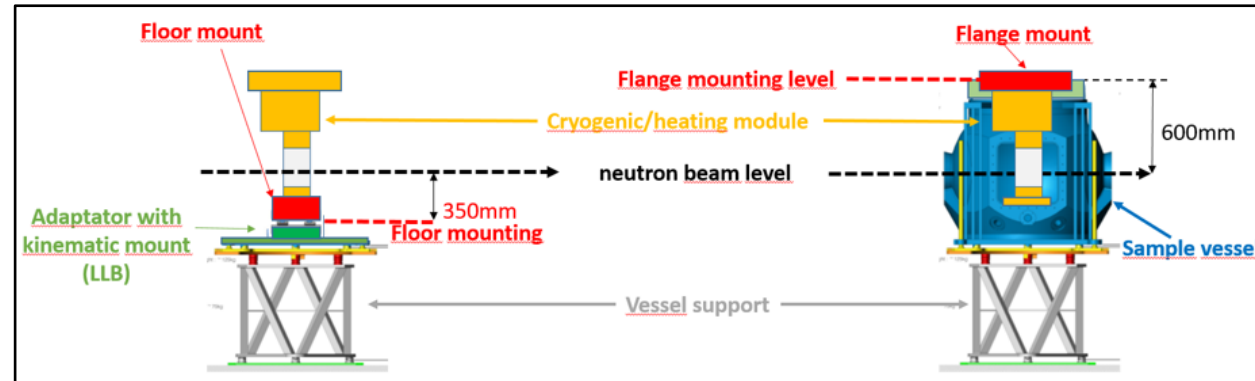


Elevation & location of venting units



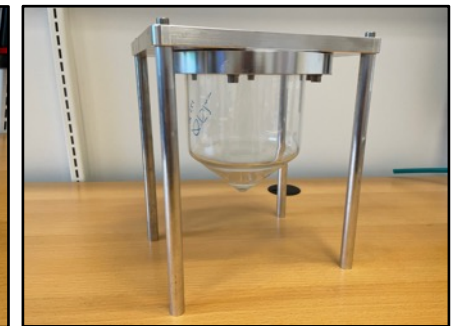
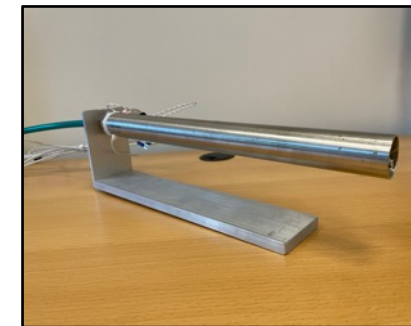
DREAM Specific SEE: Cryofurnace with Sample Changer

- T = 4 - 800K
- 20 samples
- Flange & floor mounts



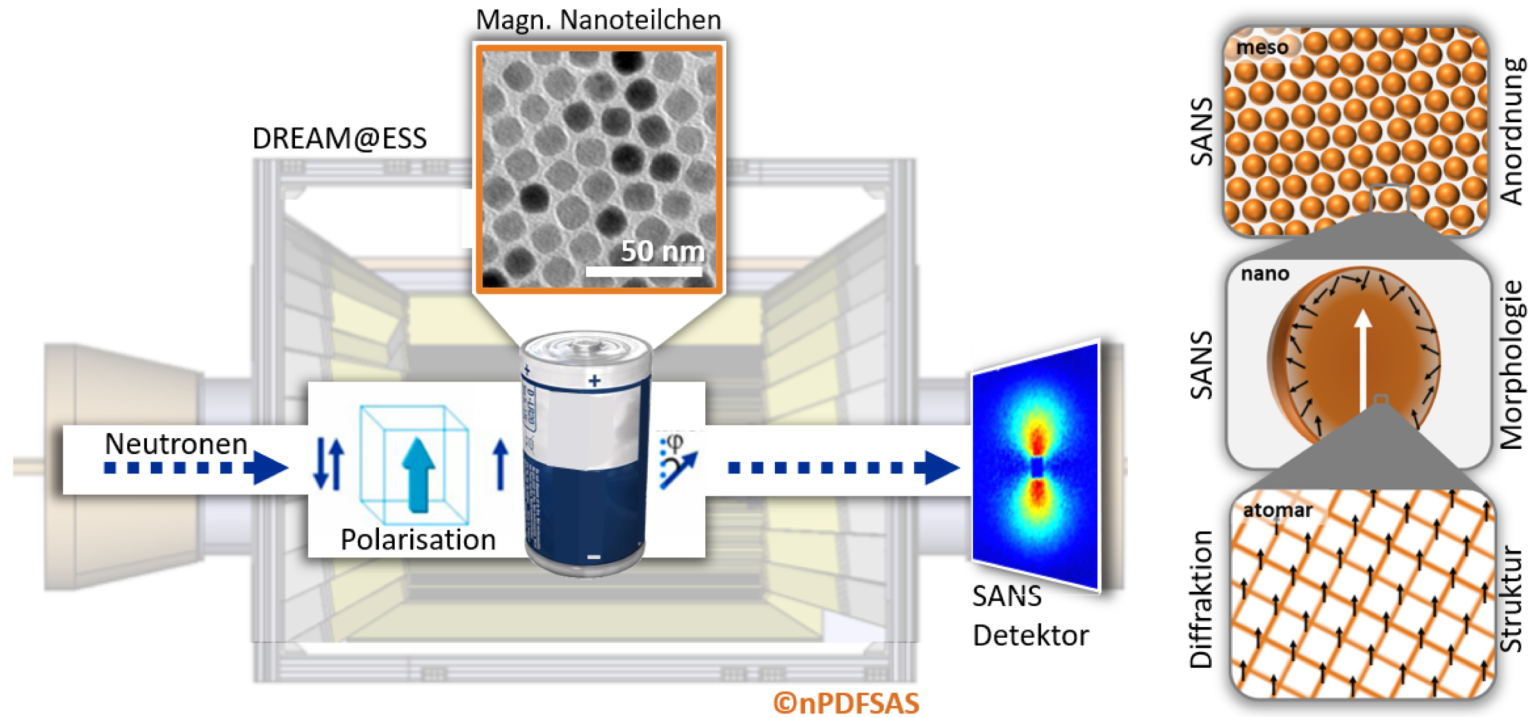
SEE delivered to ESS	Sample vessel & support Installed	Detectors Installation completed
May - 2023	Nov. - 2022	Sept. - 2023

- Two unsuccessful tenders
- 2 requirements were relaxed (longer cooling time, sample position measurement along 3 axis with accuracy < 1 mm)
- Schedule was relaxed
- New tender was open in September 2021
- If more delays: decouple SEE from TG5 (ICEB discussion)
- Fallback option: simple stage with cryo-jet and/or heat gun (Nordforsk postdoc)



RAC project

nPDFSAS: Simultaneous polarized SANS and NPDF methods to study novel electrode nanomaterials



UPPSALA
UNIVERSITET



- Nano-SANS detector quote is considered (delivery before BOT)
- Magnets for guiding field are purchased (tests at Delft University)
- Laser system for polarization cell are purchased
- Covid delays in hiring personnel at Cologne University
- Unavailability of neutron beam time (FRMII cold source issues)
- Potential delays of BOT after re-baselining

*Optigrade laser
system*



*Representative
Neodeltamagnet*



Other updates



- Mikhail Feygenson & Sylvain Desert are relocated to ESS
- Good and active interactions with DMSC (controls, data reduction)
- Work on data reduction document is ongoing
- Good progress with PSS

Issues

- Relocation of Florence Porcher to ESS is needed
- Cryofurnace procurement delays, but still delivery before BOT
- Detailed cost of common projects is still unknown (detailing specification)
- Raising overall cost of materials due to pandemic