Diffraction STAP Oct. 2024 - DREAM update

F. Porcher[1,2], W. Schweika[1,3], P. Harbott[3], A. Poqué[3],
A. Schwaab[3], S. Désert[2], M. Feygenson[1,3]

[1] European Spallation Source ERIC, Sweden
[2] Laboratoire Leon Brillouin, France
[3] Forschungszentrum Jülich, Germany

DREAM instrument

Partners: FZJ 76%, LLB 20%, ESS 4%
Construction budget: 13.66 M€
TG5: March 2025

Detectors (FZJ)
- Endcap: Installed
- High-Resol: **Installed**
- Mantel: **Nov. 24**
- NanoSANS: **Nov. 24**

Detector frame (FZJ)
- Installed

Experimental cave (LLB)
- Installed

Control hutch & sample prep. lab (FZJ)
- Installed
- **Equipped: Nov. 24**

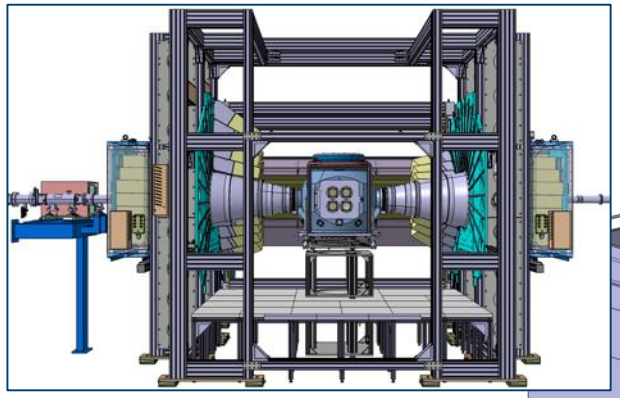
Disc choppers (FZJ)
(PSC & BC)
- **Installed – SAT Nov. 24**

T0 Chopper (ESS)
- Installed – **SAT Dec. 24**

Sample vessel (FZJ)
- Installed

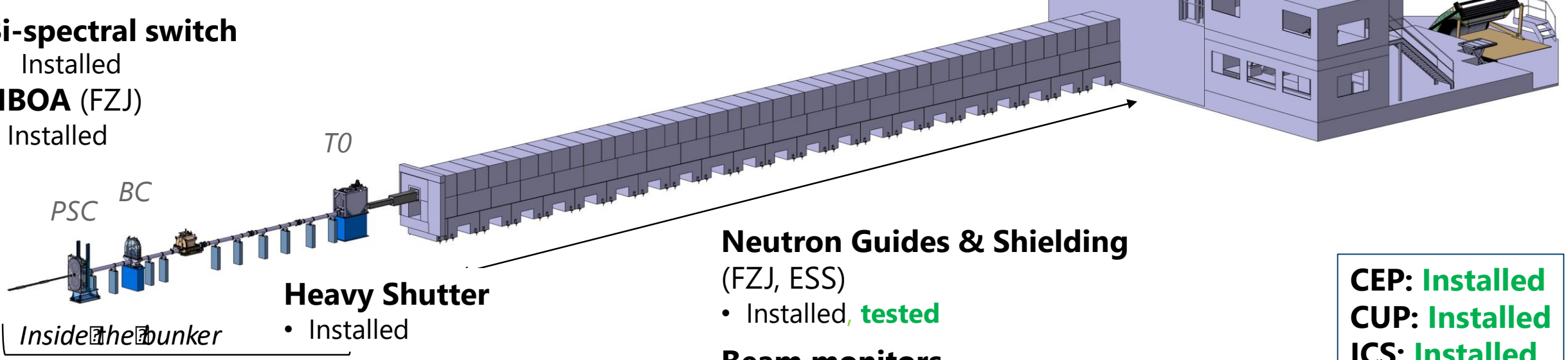
Vessel support (LLB)
- Installed

Cryofurnace (LLB➔ESS)
- **On-going, mitigation**



Bi-spectral switch
- Installed

NBOA (FZJ)
- Installed



Heavy Shutter
- Installed

Neutron Guides & Shielding (FZJ, ESS)
- Installed, **tested**

Beam monitors
- **Installation Nov. 24, Dec. 24**

CEP: Installed
CUP: Installed
ICS: Installed
PSS: ongoing

In-bunker: Choppers

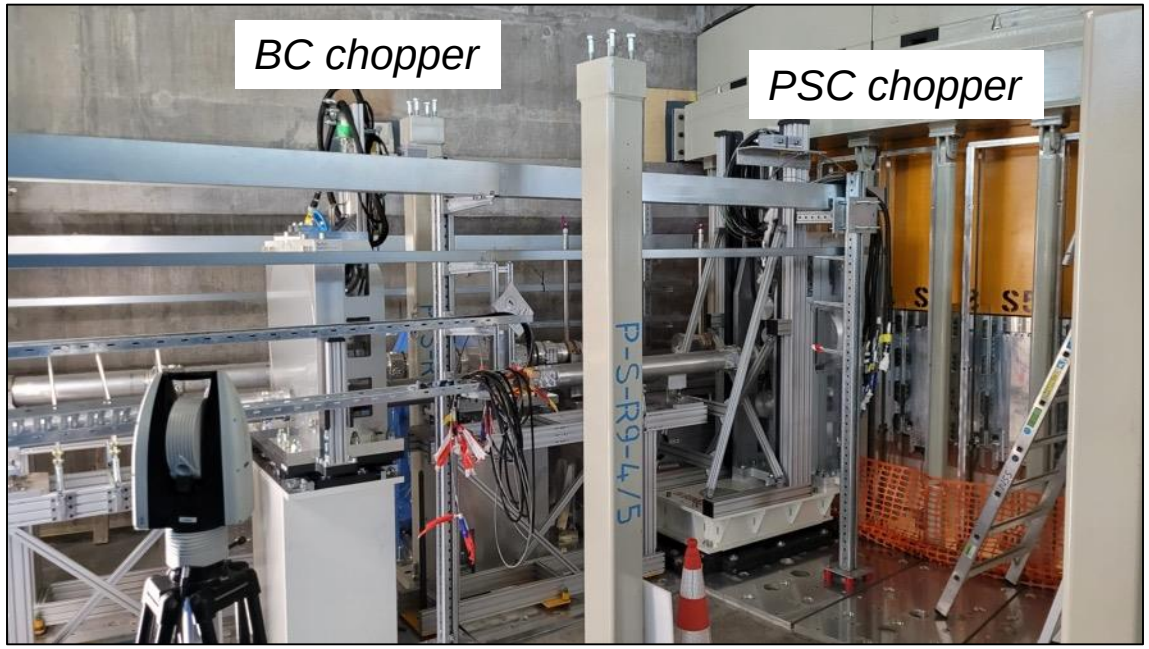
PSC & BC assemblies

Choppers installed (Sep. 24)

Preparing for SAT of PSC and BC choppers
- Vacuum of the 1rst section (PSC + BC)
- Cabling

SAT with ESS chopper group + SKF + FZJ
➔ (w48, Nov. 24)

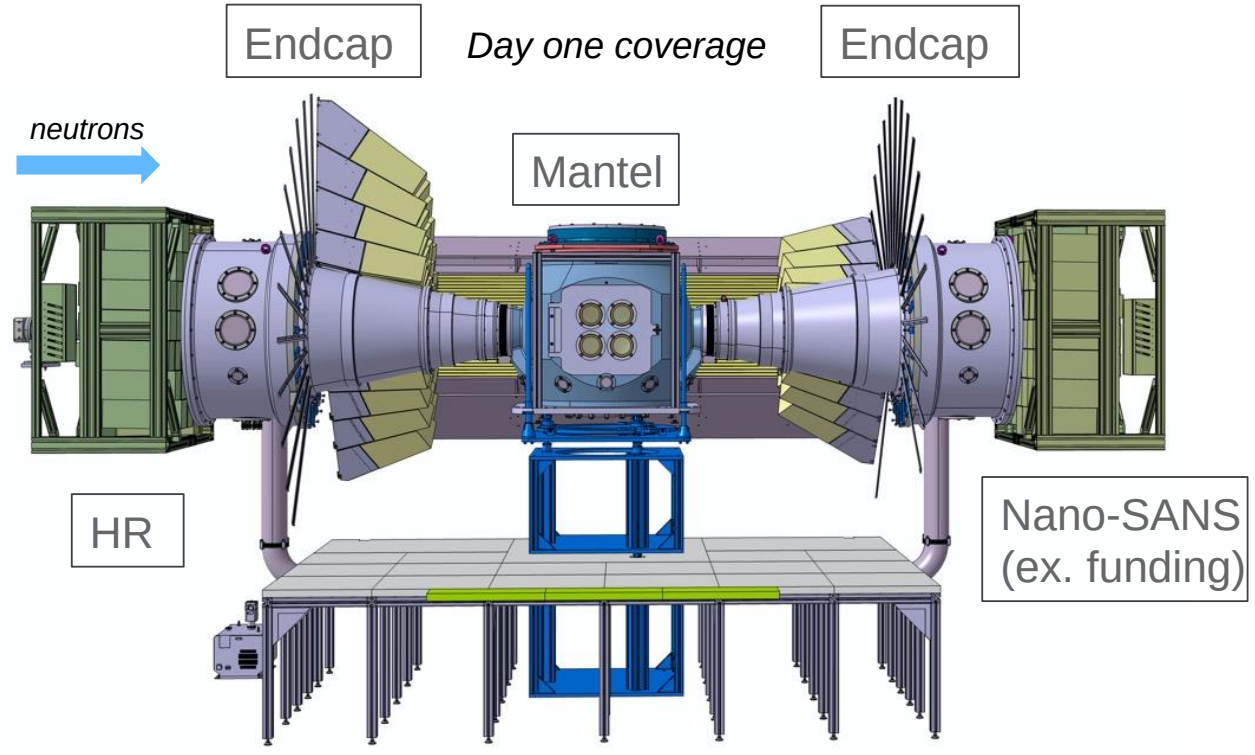

PSC – BC choppers cabinets

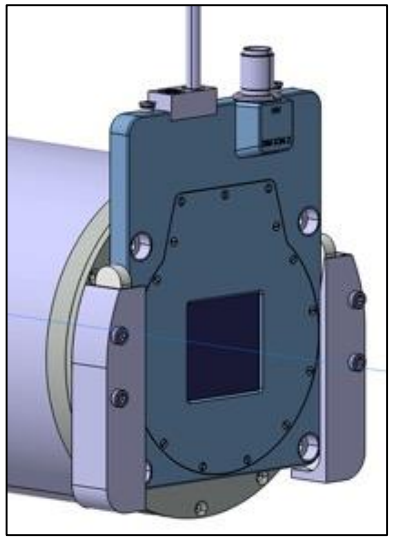



Final cabling before bunker closure

Next step:
T0 chopper (> Dec. 24)

DREAM detectors & monitors



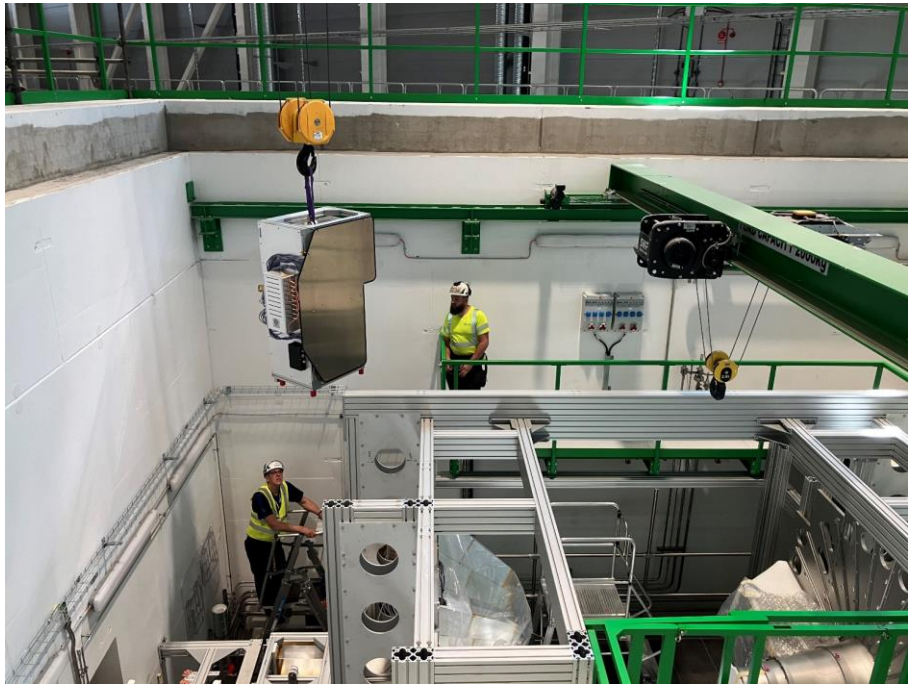


- Endcap FS & BS: Installed
- HR : Installed in May 24
- Mantel: Installation in Nov. 24
- NanoSANS: Installation in Nov. 24
- Detector racks: installed, populated

- In-bunker monitor: Installation in Nov. 24
- Cave monitor: Installation > Nov. 24
- In-bunker monitor rack: Dec. 24

- HV cables (CDT), LV cables (FZJ)
- LV breakout boxes (FZJ)

HR-Detector



Collaborative effort

FZJ, LLB, DetG,

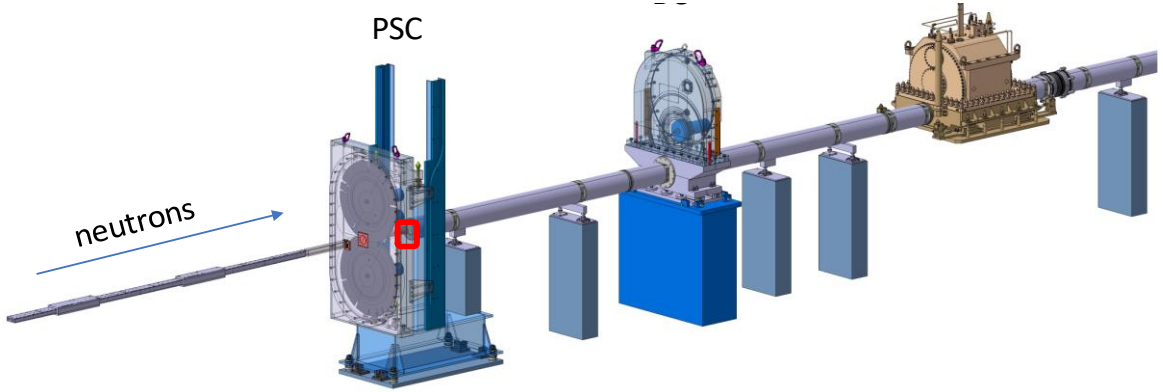
CDT, Rigging, Logistics

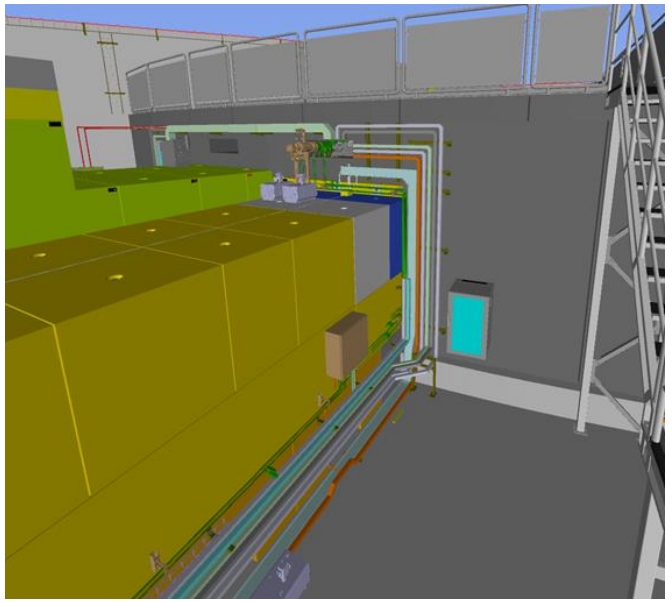
HR detector installation: May 24

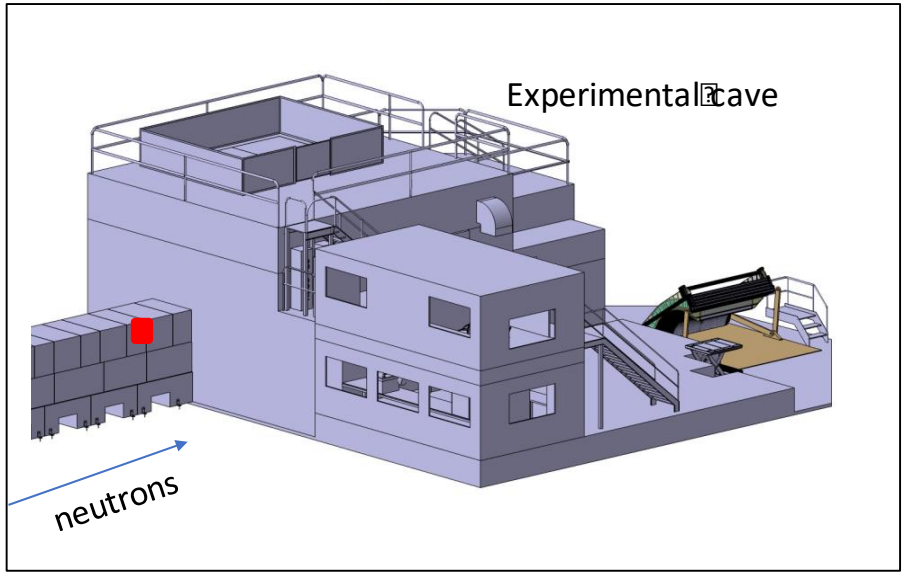
Next step:
Mantel detector & NanoSANS (End Nov. 24)

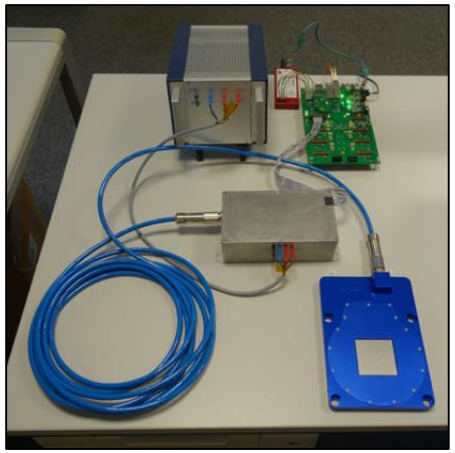
Beam Monitors

- **Not part of common project, CDT**
- **Gas piping + cables ready**
- **In-bunker monitor rack position agreed, manufacturing**
- **In–bunker monitor: to be installed in Nov. 24**





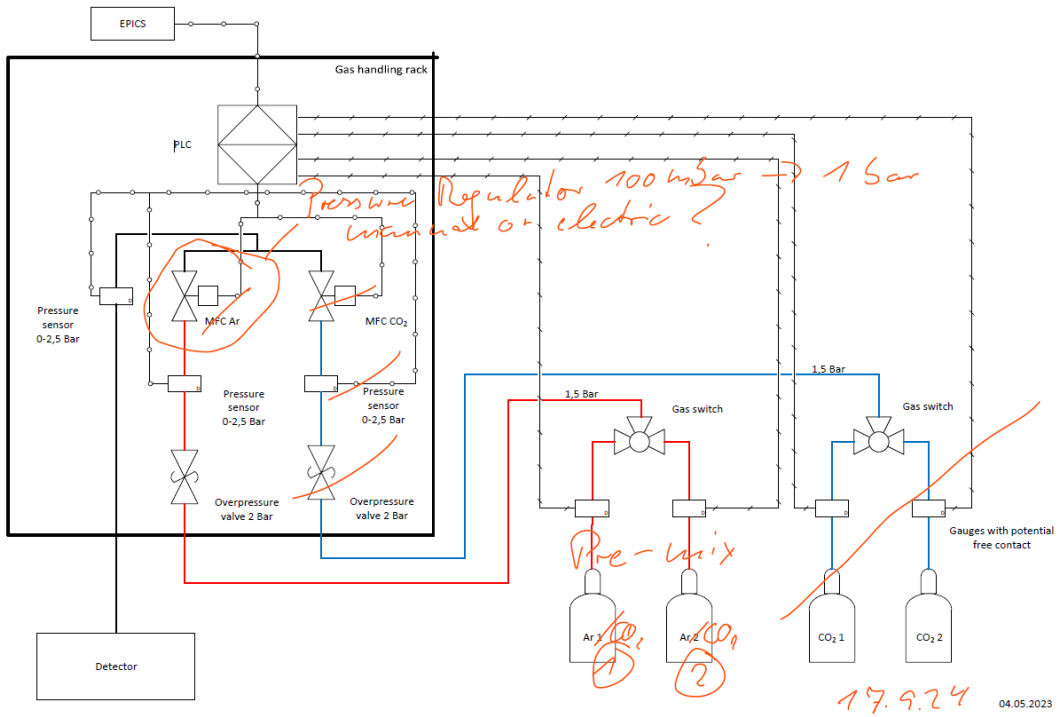




Cave monitor:
to be installed together with polarizer changer

Gas distribution system

DREAM gas handling system, version 3



Ar-CO_2 needed for detectors + monitors
(constant 4.5ml/mn flow for operation + more for flushing)

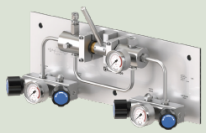
System still at design phase:

- **Gas switch, release valve, flow/pressure controller**
- **Integration in EPICS/NICOS (detector protection)**
- **Adapt 2 bunches of 12 cylinders**

Ensure timely delivery of gas on site…

ARCAL Force
Ar + 18% CO_2
EN ISO 14175-M21-ArC-18
Användningsområde: Universell skyddsgas för MAG-svetsning med tråd- och rörelektrod av låg- och olegerade stål. Tolerant mot ytföroreningar, ger god inträngning och lite svetssprut.
SMARTOP-anslutning: W 24,32 x 1/14", utvändig höger, DIN 10
EXELTOP- och ALTOP-anslutning: Snabbkoppling

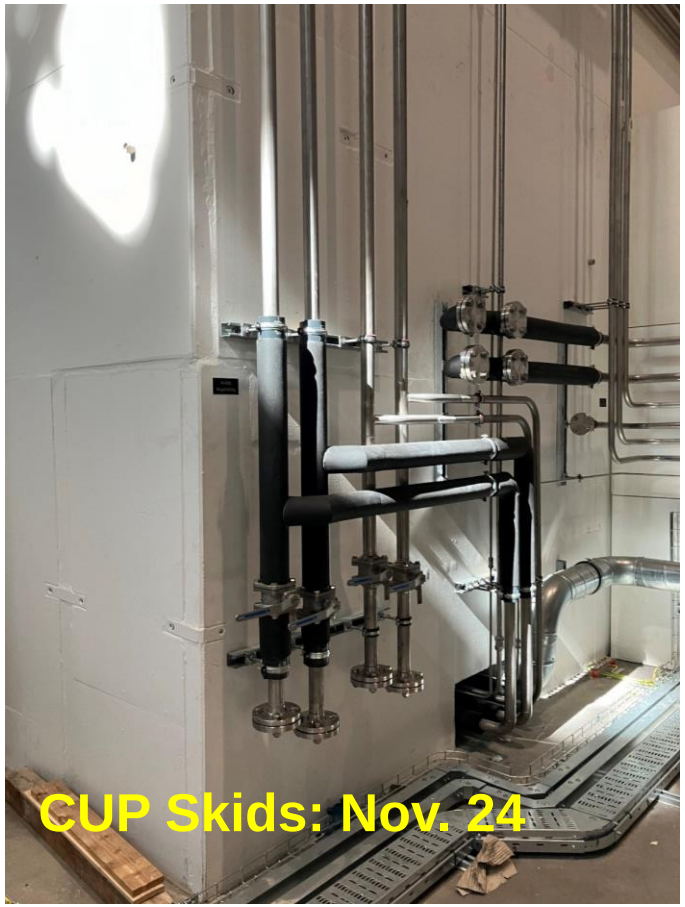
CHANGE-OVERS CLSA1 200-10-10



- Continuous gas delivery system to pipe network
- Connection of 2x1 or 2x2 200 bar cylinders or bundles
- Suitable for pure gases and mixtures, non corrosive
- Made of nickel-plated Brass
- Automatic switch with reset

Utilities, Cave, Hutches

- CEP, CUP, ICS installed
- PSS ongoing
- Control hutch: furniture installed Nov. 24, IT will follow
- Cave energization pending (crane…)



ICS networks (interactions with Infra, MCA & DG)

GPN (General Purpose Network)

"Office" networks (E-mail, Internet access, etc.)

- **NIN-CN (Neutron Instrument Network- Controls Netwo...)**

  Controls network (EPICS) + monitoring (HVAC, radiation & environment

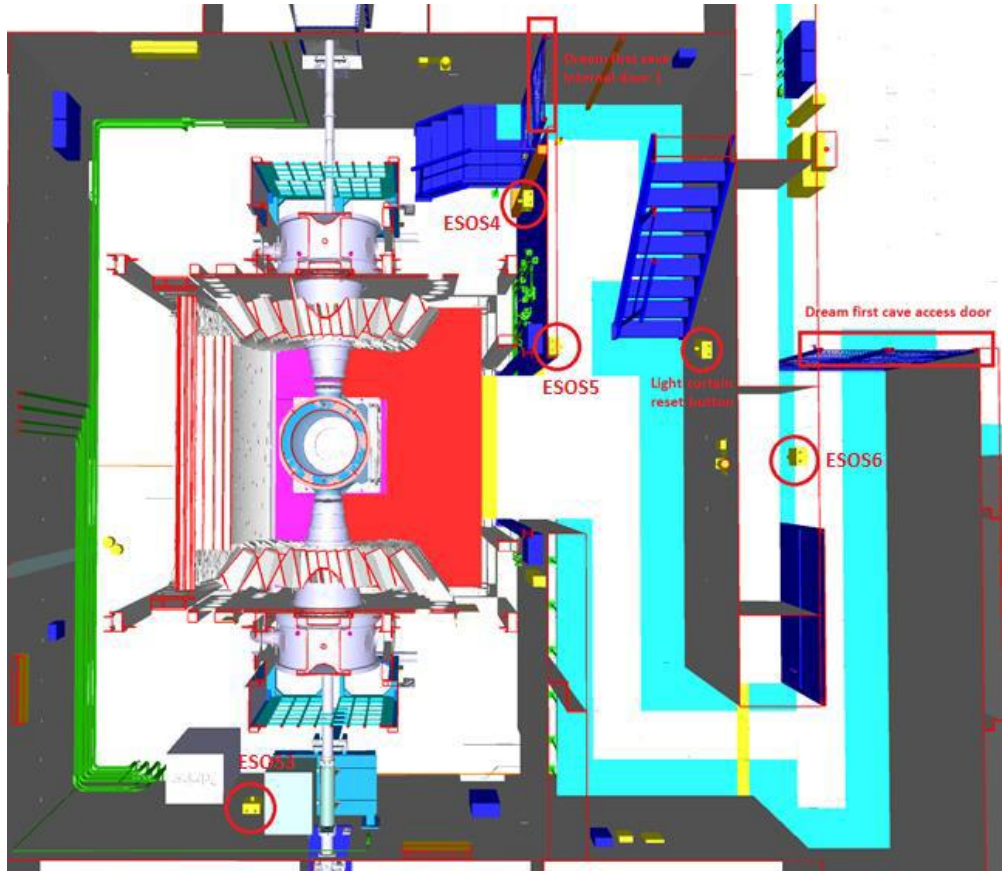
- **NIN-DAQ (Neutron Instrument Network- Data Acquisition)**

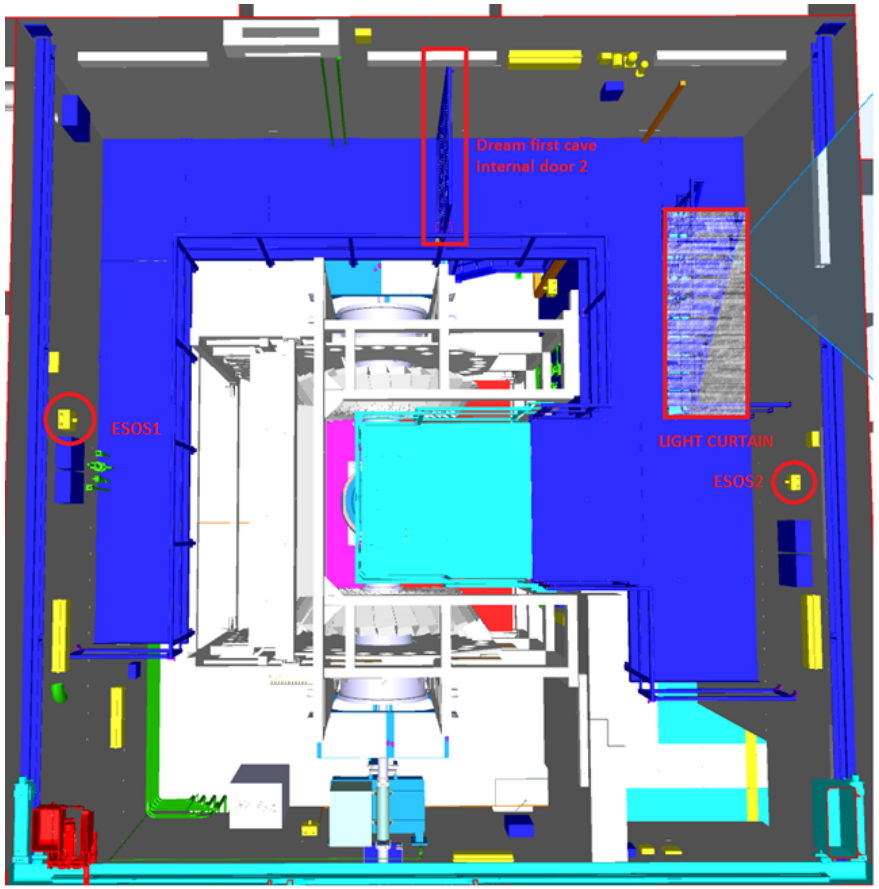
  Data acquisition + Data curation networks + Data analyses

Control + Prep. Hutches + Cave

Cave area + Bunker

DREAM PSS



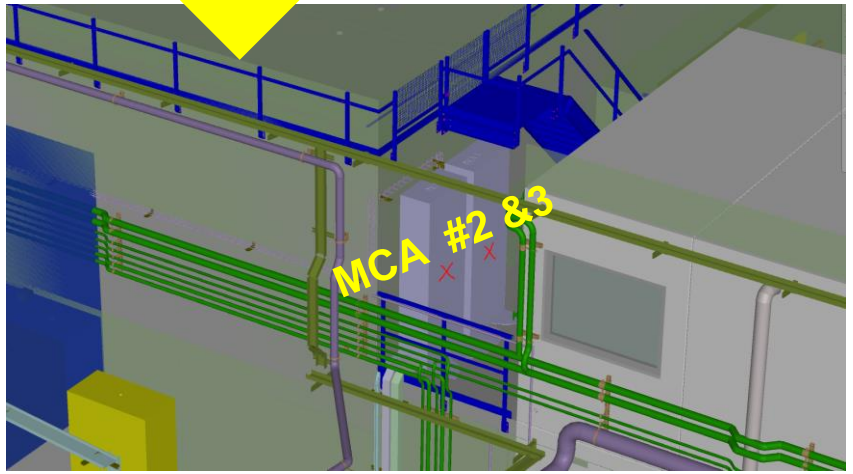


PSS CDR (May 24): Design

- PSS Key exchange system
  ➔ 1 key for main door + 1 key for roof “master” shield block
- 4 zones separated by zone gates
  ➔ Partial search allowed

PSS: Installation started not needed for Cold Com.

DREAM Racks & Utilities

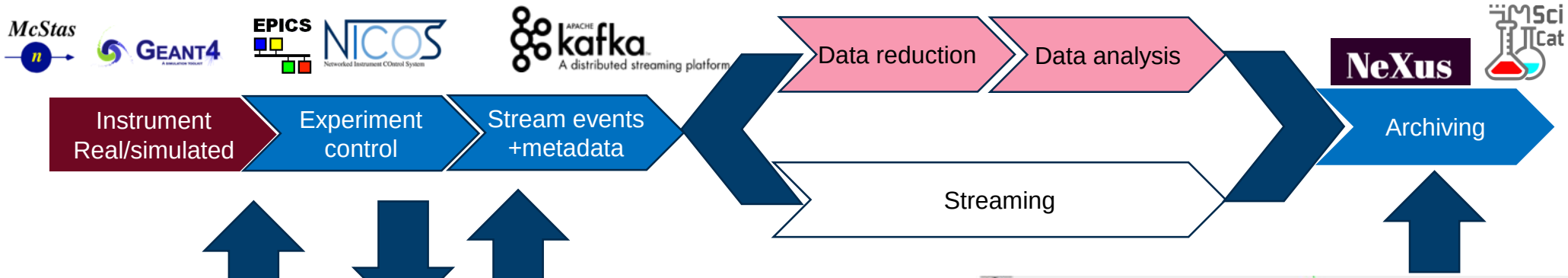


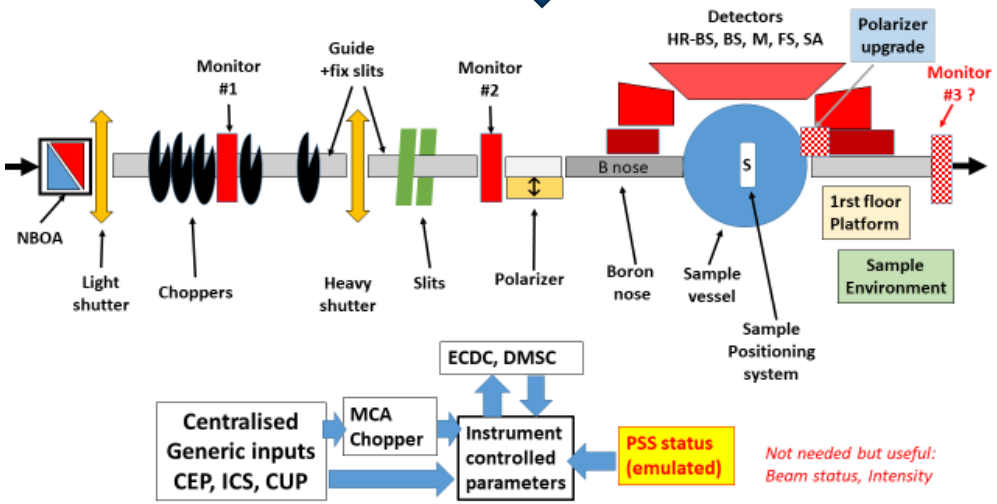
CEP (Bunker, DREAM area): Energization Oct.-Nov. 24?

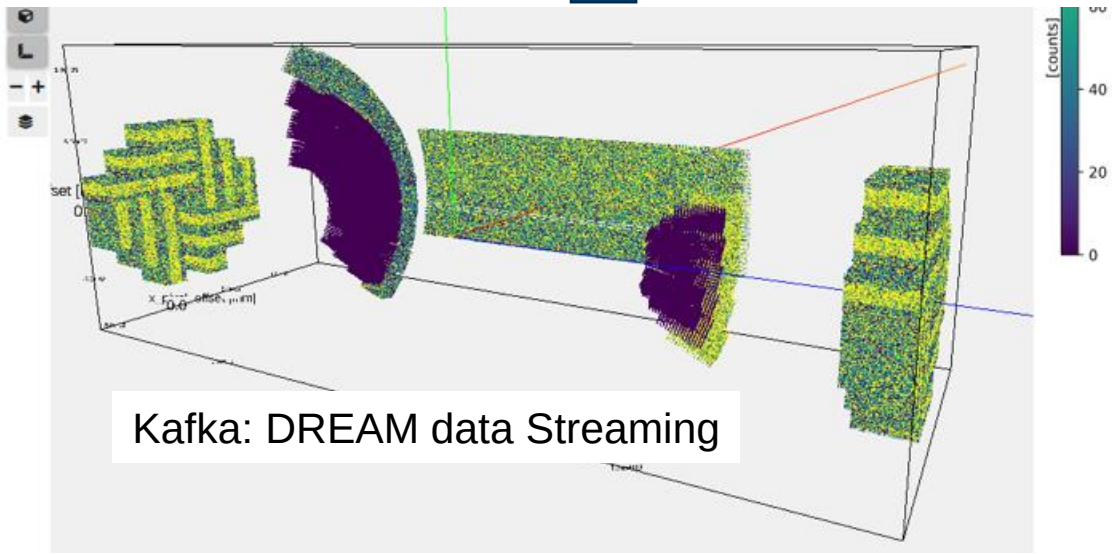
ICS: Ready, waiting for energization
MCA: Cabinets #1,2,3, waiting for installation: Nov. 24
Vacuum: ready
PSS: Installation ongoing

Feedthroughs, elevated floor: Nov. 24

Integration (ICS / ECDC ➔ DMSC)







Kafka: DREAM data Streaming

EPICS/NICOS Integration of equipment

Slits,… MCA components: on going
Monitor: on going
Choppers: Standard solution
Gas system: pending for Detailled design

Detector Integrated testing: Dec. 2024?
NeXus format + Inst. Geometry: agreed
Kafka streaming of simulated data: Ongoing
➔ data rate capability, data reduction (C. Durniak)

Additional remarks

DREAM Lead scientist, Commissioning scientist (Uppsala Univ.)
& Instrument Operation Engineer appointed end of 24

Risks

Energization of the cave still pending (should be solved soon)

Detector gas system from premix bottles:

- Still to be agreed + installed
- Limited delivery of Ar-CO_2 premix cylinders

Problems with the procurement of sample changer cryofurnace
(backups: DREAM wet cryostat / N_2 blower + capillary changer developed internally)