# Overview ODIN – Status and Plans

## STAP – April 2026

S. Athanasopoulos, R. Woracek,
S. Schmidt, A. Tartaglione, R. Ammer, T. Chulapakorn, S. Xu

LUND
21 APRIL 2026

# AGENDA

- ❑ Updates since last STAP
- ❑ TG5 experience
- ❑ Previous STAP report – Comment on suggested actions
- ❑ Update x-ray setup
- ❑ First Science Strategy
- ❑ Summary

# ODIN Team

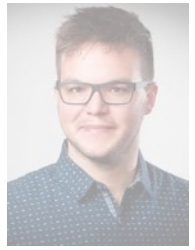
*Michael Lerche (TUM)*
*Philipp Schmackat (TUM)*
*Burkard Schillinger (TUM)*
*& many more…*

Aureliano Tartaglione
*Scientist*



Manuel Morgano
*Scientist*

Shuqi Xu
*Post-Doc (LU)*



Robin Woracek
*Scientist*
*(as of 1st March: 10%)*



Bojan Peric
*Lead Engineer*



Elbio Calzada
*Lead Engineer*



Jan Hovind
*Technician*

Søren Schmidt
*Data Scientist*



Egla Luca
*Installation Engineer*



Virginia Martinez Monge
*Installation Engineer*

Caroline Curfs
*Sample Environment*

Stefanos Athanasopoulos
*Scientist (LTH)*



Michael Schulz
*Head of Imaging group*

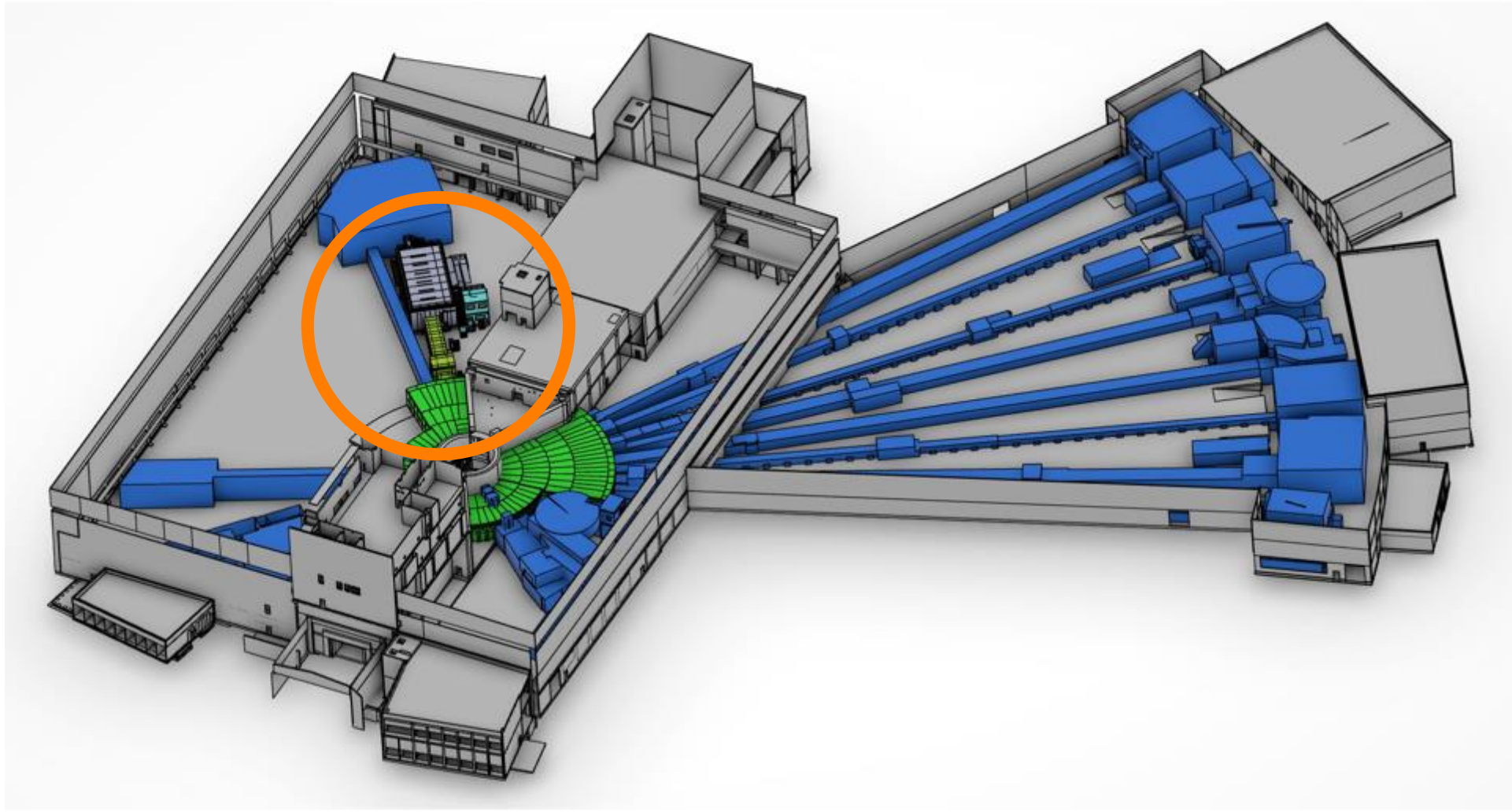


Markus Strobl
*Head of Imaging group*

Richard Ammer
*Operation Engineer*

# ODIN

## Location in Facility: S02 (South Sector)



# ODIN

## Status Update

Other components/activities:
- CUP (ESS): Installation complete
- CEP (ESS): Installation complete
- PSS (ESS): Installation complete
- Fire detectors and fire sprinklers: Installation complete

*Installed*,
*In installation/storage*,
*In manufacturing*

Choppers:
Disc choppers: Installed

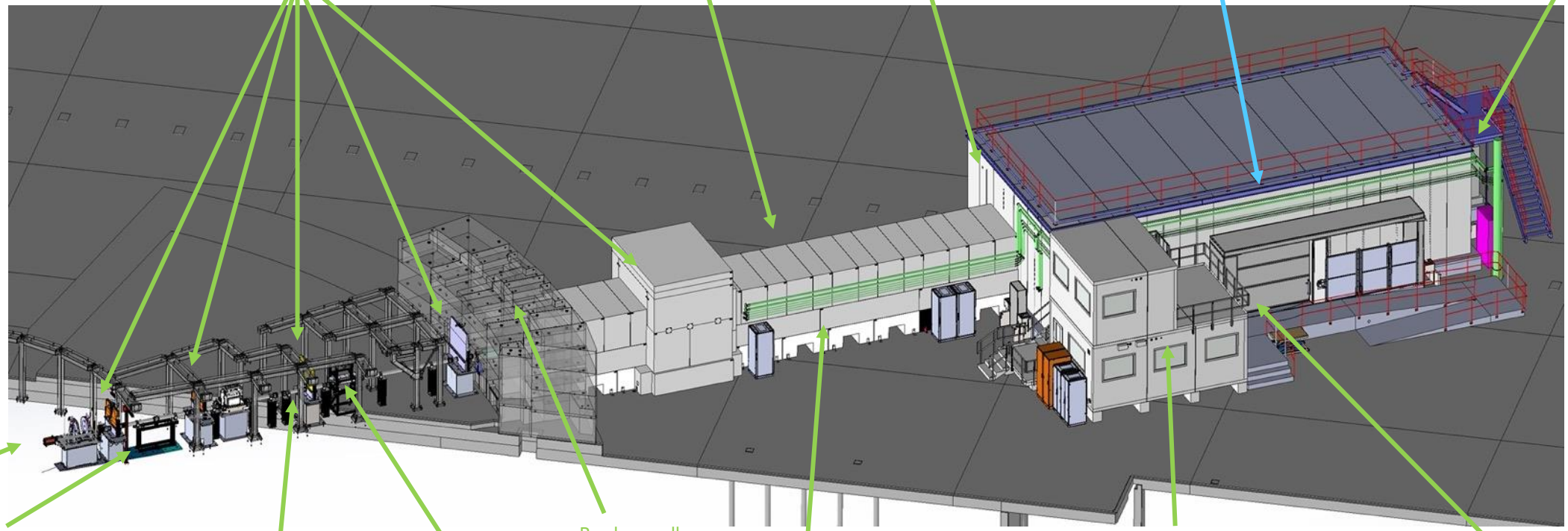
**T0 chopper:**
bottom housing installed, upper part in manufacturing, expected March 2027

Common shielding:
Installed

Cave walls:
Installed

Cave interior components:
Installed
MCA SAT ongoing

Cave roof, beam stop ,stairs and railing:
Installed



NBOA:
installed

Remote handling area guides
BBG with BBGOA installed

In bunker guides: Installed

Heavy shutter:
Installed

Bunker wall feedthrough:
Installed

Out-of-bunker guides Installed

Control hutch:
Installed

Cave internal door: Installed
External door: installed

# ODIN

## Status Update

# AGENDA

- ❑ Updates since last STAP
- ❑ TG5 experience
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- ❑ Summary

# ODIN

https://indico.ess.eu/event/3912/

## Status Update: SAR and ISRR

### ODIN System Acceptance Review and Instrument Safety Readiness Review Meetings

17 Dec 2025, 08:45 → 18 Dec 2025, 16:30 Europe/Stockholm

ESS D01, Tycho-Brahe and LINXS

Mikhail Feygenson (European Spallation Source ERIC)

# ODIN

## Status Update: SAR and ISRR – Reminder about types of documentation

Green documents ODIN **(docs from TG3 that have been reviewed and released as part of final TG3)**

- Concept of Operations
- Requirements Specification
- Architecture description (e.g. P&ID)
- Design descriptions (as designed state)

**Orange documents ODIN (docs that were in draft at TG3 that must be finalized for TG5)**

- Operation and maintenance documents
- Verification & Validation Plan (includes Hot Commissioning Plan, RP survey plan)
- Risk assessment (IHA) (Radiological, Conventional, Motion, Equipment Protection)
- Radiation Safety Report (IHA + H1/H2 + Shielding Report + Inventory)

**Red documents ODIN (documentation resulting from verification and validation (testing) activities)**

- All Verification report/-s (or equivalent from FAT/SSAR/SAT/Local testing) for sub-systems (safety systems and supporting systems)
- All Validation report/-s (or equivalent from SSAR/SAT/Local testing) for sub-systems (safety systems and supporting systems)
- **Integrated System Verification Report (full instrument cold commissioned including controls)**
- CIDL – “As Verified” Baseline
- CE marking and/or Declaration of Conformity (need clarification from Quality on how this is issued)

Green: TG3 documents

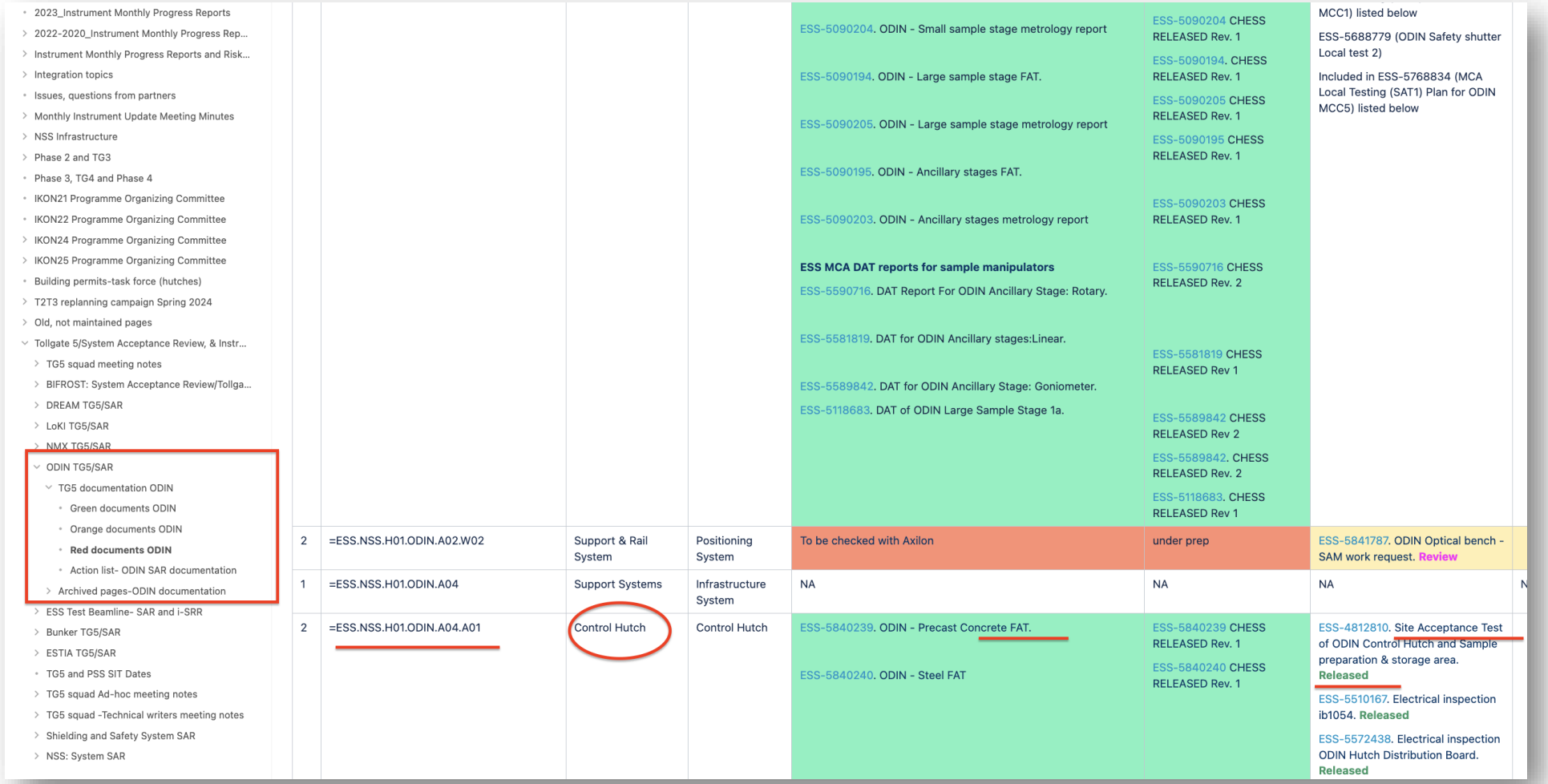
Orange: Operation and maintenance Manuals, Verification & Validation Plans

Red: FAT & SAT documents, Integrated test reports

# ODIN

## Status Update: SAR and ISRR – Reminder about types of documentation

organized and tracked in three Confluence pages with tables and FBS labels



- 2023_Instrument Monthly Progress Reports
- 2022-2020_Instrument Monthly Progress Rep...
- Instrument Monthly Progress Reports and Risk...
- Integration topics
- Issues, questions from partners
- Monthly Instrument Update Meeting Minutes
- NSS Infrastructure
- Phase 2 and TG3
- Phase 3, TG4 and Phase 4
- IKON21 Programme Organizing Committee
- IKON22 Programme Organizing Committee
- IKON24 Programme Organizing Committee
- IKON25 Programme Organizing Committee
- Building permits-task force (hutches)
- T2T3 replanning campaign Spring 2024
- Old, not maintained pages
- Tollgate 5/System Acceptance Review, & Instr...
  - TG5 squad meeting notes
  - BIFROST: System Acceptance Review/Tollga...
  - DREAM TG5/SAR
  - LoKI TG5/SAR
  - NMX TG5/SAR
  - ODIN TG5/SAR
    - TG5 documentation ODIN
      - Green documents ODIN
      - Orange documents ODIN
      - **Red documents ODIN**
      - Action list- ODIN SAR documentation
    - Archived pages-ODIN documentation
  - ESS Test Beamline- SAR and i-SRR
  - Bunker TG5/SAR
  - ESTIA TG5/SAR
  - TG5 and PSS SIT Dates
  - TG5 squad Ad-hoc meeting notes
  - TG5 squad -Technical writers meeting notes
  - Shielding and Safety System SAR
  - NSS: System SAR

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | ESS-5090204. ODIN - Small sample stage metrology report<br>ESS-5090194. ODIN - Large sample stage FAT.<br>ESS-5090205. ODIN - Large sample stage metrology report<br>ESS-5090195. ODIN - Ancillary stages FAT.<br>ESS-5090203. ODIN - Ancillary stages metrology report<br>**ESS MCA DAT reports for sample manipulators**<br>ESS-5590716. DAT Report For ODIN Ancillary Stage: Rotary.<br>ESS-5581819. DAT for ODIN Ancillary stages:Linear.<br>ESS-5589842. DAT for ODIN Ancillary Stage: Goniometer.<br>ESS-5118683. DAT of ODIN Large Sample Stage 1a. | ESS-5090204 CHESS RELEASED Rev. 1<br>ESS-5090194. CHESS RELEASED Rev. 1<br>ESS-5090205 CHESS RELEASED Rev. 1<br>ESS-5090195 CHESS RELEASED Rev. 1<br>ESS-5090203 CHESS RELEASED Rev. 1<br>ESS-5590716 CHESS RELEASED Rev. 2<br>ESS-5581819 CHESS RELEASED Rev 1<br>ESS-5589842 CHESS RELEASED Rev 2<br>ESS-5589842. CHESS RELEASED Rev. 2<br>ESS-5118683. CHESS RELEASED Rev 1 | MCC1) listed below<br>ESS-5688779 (ODIN Safety shutter Local test 2)<br>Included in ESS-5768834 (MCA Local Testing (SAT1) Plan for ODIN MCC5) listed below |
| 2 | =ESS.NSS.H01.ODIN.A02.W02 | Support & Rail System | Positioning System | To be checked with Axilon | under prep | ESS-5841787. ODIN Optical bench - SAM work request. **Review** |
| 1 | =ESS.NSS.H01.ODIN.A04 | Support Systems | Infrastructure System | NA | NA | NA |
| 2 | =ESS.NSS.H01.ODIN.A04.A01 | Control Hutch | Control Hutch | ESS-5840239. ODIN - Precast Concrete FAT.<br>ESS-5840240. ODIN - Steel FAT | ESS-5840239 CHESS RELEASED Rev. 1<br>ESS-5840240 CHESS RELEASED Rev. 1 | ESS-4812810. Site Acceptance Test of ODIN Control Hutch and Sample preparation & storage area. **Released**<br>ESS-5510167. Electrical inspection ib1054. **Released**<br>ESS-5572438. Electrical inspection ODIN Hutch Distribution Board. **Released** |

Example: part of red documents table…

# ODIN

https://indico.ess.eu/event/3912/

## Status Update: SAR and ISRR

| ODIN TOTAL DOCUMENTATION | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 168 | 1 | 4 | 0 | 173 |


| ODIN GREEN DOCUMENTATION (SDD) | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 16 | 0 | 0 | 0 | 16 |

| ODIN ORANGE DOCUMENTATION | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 41 | 0 | 2 | 0 | 43 |

| ORANGE DOCUMENTATION(HAZ +RADSAF) | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 6 | 0 | 1 | 0 | 7 |

| ORANGE DOCUMENTATION(O&M manuals) | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 27 | 0 | 1 | 0 | 28 |

| ORANGE DOCUMENTATION(V&V plans) | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 8 | 0 | 0 | 0 | 8 |

| ODIN RED DOCUMENTATION | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 111 | 1 | 2 | 0 | 114 |

| RED DOCUMENTATION (FAT reports) | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 61 | 0 | 0 | 0 | 61 |

| RED DOCUMENTATION (SAT reports) | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 43 | 0 | 2 | 0 | 45 |

| RED DOCUMENTATION (INTEGRATED test reports) | | | | |
|---|---|---|---|---|
| CHESS RELEASED | CHESS REVIEW | CHESS PRELIMINARY | UNDER PREPARATION | TOTAL |
| 7 | 1 | 0 | 0 | 8 |

**STATUS AS ON 09 DEC 2025**

# ODIN

https://indico.ess.eu/event/3912/

## Status Update: SAR

### Wednesday 17 December

**08:45 → 11:30** ODIN Site Visit and Safety Systems Demonstration to the Review Committee — D01

- 08:45 **Transfer to ODIN** — 15m
  Meet at Iceberg, B01 in PPE (high-vi vest).
  **Speaker**: Review Committee
- 09:00 **Presentation of Installed Components, Including Safety Systems** — 1h
  **Speaker**: Robin Woracek (European Spallation Source ERIC)
- 10:00 **Operation Procedures: PSS and Motion Safety Demonstration** — 30m
  **Speaker**: Richard Ammer (European Spallation Source ERIC)
- 10:30 **Operation Procedures: Team Installing Sample, Closes Cave, Remove Activated Sample** — 1h
  **Speaker**: ODIN Team

**12:44 → 12:45** ODIN System Acceptance Review Meeting — 1m — Tycho-Brahe

**12:45 → 13:00** CLOSED SESSION for Review Committee / Presentation of charge — 15m — Tycho-Brahe

**13:00 → 13:05** Welcome / Meeting Rules — 5m — Tycho-Brahe
**Speaker**: Mikhail Feygenson (European Spallation Source ERIC)
SAR_iSRR_intro_r...

**13:05 → 13:25** Scientific Overview of Instrument - High Level Requirements — 20m — Tycho-Brahe
**Speaker**: Robin Woracek (European Spallation Source ERIC)
ODIN-TG5_01_Sci...

**13:25 → 14:05** Instrument Components Overview — 40m — Tycho-Brahe
Including deferred scope
**Speaker**: Aureliano Tartaglione (TUM)
ODIN-TG5_02_Ins...

**14:05 → 14:10** CIDL and Interfaces / FBS — 5m — Tycho-Brahe
**Speakers**: Joakim Meyer (European Spallation Source ERIC), & Team
ODIN SAR_CIDL-J...

**14:10 → 14:30** NIT / NCR Status — 20m — Tycho-Brahe
**Speaker**: Robin Woracek (European Spallation Source ERIC)
ODIN-TG5_04_NIT...

**14:30 → 14:45** COFFEE BREAK — 15m

**14:45 → 14:55** Choppers — 10m — Tycho-Brahe
**Speaker**: Nikolaos Tsapatsaris (European Spallation Source ERIC)
SAR_ODIN_Chopp...

**14:55 → 15:05** Motion Control and Automatization — 10m — Tycho-Brahe
**Speaker**: Thomas Gahl (European Spallation Source ERIC)
MCA-SAR-ODIN-T...

**15:05 → 15:20** Detectors & Beam Monitors — 15m — Tycho-Brahe
**Speakers**: Robin Woracek (European Spallation Source ERIC), Ioannis Katsioulas (European Spallation Source ERIC)
ODIN-TG5_07_Det... sar_odin_monitor...

**15:20 → 15:25** ICS — 5m
**Speaker**: Johan Christensson (European Spallation Source ERIC)
SAR ODIN ICS-IT_...

**15:25 → 15:35** ECDC — 10m — Tycho-Brahe
**Speaker**: George Nicolas Kontogiorgos (European Spallation Source ERIC)
SAR presentation ...

**15:35 → 15:45** DMSC: Data Visualization / Reduction Software — 10m — Tycho-Brahe
**Speaker**: Søren Schmidt (European Spallation Source ERIC)
ODIN-TG5_DMSC...

**15:45 → 16:05** Integrated Test Results — 20m — Tycho-Brahe
**Speaker**: Robin Woracek (European Spallation Source ERIC)
ODIN-TG5_11_Int...

**16:05 → 16:35** Scientific Hot Commissioning Plan — 30m — Tycho-Brahe
Overview
**Speaker**: Robin Woracek (European Spallation Source ERIC)
ODIN-TG5_12_Ho...

**16:35 → 17:30** CLOSED SESSION: Finalize the SAR Part of the Report — 55m — TYcho-Brahe
**Speaker**: Review Committee

# TG5/SAR Meeting

## ODIN: Scientific Overview of Instrument – High Level Requirements

R. Woracek, A. Tartaglione, R. Ammer, S. Athanasopoulos, S. Schmidt, T. Chulapakorn, S. Xu, M. Morgano, M. Schulz, M. Strobl, V.M. Monge, B. Peric, E. Luca, E. Calzada

*+ support groups*

LUND
17 DEC 2025

# ODIN

| | | | |
|---|---|---|---|
| Document Type | Concepts of Operations Description | Date | Feb 17, 2025 |
| Document Number | ESS-0129656 | State | Released |
| Revision | 2 | Confidentiality Level | Internal |

## High Level Requirements

### 2.2. Top-level requirements for ODIN

Corresponding to 2.1.1 above, the top-level requirements for the basic scope are[1]:

1) ODIN shall be capable of a direct spatial resolution down to 10 µm (3D).
2) ODIN shall allow for time resolutions below 70 ms in kinetic measurements, with a spatial resolution down to 50 µm.
3) ODIN shall allow time resolutions of the order of 1 µs in quasi-stroboscopic mode, with a spatial resolution down to 55 µm.
4) ODIN shall allow measurements of sample areas of up to 20×20 $cm_2$ at once.
5) ODIN shall allow the detection of contrast equivalent to 10 ppm $H_2$ in steel, with a spatial resolution down 100 µm.
6) ODIN shall be able to detect relative lattice distortions of the order of $10_{-5}$.
7) ODIN shall be capable of visualising crystalline phases with a 3D resolution of at least 100 µm.
8) ODIN shall be able to observe structural phase transitions with a 2D resolution down to 300 µm with a time resolution of 10 s of seconds.
9) ODIN shall be able to observe grains and their orientations with a 3D resolution of at least 100 µm
10) The System's design shall provide the space and flexibility necessary to host and drive future developments in the Neutron Imaging field, including the potential upgrade with diffraction detectors.
11) ODIN should serve the user and science community without interruptions during source operation; all components' service-cycles should be adaptable to the ESS maintenance cycle.

# ODIN

## System Requirement Specification (ESS-0129650)

### 2.2.1 Beam Transport and Conditioning System (BTCS)– PBS 13.6.5.1

| Id | Text | Trace up to |
|---|---|---|
| 25 | High ToF Resolution Imaging (HtoFR, <1% wavelength resolution) – Maximum Field of View<br>The BTCS shall allow HtoFR imaging using a maximum field of view of at least 5×5 $cm^2$ with high spatial resolution or using the full range of sizes of FOV with a spatial resolution relaxed to the mm range. | ConOps<br>2.1.: II<br>2.2.: 6,9<br>3.2. & 3.4.9 |
| 26 | High ToF Resolution Imaging (HtoFR, <1% wavelength resolution) – Bandwidth, shortest wavelength<br>The BTCS shall allow HtoFR Imaging shall be possible using the natural bandwidth starting between 1 Å and 3 Å. | ConOps<br>2.1.: II<br>2.2.: 6,9<br>3.2. & 3.4.5 |
| 27 | High ToF Resolution Imaging (HtoFR, <1% wavelength resolution) – Spatial Resolution<br>The BTCS shall allow HtoFR Imaging with spatial resolution at least 100µm on a limited field of view (approximately 5×5 $cm^2$). | ConOps<br>2.1.: II<br>2.2.: 6,9<br>3.2. & 3.4.9 |
| 28 | Beam Monitoring<br>The BTCS shall allow for monitoring the beam flux with a wavelength resolution of <0.3% at 9, 33 and 50 m downstream the moderator under any operation condition. | ConOps<br>2.1.: I, II<br>2.2.: 2,3,5,8, 10,11<br>3.2. |
| 29 | Background<br>The fast neutron and gamma background shall not exceed signal to background values in the white beam mode and shall not exceed a 1% level in any time channel for the best HtoFR with an MCP detector from UC Berkeley. The latter can be relaxed if reliable background correction is possible. Background level refers to measured background assuming current state of the art detectors. | ConOps<br>2.1.: I, II<br>2.2.: 2,3,5,6, 8-10<br>3.4.3.<br>5.3.3 |

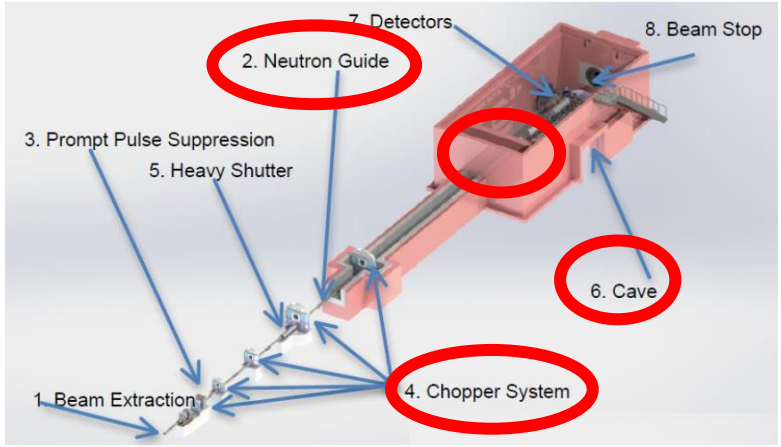



*Figure 2 - ODIN conceptual layout*

+ Cave Interior

# ODIN

## System Requirement Specification (ESS-0129650)

### 2.3 Constraint Requirements

#### 2.3.1 Operational constraint requirements

| Id | Text | Trace up to |
|---|---|---|
| 84 | Operation Mode Changes – Mode Redundancy<br>Maintenance or failure issues of one mode shall have a minimum impact on other modes (That choppers are removable or can be set to an open position is more important than repair and maintenance times that still should be kept to a minimum). | ConOps<br>5.3.3<br>6.1.2 |
| 85 | Operation mode changes – BTSC access, configuration time<br>No configuration mode change requiring access in the area downstream the pinhole shall take longer than 8 hours (including alignment). | ConOps<br>3.& 5. |
| 86 | BTCS Ergonomics<br>The beam and BTCS components downstream of the pinhole shall be accessible at a comfortable height. (125±10 cm) | ConOps 3.& 5. |
| 87 | Detector exchange –<br>As the SCS shall include a number of detectors, any change of detector configuration and system shall be a smooth standard operation carried out within 15 min (not including hot alignment, i.e. requiring beam). | ConOps<br>3.& 5. |

Ok for ‘ODIN standard detectors’, not for others however: ESS systems are inherently not designed for the flexibility typically required at imaging beamlines at operating facilities

# SAR Meeting

## Instrument Components Overview

A. Tartaglione, R. Woracek, R. Ammer

European Spallation Source (ERIC), Lund, Sweden

17 December 2025

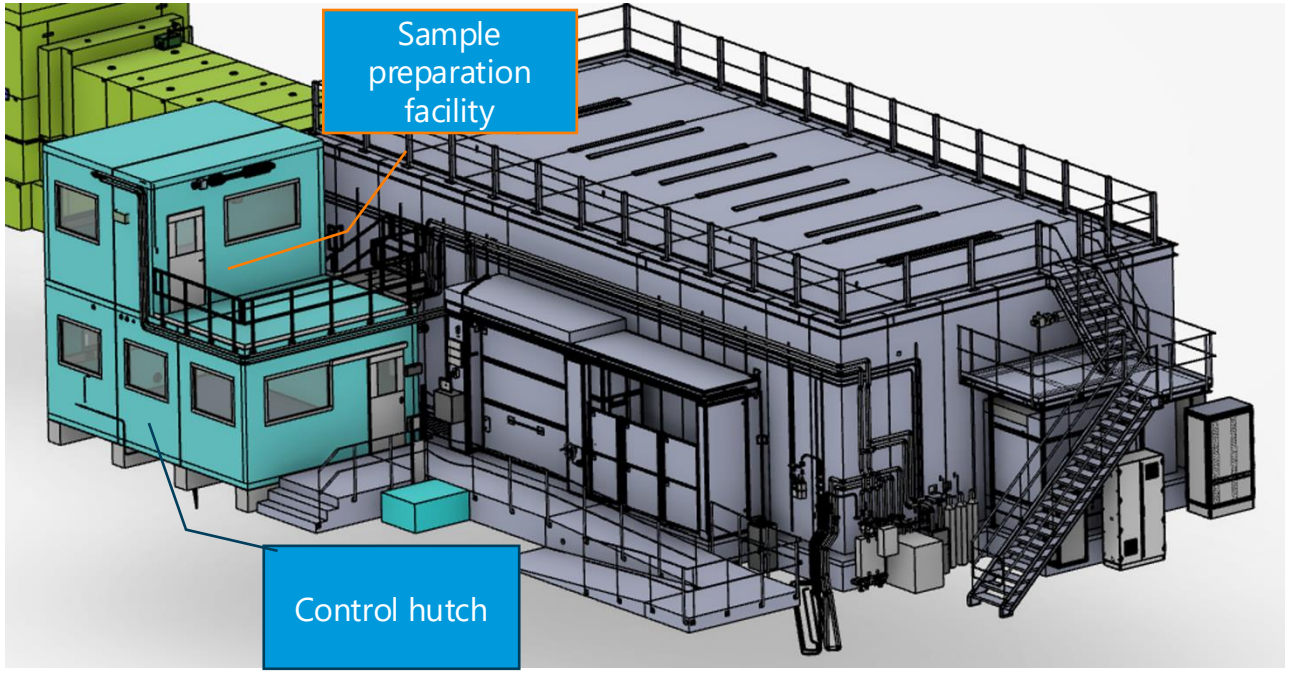
# Support system ESS.NSS.H01.ODIN.A04

EXAMPLE

=ESS.NSS.H01.ODIN.A04.A01 Control Hutch

=ESS.NSS.H01.ODIN.A04.A02 Sample Preparation Facility

=ESS.NSS.H01.ODIN.A04.F01 Fire Protection




# Scattering Characterization system ESS.NSS.H01.ODIN.B01 (Neutron Detector System)

EXAMPLE

=ESS.NSS.H01.ODIN.B01.B01.B01 TimePix3 Camera

=ESS.NSS.H01.ODIN.B01.B01.B02 Orca Flash v3 CMOS Camera

=ESS.NSS.H01.ODIN.B01.B01.B02 Large Camera Box

=ESS.NSS.H01.ODIN.B01.B01.B01.W01: Small Camera Positioning System

=ESS.NSS.H01.ODIN.B01.B01.B02 Large Camera Box

=ESS.NSS.H01.ODIN.B01.B01.B02.W01: Large Camera Positioning System

# Instrument Automation Control system ESS.NSS.H01.ODIN.K01 (Motion Control System)

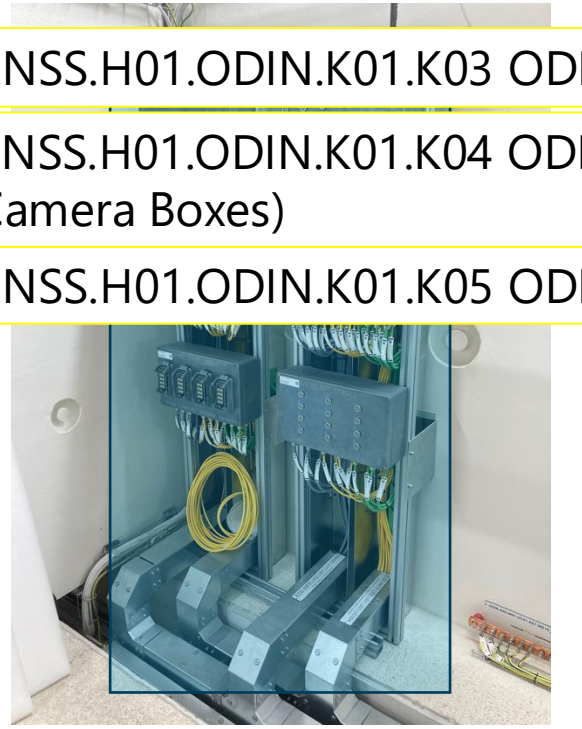
EXAMPLE

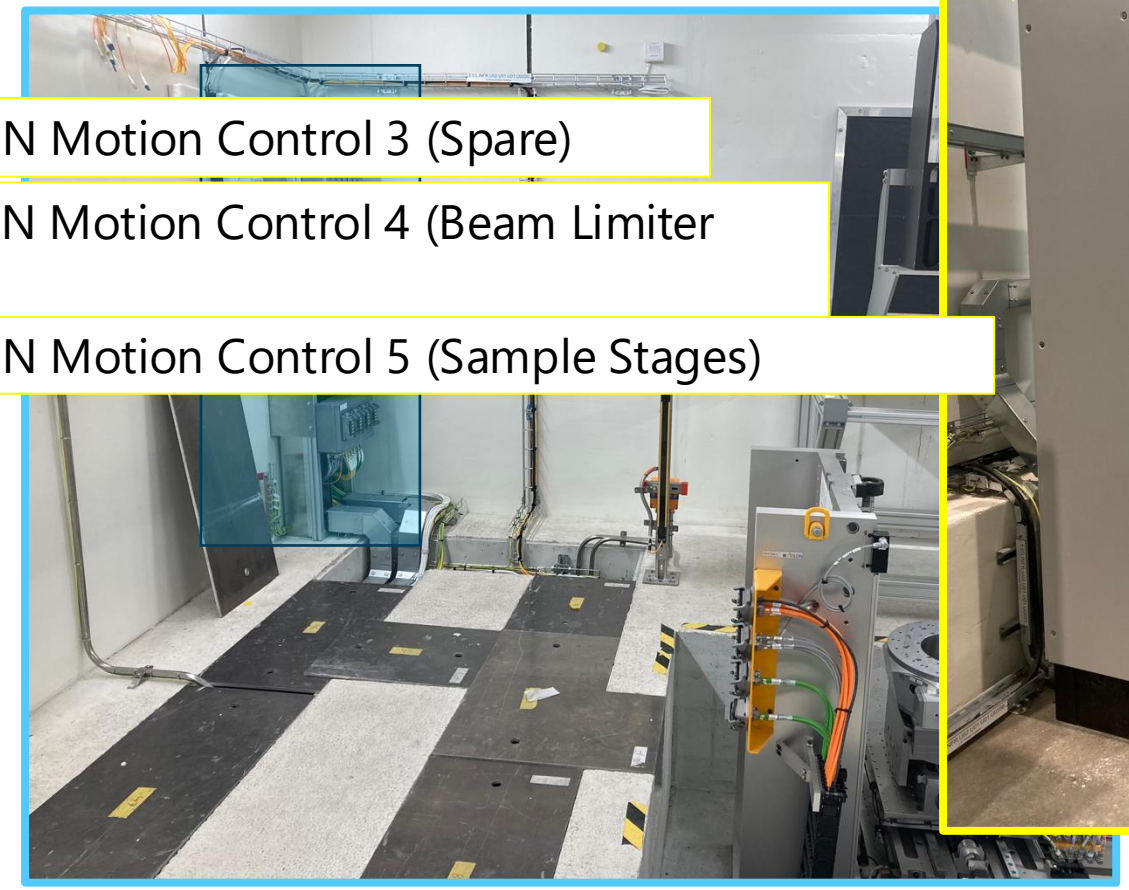
=ESS.NSS.H01.ODIN.K01.U01 Frame for Connection Boxes

=ESS.NSS.H01.ODIN.K01.K03 ODIN Motion Control 3 (Spare)

=ESS.NSS.H01.ODIN.K01.K04 ODIN Motion Control 4 (Beam Limiter and Camera Boxes)

=ESS.NSS.H01.ODIN.K01.K05 ODIN Motion Control 5 (Sample Stages)

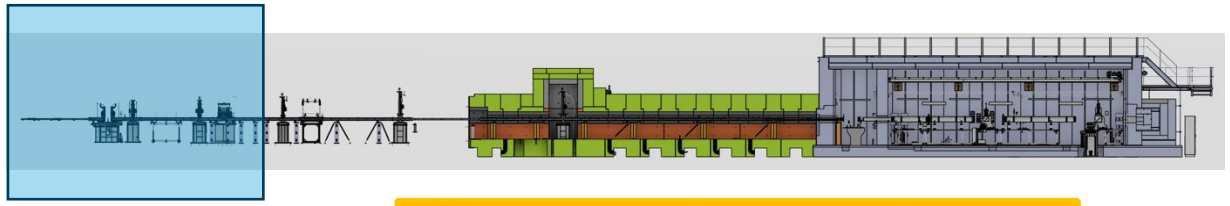


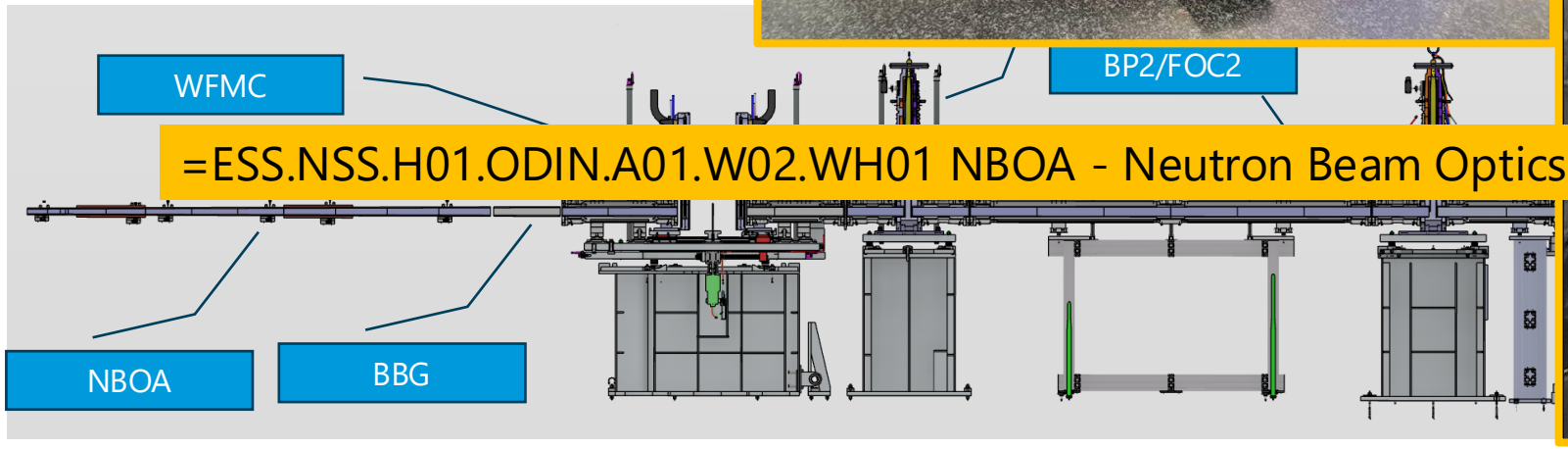


# Beam transport and Conditioning
# ESS.NSS.H01.ODIN.A01

EXAMPLE

=ESS.NSS.H01.ODIN.A01.W01 Beam Delivery System



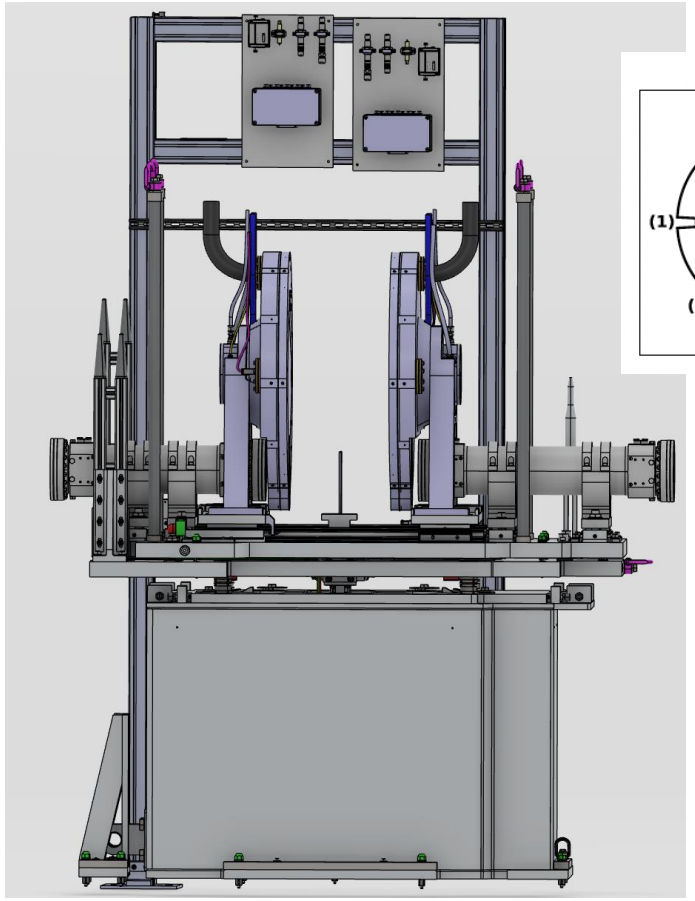


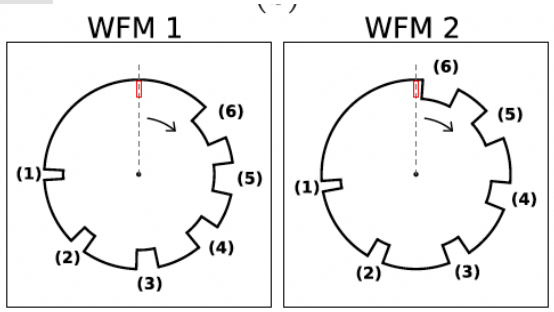

=ESS.NSS.H01.ODIN.A01.W02.WH01 NBOA - Neutron Beam Optics Assembly

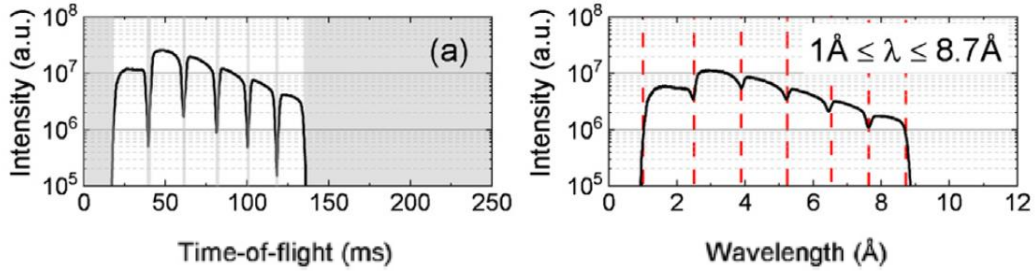
# Beam transport and Conditioning ESS.NSS.H01.ODIN.A01

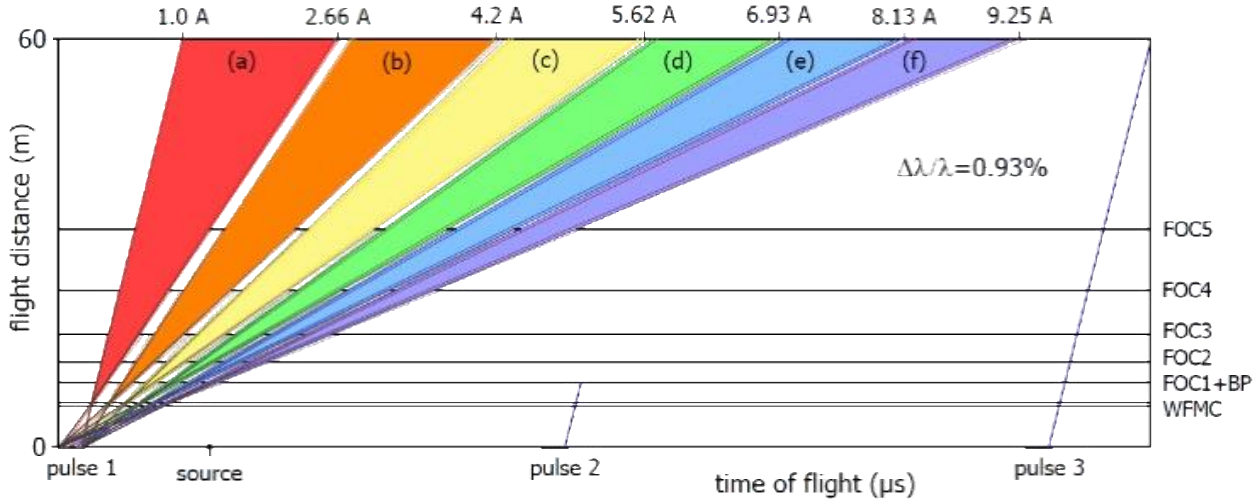
EXAMPLE

=ESS.NSS.H01.ODIN.A01.R01 Neutron Chopper System





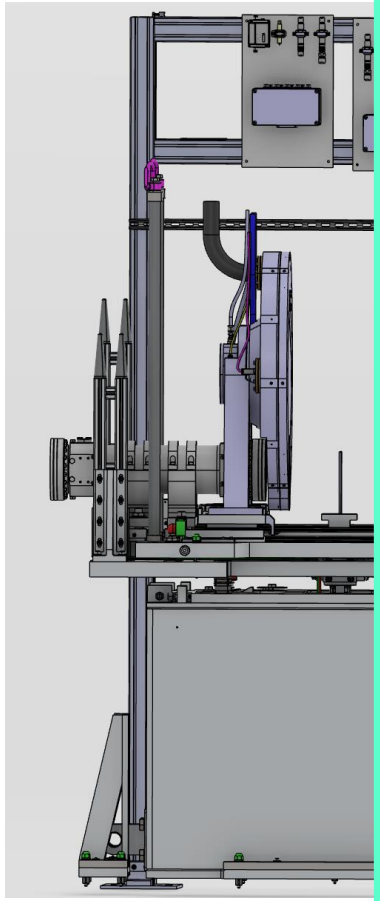



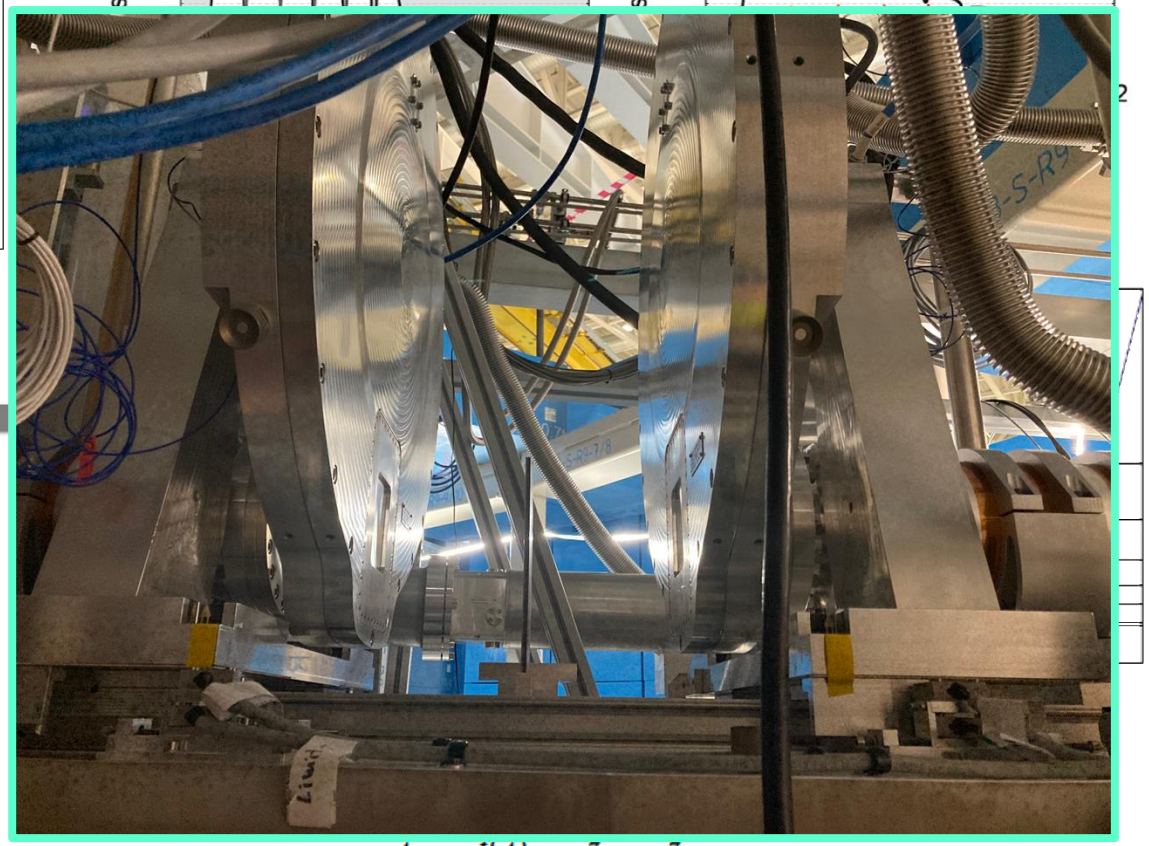

$$\frac{\Delta\lambda}{\lambda} = \frac{\Delta t(\lambda)}{t(\lambda)} = \frac{\Delta z_{\mathrm{WFM}}}{z_{\mathrm{det}} - z_{\mathrm{WFM}}}.$$

# Beam transport and Conditioning
# ESS.NSS.H01.ODIN.A01

EXAMPLE

=ESS.NSS.H01.ODIN.A01.R01 Neutron Chopper System

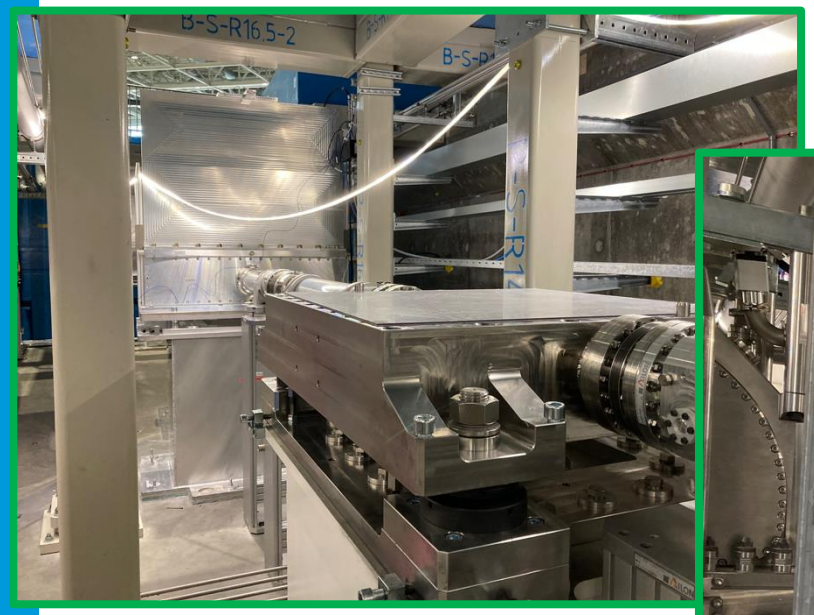


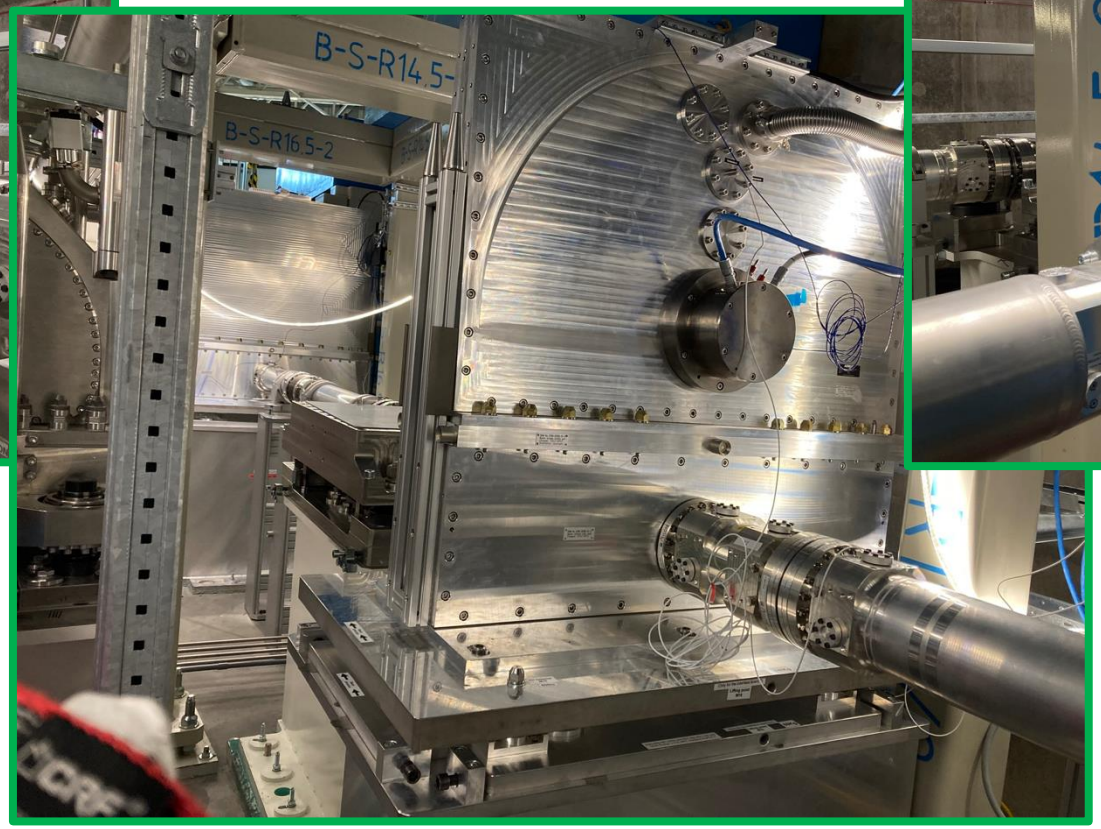


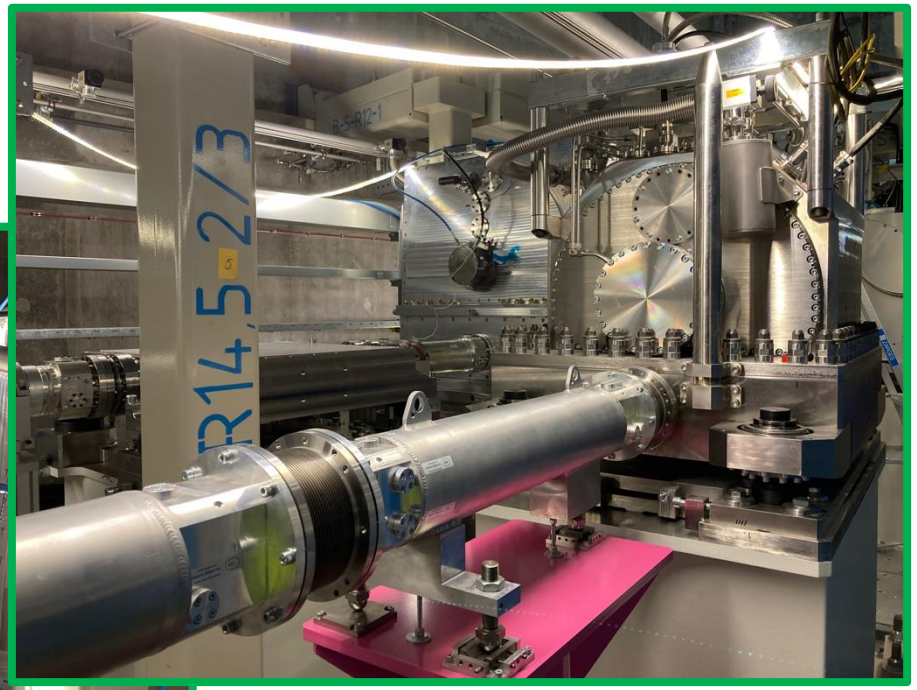
# Beam transport and Conditioning
# ESS.NSS.H01.ODIN.A01

=ESS.NSS.H01.ODIN.A01.R01 Neutron Chopper System

=ESS.NSS.H01.ODIN.A01.R01.R03 T0 Chopper System



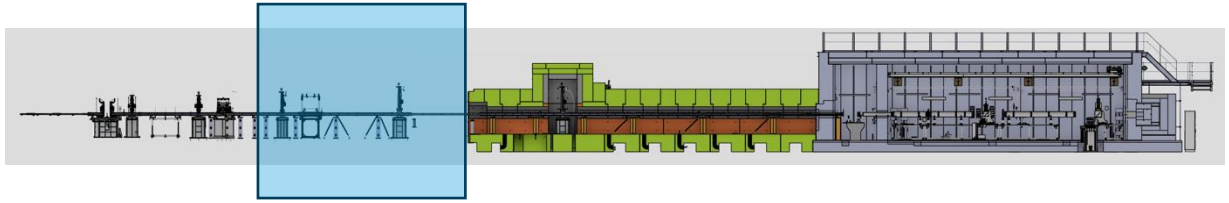



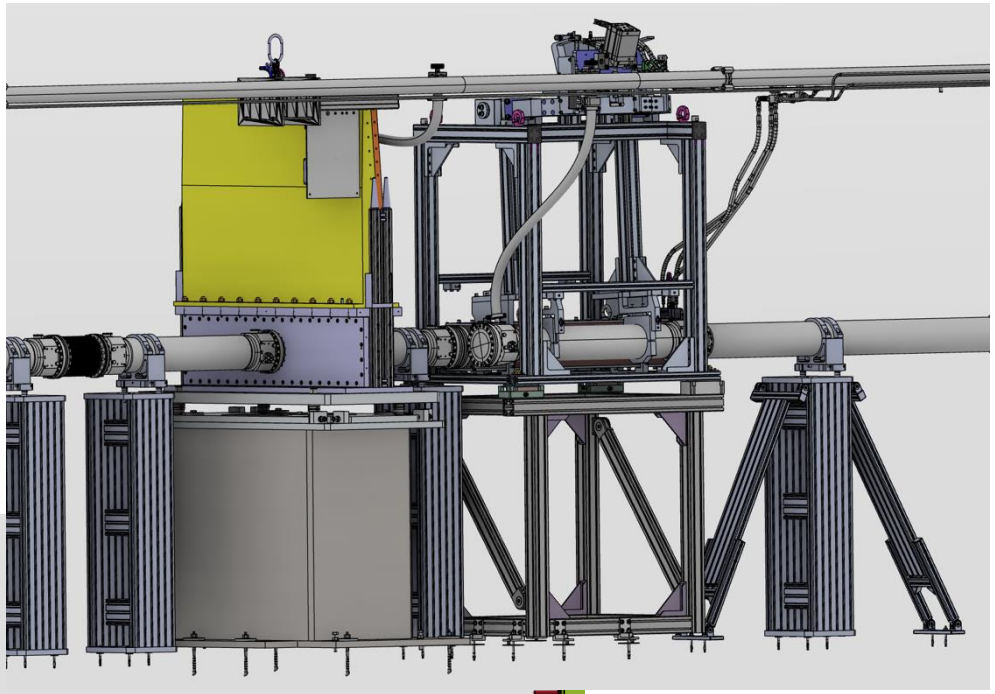
# Beam transport and Conditioning ESS.NSS.H01.ODIN.A01

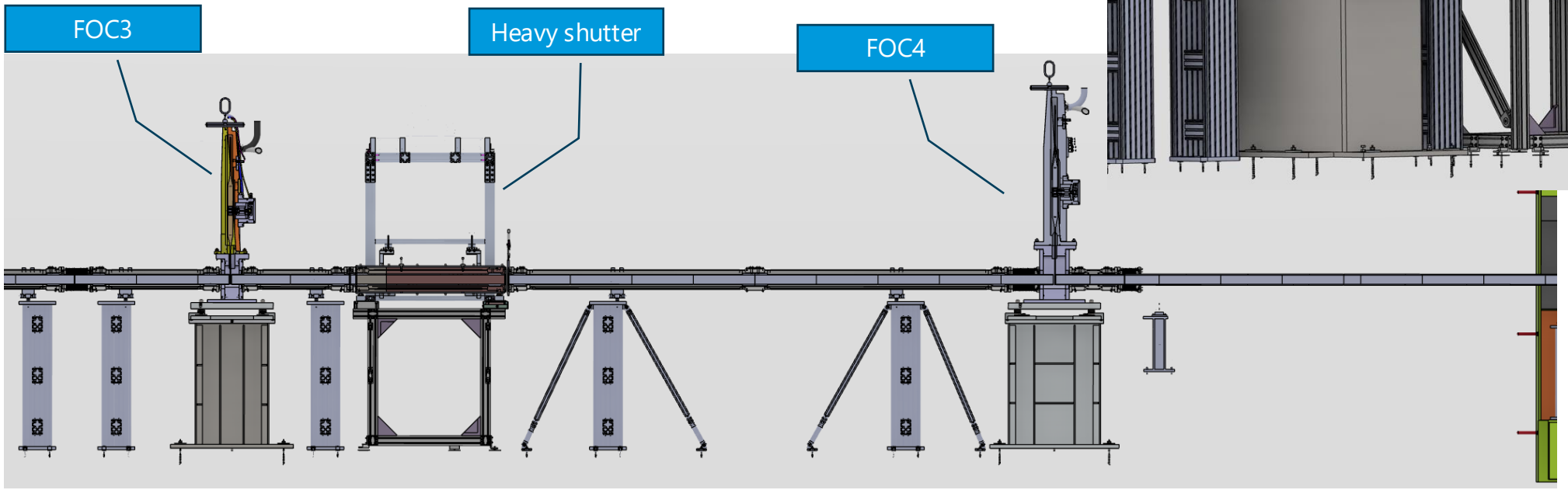
EXAMPLE

=ESS.NSS.H01.ODIN.A01.R01 Neutron Chopper System

=ESS.NSS.H01.ODIN.A01.R03 Beam Cut off







# Status of ODIN

Configuration Management

PRESENTED BY JOAKIM MEYER

2025-12-15

# Configuration Management

## In a Nutshell

### 1. Purpose

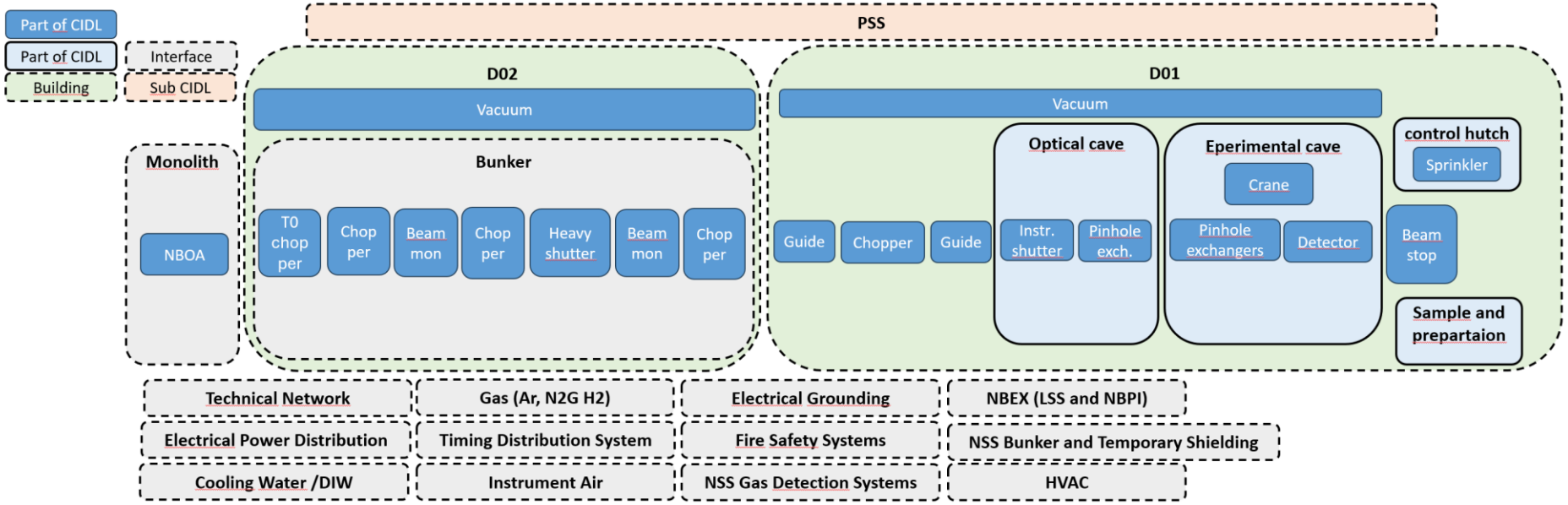
To ensure that, throughout the lifecycle, **information and configuration status** are:

- ✅ known at all times
- ✅ agreed upon by related parties
- ✅ complete
- ✅ correct
- ✅ consistent

# ODIN

## For information how ESS works: What is the CIDL?

### Configuration Item Data List




Content

Actions ▾ Table ▾

| | FBS/LBS Tag | Name | Title | CI Type | Description | SSC I2 | Revision | Version | State | Released Dat |
|---|---|---|---|---|---|---|---|---|---|---|
| 16. | =ESS.NSS.H01.ODIN | ESS-0094875 | | Sub-Item | ODIN | | 2 | | Released | Dec 12, 2025 |
| 17. | =ESS.NSS.H01.ODIN.A01 | ESS-3887114 | | Sub-Item | Beam Transport and Conditioning | | 2 | | Released | Dec 12, 2025 |
| 18. | =ESS.NSS.H01.ODIN.A01.B01 | ESS-3887115 | | Sub-Item | Beam Validation | | 2 | | Released | Dec 12, 2025 |
| 19. | =ESS.NSS.H01.ODIN.A01.B01.C01 | ESS-3887124 | | Sub-Item | Beam Monitor DAQ System in Bunker Zone | | 1 | | Released | Dec 15, 2025 |
| 20. | =ESS.NSS.H01.ODIN.A01.B01.C01.UH01 | ESS-3887125 | | Sub-Item | Beam Monitor DAQ Rack 1 | | 1 | | Released | Dec 15, 2025 |
| 21. | =ESS.NSS.H01.ODIN.A01.F01 | ESS-3887128 | | Sub-Item | Shielding | Worker Radiation Safety | 2 | ⚠ | Released | Nov 10, 2025 |
| 22. | =ESS.NSS.H01.ODIN.A01.F01.F01 | ESS-3185334 | | Sub-Item | In Bunker Shielding | | 1 | | Released | Dec 15, 2025 |
| 23. | =ESS.NSS.H01.ODIN.A01.F01.F01.F01 | ESS-3234190 | | Sub-Item | Bunker Wall Feedthrough | | 1 | | Released | Dec 15, 2025 |
| 24. | =ESS.NSS.H01.ODIN.A01.F01.F02 | ESS-3234330 | | Sub-Item | Neutron Guide Shielding | | 1 | | Released | Apr 10, 2025 |
| 25. | =ESS.NSS.H01.ODIN.A01.R01 | ESS-3887129 | | Sub-Item | Neutron Chopper System | | 2 | | Released | Dec 12, 2025 |
| 26. | =ESS.NSS.H01.ODIN.A01.R01.R04 | ESS-3999018 | | Sub-Item | FOC-500 Chopper System | | 1 | | Released | Apr 10, 2025 |
| 27. | =ESS.NSS.H01.ODIN.A01.R02 | ESS-3887130 | | Sub-Item | Beam Geometry Conditioning | | 2 | | Released | Dec 12, 2025 |
| 28. | =ESS.NSS.H01.ODIN.A01.R03 | ESS-3887132 | | Sub-Item | Beam Cut off | | 2 | | Released | Dec 12, 2025 |
| 29. | =ESS.NSS.H01.ODIN.A01.R03.R01 | ESS-3887133 | | Sub-Item | Heavy Shutter | Worker Radiation Safety | 3 | | Released | Dec 15, 2025 |
| 30. | =ESS.NSS.H01.ODIN.A01.R03.R02 | ESS-3887134 | | Sub-Item | Beam Stop | Worker Radiation Safety | 1 | ⚠ | Released | Apr 10, 2025 |
| 31. | =ESS.NSS.H01.ODIN.A01.R04 | ESS-3887137 | | Sub-Item | Beam Filtering System | | 2 | | Released | Dec 12, 2025 |
| 32. | =ESS.NSS.H01.ODIN.A01.R05 | ESS-3887139 | | Sub-Item | Beam Polarising System | | 1 | | Released | Apr 10, 2025 |
| 33. | =ESS.NSS.H01.ODIN.A01.U01 | ESS-4069015 | | Sub-Item | In Bunker Mechanical support system | | 2 | | Released | Dec 15, 2025 |

- Every component has its FBS tag
- CIDL describes the current configuration
- **ESS has invested large resources** into this type of **engineering management system**(s)

-> It has to be discussed how to handle CIDL when the instrument configuration changes

# TG5/SAR Meeting

## ODIN: Integrated Tests

R. Woracek, A. Tartaglione, R. Ammer, S. Athanasopoulos, S. Schmidt,
T. Chulapakorn, S. Xu
*+ support groups*

LUND
17 DEC 2025

# ODIN SAR

| | |
|---|---|
| Document Type | Concepts of Operations Description |
| Document Number | ESS-0129656 |
| Revision | 2 |


Feb 17, 2025
Released
Internal

## Components that require Integrated Testing

### 3.4. System overview

#### *3.4.1. General*

The conceptual ODIN instrument, see Figure 2, is subdivided into the following generic main functional blocks:

- Neutron guide
- Prompt pulse suppression
- Shielding
- Chopper system
- Shutters
- Cave interior
- Beam manipulation and analysis equipment
- Detectors
- Beam stop
- Personnel Safety System, PSS
- Control hutch
- Instrument control

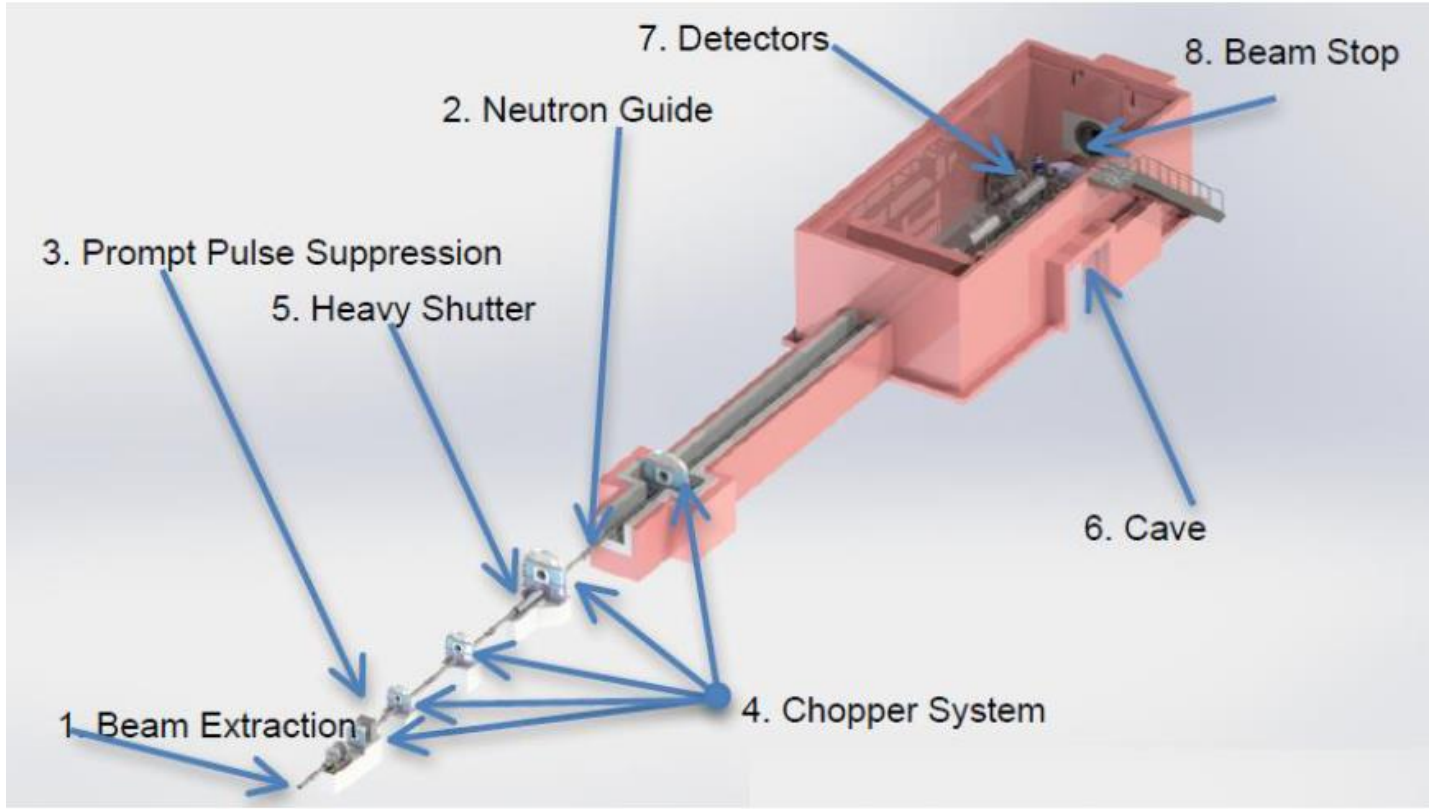



*Figure 2 - ODIN conceptual layout*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | Included in ESS-1075657, O&M listed above. | | | |
| 2 | =ESS.NSS.H01.ODIN.A01.R01 | Neutron Chopper System | Chopper System | ESS-4123348: Datasheets for maintenance<br>ESS-5456760: Operation Manual prepared by supplier (AIRBUS)<br>ESS-4962591: BOM for maintenance | ESS-4123348: CHESS RELEASED REV 1<br>ESS-5456760: CHESS RELEASED REV 1<br>ESS-4962591: CHESS RELEASED REV 1 | ESS-5815722. INTEGRATED SYSTEM | EASED REV 1 |
| 2 | =ESS.NSS.H01.ODIN.A01.R02 | Beam Geometry Conditioning | Beam Geometry Conditioning System | ESS-5200993, Supplier Manuals (JJXRay) | CHESS RELEASED REV 1 | ESS-5860915. INTEGRATED TEST PLAN FOR ODIN – BEAM GEOMETRY CONDITIONING | CHESS RELEASED REV 1 |
| 2 | =ESS.NSS.H01.ODIN.A01.R03 | Beam Cut off | Beam Cut Off System | ESS-3049036: NSS Instrument safety Shutter Operation and Maintenance Manual | CHESS RELEASED REV 3 | NA | |
| 2 | =ESS.NSS.H01.ODIN.A01.R04 | Beam Filtering System | Beam Filtering System | Included in ESS-1075657, O&M listed above.<br>ESS-3762735: Motion Control design description | ESS-3762735: CHESS RELEASED REV 2 | ESS-5866584 INTEGRATED TEST PLAN FOR ODIN – BEAM FILTERING SYSTEM | CHESS RELEASED REV 1 |
| 2 | =ESS.NSS.H01.ODIN.A01.W01 | Beam Delivery System | Beam Transport System | Included in ESS-1075657, O&M listed above. | | NA | |
| 2 | =ESS.NSS.H01.ODIN.A01.W02 | Beam Extraction System | Beam Transport System | Included in ESS-1075657, O&M listed above. | | NA | |
| 3 | =ESS.NSS.H01.ODIN.A01.W02.WH01 | NBOA - Neutron Beam Optics Assembly | Neutron Guide System | N/A | | NA | |
| 3 | =ESS.NSS.H01.ODIN.A01.W02.WH02 | BBG- Bridge Beam Guide | Neutron Guide System | ESS-5227353: NSS BBGOA Maintenance Manual | ESS-5227353 : CHESS RELEASED REV 1 | NA | |
| 2 | =ESS.NSS.H01.ODIN.A01.U01 | In Bunker Mechanical support system | Mechanical Support | Included in ESS-1075657, O&M listed above. | | NA | |
| 2 | =ESS.NSS.H01.ODIN.A01.W03 | Flight Tube System | Beam Transport System | Included in ESS-1075657, O&M listed above. | | NA | |
| 1 | =ESS.NSS.H01.ODIN.B01 | Scattering Characterization System | Neutron Detector System | Covered in the nodes below | | | |
| 3 | =ESS.NSS.H01.ODIN.B01.B01.B01 | TimePix3 CMOS Camera | Neutron Detector System | ESS-5066842: (SoPhy user Manual and TPX3CAM Manual)<br>ESS-5512704: (Image intensifier manual)<br>ESS-5283134: (TimePix3 camera manuals)<br>ESS-5066841: Datasheets for cameras, lenses and scintillators<br>ESS-5091491: Datasheets for camera box and Instructive/Manual to mount the mirror | ESS-5066842: CHESS RELEASED REV 1<br>ESS-5066841: CHESS RELEASED REV 1<br>ESS-5091491: CHESS RELEASED REV 1<br>ESS-5512704: CHESS RELEASED REV 3<br>ESS-5283134: CHESS RELEASED REV 3 | ESS-5820246. INTEGRATED TEST PLAN FOR ODIN – TIMEPIX3 DETECTOR | CHESS RELEASED REV 1 |
| 3 | =ESS.NSS.H01.ODIN.B01.B01.B02 | Orca Flash v3 CMOS Camera | Neutron Detector System | Included in ESS-5066842: (CMOS camera Manual) listed above | | ESS-5754643. LOCAL AND SYSTEM INTEGRATED TEST PLAN FOR ODIN – CMOS DETECTOR | ESS-5754643 CHESS RELEASED REV 1 |
| 1 | =ESS.NSS.H01.ODIN.K01 | Instrument Automation Control System | Motion Control System | ESS-5483415 (generic service & maintenance document)<br>the operation manual (generic for each type of controller) is coming separately | CHESS RELEASED REV 2 | NA | |
| 1 | =ESS.NSS.H01.ODIN.U01 | Experimental Cave | Structural System | Included in ESS-1075657, O&M listed above.<br>ESS-5551590 (Mirrotron O&M) | ESS-5551590 : CHESS RELEASED REV 1 | NA | |

# Integrated Tests

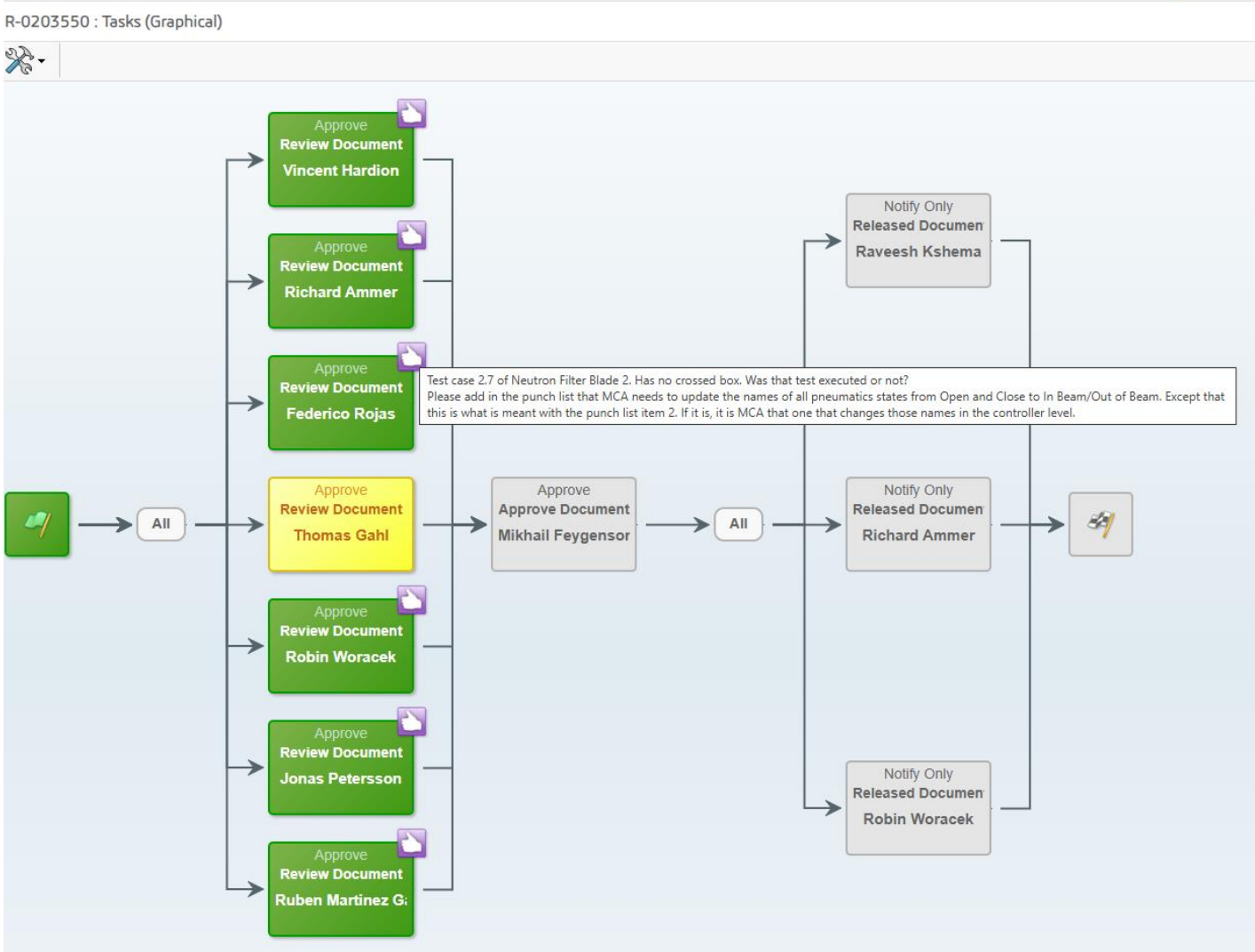

Example CHESS workflow of Integrated test report

Rev 1
Internal

ODIN INTEGRATED TEST REPORT – BEAM FILTERING SYSTEM

**Routes**

| | | Task completion date | Owner | Graphical Overview | Res... | Comment | State |
|---|---|---|---|---|---|---|---|
| 1. | R-0203392 | | | Review Document | | Please review and leave your comments if any. Thanks! | Archive |
| 2. | R-0203532 | | | Review Document | | new version of document. Software version added in Section 2. Please review and leave your comments if any. Thanks! | Archive |
| 3. | R-0203550 | | | Review Document | | new version of document. Software version added in Section 2. Please review and leave your comments if any. Thanks! | In Process |



# ODIN Integrated Tests

## CHOPPER SYSTEM


EUROPEAN SPALLATION SOURCE

| | |
|---|---|
| Document Type | Integration Report |
| Document Number | ESS-5849588 |
| Date | Nov 11, 2025 |
| Revision | 1 |
| State | Released |
| Confidentiality Level | Internal |
| Page | 1 (21) |

# ODIN INTEGRATED TEST REPORT - CHOPPER SYSTEM

| | Name | Role/Title |
|---|---|---|
| Owner | Aureliano Tartaglione | ODIN Instrument Scientist |
| Author | Robin Woracek | ODIN Instrument Scientist |
| Reviewer | Markus Olsson | Neutron Chopper Group |
| | Nikolaos Tsapatsaris | Neutron Chopper Group Leader |
| | Jonas Petersson | Data Acquisition Software Engineer (EC/DC) |
| | Federico Rojas | Automation Engineer - Motion Control Neutrons Instruments |
| | Søren Schmidt | ODIN IDS |
| | Ruben Martinez Garcia | MCA Engineer |
| Approver | Mikhail Feygenson | Head of Diffraction and Imaging Division |



| TEST CASE(S) TO BE PERFORMED | SUMMARY FINDINGS | | | | |
|---|---|---|---|---|---|
| | Pass | Fail | NA | Signature | Date |
| 1. Band Pass Choppers | ☒ | ☐ | ☐ | Robin Woracek | 29.10.2025 |
| Comments: | | | | | |
| 2. Wavelength Frame Multiplication Choppers 1 and 2 (WFMC1 and WFMC2) | ☒ | ☐ | ☐ | Robin Woracek | 29.10.2025 |
| Comments: | | | | | |
| 3. FOC1 – FOC 5 chopper | ☒ | ☐ | ☐ | Robin Woracek | 29.10.2025 |
| Comments: | | | | | |
| 4. Operate all nine choppers simultaneously | ☒ | ☐ | ☐ | Robin Woracek | 29.10.2025 |
| Comments: | | | | | |
| 5. Data acquisition | ☒ | ☐ | ☐ | Robin Woracek | 29.10.2025 |
| Comments: | | | | | |
| 6. Data Visualization | ☒ | ☐ | ☐ | Robin Woracek | 29.10.2025 |
| Comments: | | | | | |
| 7. Documentation | ☒ | ☐ | ☐ | Robin Woracek | 29.10.2025 |
| Comments: | | | | | |

# ODIN Integrated Tests

## CHOPPER SYSTEM

EXAMPLE

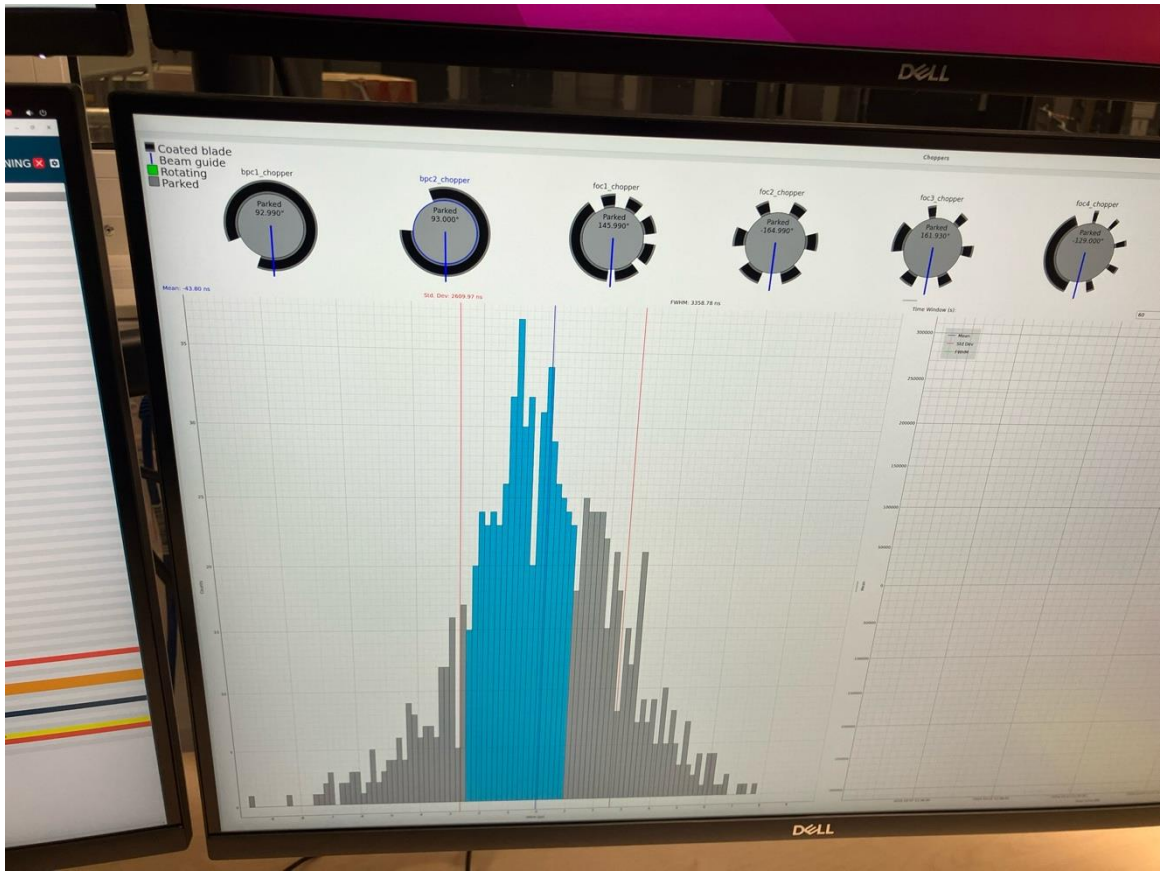
| LIST OF EQUIPMENT TO BE TESTED | |
|---|---|
| SIGNATURE: | |
| DATE: | |

1. =ESS.NSS.H01.ODIN.A01.R01 – Chopper System
2. =ESS.NSS.H01.ODIN.A01.R01.R01 – Chopper System – Bunker 1 Chopper System
3. =ESS.NSS.H01.ODIN.A01.R01.R01.K01 – Control System – Bunker 1 Chopper Control System
4. =ESS.NSS.H01.ODIN.A01.R01.R01 – Chopper System – Bunker 1 Chopper System
5. =ESS.NSS.H01.ODIN.A01.R01.R01.K01 – Control System – Bunker 1 Chopper Control System
6. =ESS.NSS.H01.ODIN.A01.R01.R01.R01 – Chopper System – Bunker 1 WFMC Mechanical Assembly
7. =ESS.NSS.H01.ODIN.A01.R01.R01.R02 – Chopper System – Bunker 1 FOC-BPC-100 Mechanical Assembly
8. =ESS.NSS.H01.ODIN.A01.R01.R01.UH01 – Instrumentation and Control Cabinet – Bunker 1 Chopper System Control Cabinet
9. =ESS.NSS.H01.ODIN.A01.R01.R02 – Chopper System – Bunker 2 Chopper System
10. =ESS.NSS.H01.ODIN.A01.R01.R02.K01 – Control System – Bunker 2 Chopper Control System
11. =ESS.NSS.H01.ODIN.A01.R01.R02.R01 – Chopper System – Bunker 2 FOC-BPC-200 Mechanical Assembly
12. =ESS.NSS.H01.ODIN.A01.R01.R02.R02 – Chopper System – Bunker 2 FOC-300 Mechanical Assembly
13. =ESS.NSS.H01.ODIN.A01.R01.R02.R03 – Chopper System – Bunker 2 FOC-400 Mechanical Assembly
14. =ESS.NSS.H01.ODIN.A01.R01.R02.UH01 – Instrumentation and Control Cabinet – Bunker 2 Chopper System Control Cabinet

# ODIN Integrated Tests

## CHOPPER SYSTEM

EXAMPLE



# ODIN Integrated Tests

## CHOPPER SYSTEM


| ITEM | DESCRIPTION | CATEGORY | RESPONSIBLE | COMPLETION DATE |
|---|---|---|---|---|
| 2.5 | Fact that choppers sometimes did not respond from NICOS and needed to repeat command to be stress-tested: This was fixed during the test and seemed to work. No real impact on mots pressing functionality for HC, should be tracked by NIT. | d | Markus Olsen | Nov 2025 |
| 0 | Chopper direction and phase to be agreed between McStas and NICOS: Cannot be tested in this plan. A meeting has been held and discussions ongoing. | d | Robin Woracek | Nov 2025 |

**-> tracked via NIT**

# ODIN Integrated Tests

## SAMPLE AND CAMERAS POSITIONING SYSTEM


EUROPEAN SPALLATION SOURCE

| | |
|---|---|
| Document Type | Integration Report |
| Document Number | ESS-5849575 |
| Date | Dec 10, 2025 |
| Revision | 1 |
| State | Released |
| Confidentiality Level | Internal |
| Page | 1 (18) |

### ODIN INTEGRATED TEST REPORT – SAMPLE AND CAMERAS POSITIONING SYSTEM

| | Name | Role/Title |
|---|---|---|
| Owner | Robin Woracek | Instrument scientist (ESS) |
| Author | Aureliano Tartaglione | Instrument scientist (TUM |
| Reviewer | Jonas Petersson<br>Federico Rojas<br>Vincent Hardion<br>Thomas Gahl<br>Ruben Martinez Garcia<br>Richard Ammer<br>Robin Woracek | EC/DC motion control engineer<br>MCA motion control engineer<br>EC/DC group leader<br>MCA group leader<br>MCA motion control engineer<br>ODIN IOE<br>Instrument scientist (ESS) |
| Approver | Mikhail Feygenson | Head of Diffraction and Imaging Division |

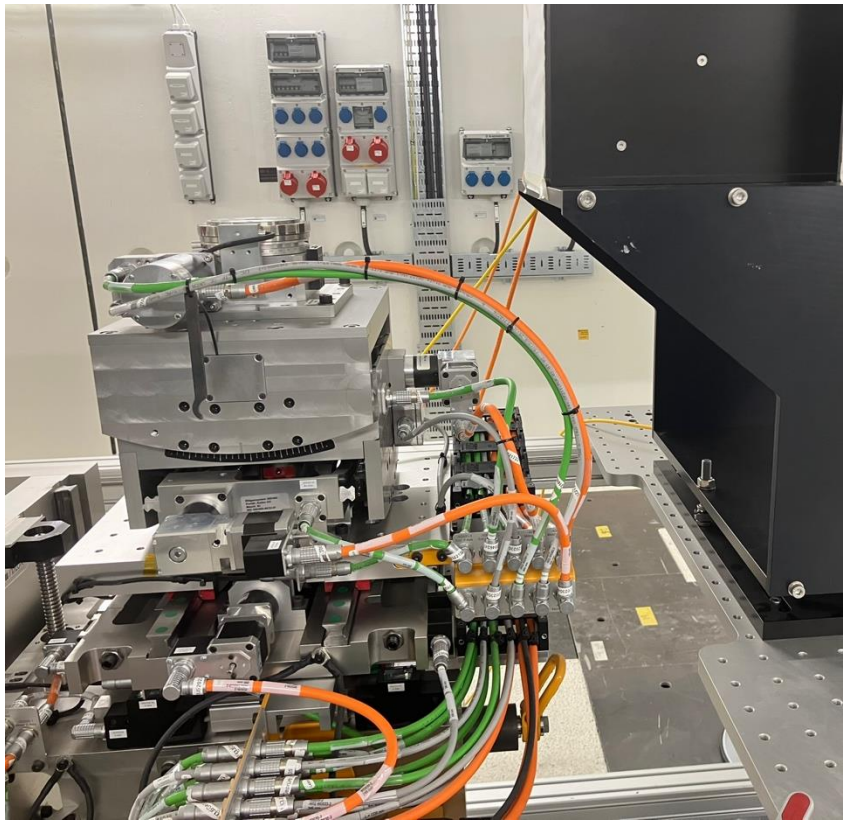


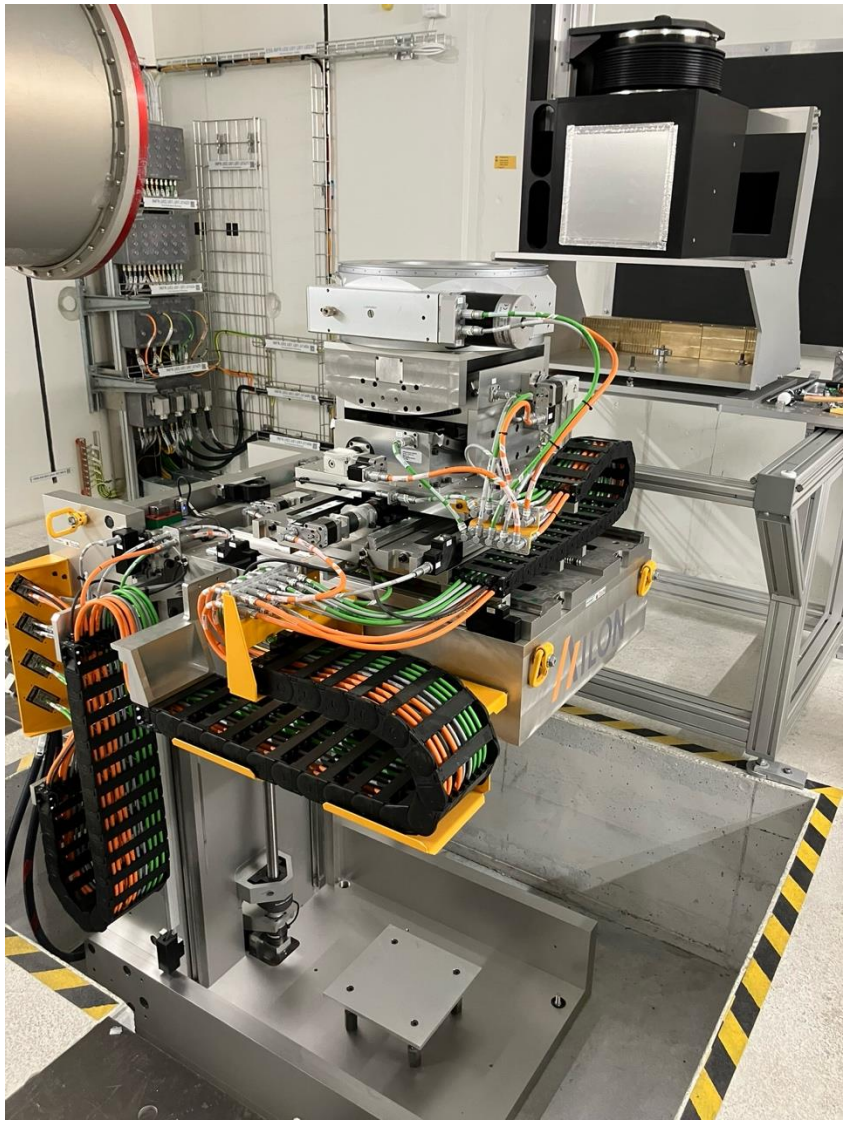
| | |
|---|---|
| 1. | ESS.NSS.H01.ODIN.A02.W01.W01: Large Sample Stage |
| 2. | ESS.NSS.H01.ODIN.A02.W01.W02: Small Sample Stage |
| 3. | ESS.NSS.H01.ODIN.A02.W01.W03.W01: Ancillary Stage 1 (Linear stage 1) |
| 4. | ESS.NSS.H01.ODIN.A02.W01.W03.W02: Ancillary Stages 2 (Linear stage 2) |
| 5. | ESS.NSS.H01.ODIN.A02.W01.W03.W03: Ancillary Stages 3 (Goniometer) |
| 6. | ESS.NSS.H01.ODIN.A02.W01.W03.W04: Ancillary Stages 4 (Rotary stage) |
| 7. | ESS.NSS.H01.ODIN.B01.B01.B01.W01: Small Camera Positioning System |
| 8. | ESS.NSS.H01.ODIN.B01.B01.B02.W01: Large Camera Positioning System |

# ODIN Integrated Tests

## SAMPLE AND CAMERAS POSITIONING SYSTEM

EXAMPLE





# ODIN Integrated Tests

## SAMPLE AND CAMERAS POSITIONING SYSTEM


Small Sample Stage

2.31 Test that the X axis movement (***SpSt2:MC-LinX-01)*** can be controlled via NICOS from the hutch

☐N/A ☒Pass ☐Fail ☒Remark: write here the NICOS name for SpSt2:MC-LinX-01(.....**spst2_lin_x** .....)

2.32 Test that both X axis positioning readback values from TwinCAT and X axis positioning set values can be monitored in NICOS

☐N/A ☒Pass ☐Fail ☐Remark:

2.33 Confirm that all motor readout values are timestamped and broadcast to Kafka.

☐N/A ☒Pass ☐Fail ☐Remark:

2.34 Confirm that the motor timestamp is synchronized with the global ESS clock to within a time zone

*We attached stickers to all axis, match axis and direction to NICOS. The naming convention will need to be improved.*

-> several issues were observed during initial testing

-> all of them were fixed within the duration of the test

-> re-assuring for becoming a functional facility *(however the control system 'chain' overall appears a bit fragile and should be stress-tested now)*

# ODIN Integrated Tests

## SAMPLE AND CAMERAS POSITIONING SYSTEM

EXAMPLE

### PUNCH LIST

Any incomplete work or non-conformities shall be recorded in the SAT2 punch list and categorized as follows:

a) To be cleared on the spot, test to be continue after rectification
b) Ongoing rectification during test
c) Test to be repeated (motivate why)
d) Modifications to be made after test, before the system is shipped to its final location on site
e) Remaining work to be rectified once in its final location on site

Non-conformities need to be registered in the Enterprise Asset Management (EAM) system.

| ITEM | DESCRIPTION | CATEGORY | RESPONSIBLE | COMPLETION DATE |
|---|---|---|---|---|
| 1 | 3.2 Models still "preliminary" in EPL. Process of being "Released" by the moment of the Integrated Test is "Ongoing". | d | NSS Technical Projects Group | Dec 15th 2025 |
| 2 | | | | |

**-> tracked via NIT**

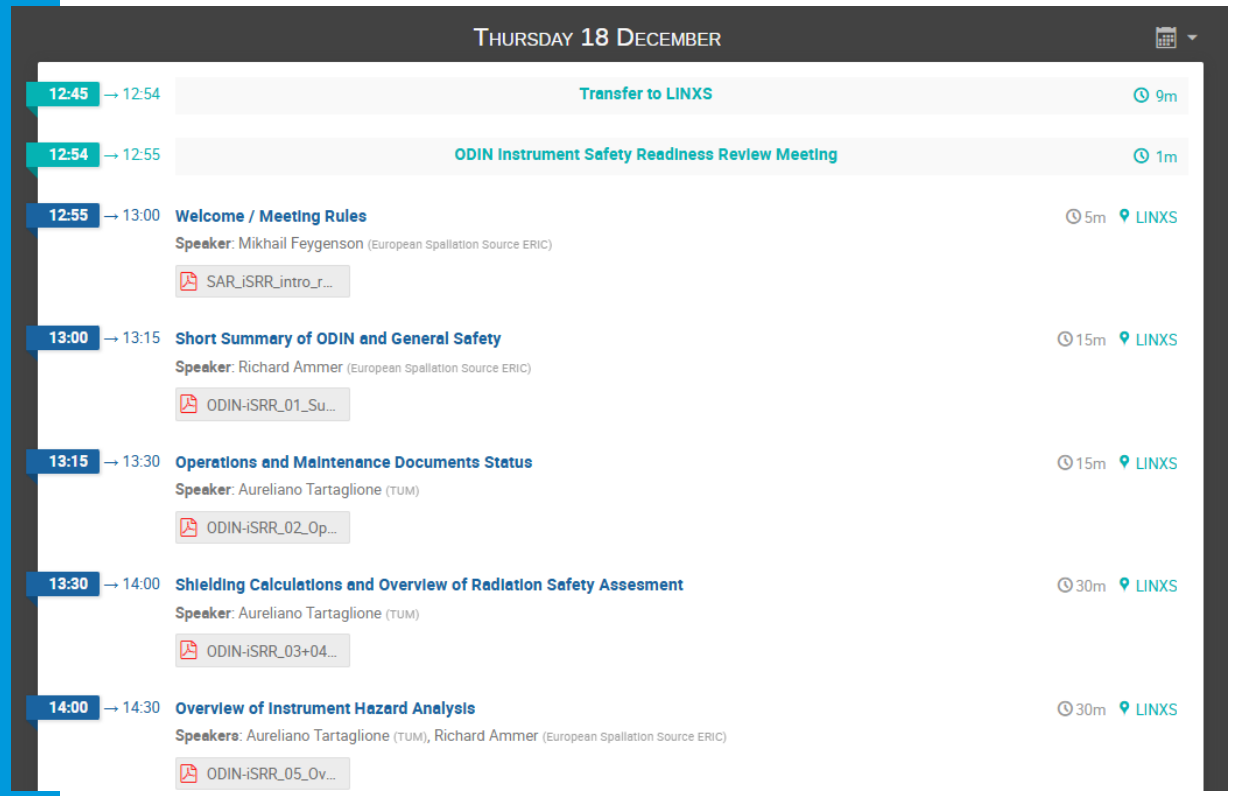
# Hot commissioning - overview

1. Shielding (steered by RP)
2. Hot commissioning of beam monitors
3. White beam profile with an imaging detector
4. Flight path calibration
5. Beam spectrum
6. Gold foil measurement
7. Choppers phases verification
8. Beam limiters and pinhole
9. WFM
10. Characterization of background (incl. T0 chopper)
11. Gamma strikes
12. Characterization of position and tilt of detectors
13. Resolution (TOF and spatial), including potential spatial dependencies.
14. Tomography and Bragg edge (first science).
15. Commissioning of SE

# ODIN

## Status Update: ISRR

https://indico.ess.eu/event/3912/



THURSDAY 18 DECEMBER

12:45 → 12:54 **Transfer to LINXS** 9m

12:54 → 12:55 **ODIN Instrument Safety Readiness Review Meeting** 1m

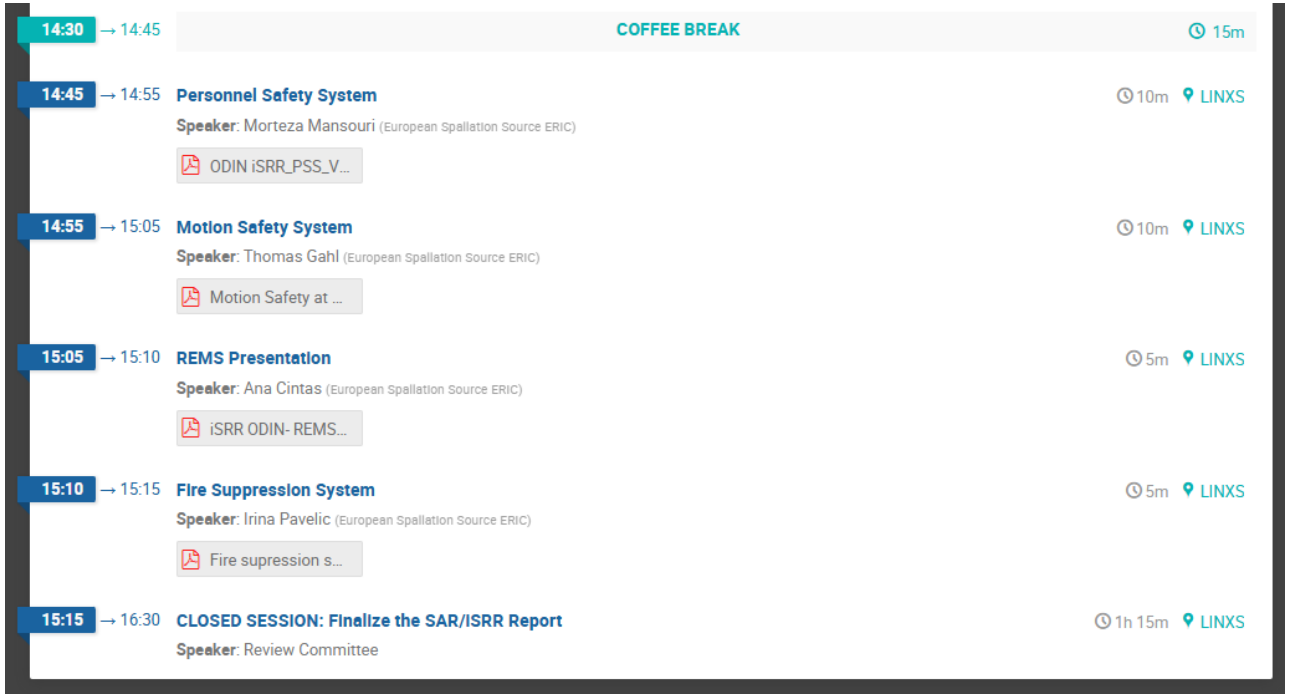
12:55 → 13:00 **Welcome / Meeting Rules** 5m LINXS
Speaker: Mikhail Feygenson (European Spallation Source ERIC)
SAR_iSRR_intro_r...

13:00 → 13:15 **Short Summary of ODIN and General Safety** 15m LINXS
Speaker: Richard Ammer (European Spallation Source ERIC)
ODIN-iSRR_01_Su...

13:15 → 13:30 **Operations and Maintenance Documents Status** 15m LINXS
Speaker: Aureliano Tartaglione (TUM)
ODIN-iSRR_02_Op...

13:30 → 14:00 **Shielding Calculations and Overview of Radiation Safety Assesment** 30m LINXS
Speaker: Aureliano Tartaglione (TUM)
ODIN-iSRR_03+04...

14:00 → 14:30 **Overview of Instrument Hazard Analysis** 30m LINXS
Speakers: Aureliano Tartaglione (TUM), Richard Ammer (European Spallation Source ERIC)
ODIN-iSRR_05_Ov...



14:30 → 14:45 **COFFEE BREAK** 15m

14:45 → 14:55 **Personnel Safety System** 10m LINXS
Speaker: Morteza Mansouri (European Spallation Source ERIC)
ODIN iSRR_PSS_V...

14:55 → 15:05 **Motion Safety System** 10m LINXS
Speaker: Thomas Gahl (European Spallation Source ERIC)
Motion Safety at ...

15:05 → 15:10 **REMS Presentation** 5m LINXS
Speaker: Ana Cintas (European Spallation Source ERIC)
iSRR ODIN- REMS...

15:10 → 15:15 **Fire Suppression System** 5m LINXS
Speaker: Irina Pavelic (European Spallation Source ERIC)
Fire supression s...

15:15 → 16:30 **CLOSED SESSION: Finalize the SAR/ISRR Report** 1h 15m LINXS
Speaker: Review Committee

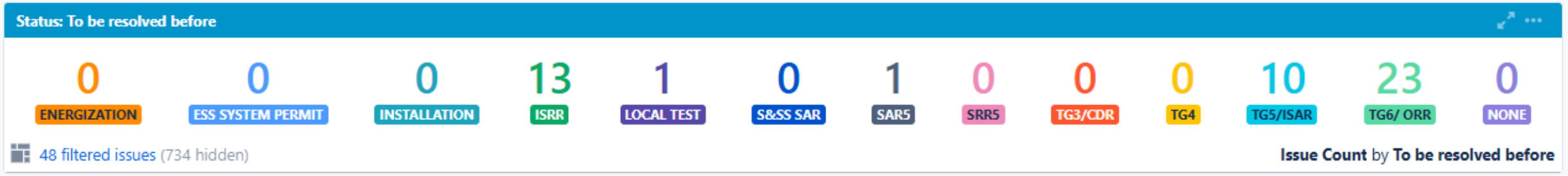
- Main open tasks were missing updated Activation Analysis and release of report DONE
- Some open documentation tasks PROGRESS

# ODIN

## What's left to do from SAR and ISRR?

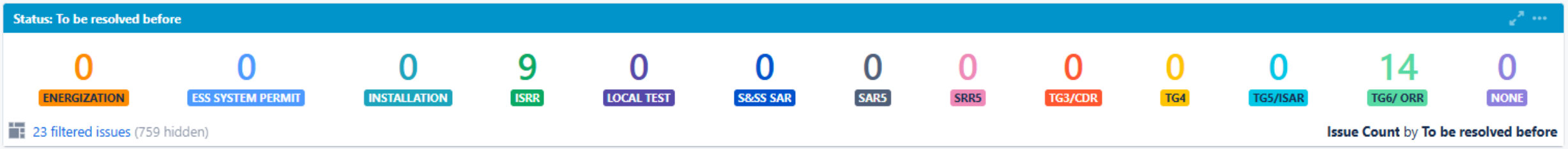
ESS works with ticket systems

**48 tickets in total**




- Many of tickets resulted from Integrated Testing
- Many are small simple fixes or 'nice to haves' that are simply tracked this way (as personell will change again)
- Many are not intented to be fixed until much later ('none')

**23 open tickets**



# ODIN

## What's left to do from SAR and ISRR?

0 open tickets related to SAR

9 open tickets related to ISRR (all of them rely on technical teams of ESS to be closed; e.g. proper integration into the engineering management system)

**NSS Issue Tracker Tickets / Rich Filter Results**

| Key | Status | Summary | Instrument | Issue source | To be resolved before | Assignee | Reporter | P | Labels |
|---|---|---|---|---|---|---|---|---|---|
| NIT-647 | IN PROGRESS | Fe-powder calibrant handling | ODIN | TG5/SAR | iSRR | Richard Ammer | Richard Ammer | = | None |
| NIT-644 | IN PROGRESS | update ODIN operational manual | ODIN | TG5/SAR | iSRR | Richard Ammer | Richard Ammer | = | None |
| NIT-613 | IN REVIEW | ODIN - Pressurised systems risk assessment | ODIN | TG5/SAR | iSRR | Tomas Nylander | Giuseppe Aprigliano | = | Global Monitored |
| NIT-612 | IN PROGRESS | ODIN EPL integration issues | ODIN | Other | iSRR | Talal Osman | Alejandro Tobias Quispe Mamani | = | EPL Global Monitored integration |
| NIT-592 | IN PROGRESS | ODIN CUP: SAT documentation not released | ODIN | Other | iSRR | Jesper Ringnér | Aureliano Tartaglione | ^ | Documentation Global Monitored |
| NIT-536 | IN PROGRESS | BM Gas panels for ODIN | ODIN | Other | iSRR | Jesper Ringnér | Jesper Ringnér | = | CBMP CBMP-Gas CUP Global Monitored odin |
| NIT-535 | IN REVIEW | Link to NCR 10682 ODIN beam stop -fence | ODIN | TG5/SAR | iSRR | Richard Ammer | Robin Woracek | = | Global Monitored |
| NIT-443 | IN REVIEW | ODIN In-bunker EPL issues | ODIN | CDR/TG3 | iSRR | Gabor Laszlo | Gabor Laszlo | = | Global Monitored design integration |
| NIT-378 | IN PROGRESS | NCR 10454 - ODIN isolation issue | ODIN | Other | iSRR | Richard Ammer | Giuseppe Aprigliano | = | Global Monitored |

# ODIN

## What's left to do from SAR and ISRR?

14 unrelated tickets

*Some of these are of actual relevance to the instrument performance!*

**NSS Issue Tracker Tickets / Rich Filter Results**

| Key | Status | Summary | Instrument | Issue source | To be resolved before | Assignee | Reporter | P | Labels |
|---|---|---|---|---|---|---|---|---|---|
| NIT-630 | TO DO | Cave Door Document update | ODIN | TG5/SAR | TG6/ ORR | *Unassigned* | Gabor Laszlo | = | documentation |
| NIT-611 | TO DO | Remote Control via NICOS in ODIN cave | ODIN | TG5/SAR | TG6/ ORR | Vincent Hardion | Robin Woracek | = | ODIN |
| NIT-593 | IN PROGRESS | ODIN MCA Local Testing for ODIN MCC3 | ODIN | Other | TG6/ ORR | Ruben Martinez Garcia | Aureliano Tartaglione | = | None |
| NIT-585 | IN PROGRESS | ODIN Slits labeling | ODIN | Installation/SAT | TG6/ ORR | Safaa Zaki | Ruben Martinez Garcia | = | None |
| NIT-564 | TO DO | ODIN BEAM FILTERING SYSTEM: Naming convention in NICOS (from ESS-5849592) | ODIN | TG5/SAR | TG6/ ORR | Vincent Hardion | Robin Woracek | = | None |
| NIT-561 | IN PROGRESS | ODIN Choppers: direction and phase controls (from ESS-5849588) | ODIN | TG5/SAR | TG6/ ORR | Robin Woracek | Robin Woracek | = | None |
| NIT-559 | IN PROGRESS | CMOS detector: MTF calculation (from ESS-5849591) | ODIN | TG5/SAR | TG6/ ORR | Søren Schmidt | Robin Woracek | = | None |
| NIT-503 | IN PROGRESS | Effective pixel size - decide place for metadata (from ESS-5849590) | ODIN | Other | TG6/ ORR | Søren Schmidt | Robin Woracek | = | None |
| NIT-502 | IN PROGRESS | Normalize by Open Beam in Live View (from ESS-5849590) | ODIN | TG5/SAR | TG6/ ORR | Søren Schmidt | Robin Woracek | = | None |
| NIT-500 | IN PROGRESS | # of neutron pulses to control detector. (from Test Report ESS-5849590) | ODIN | TG5/SAR | TG6/ ORR | Jonas Petersson | Robin Woracek | = | ecdc |
| NIT-478 | IN PROGRESS | ODIN - Chopper - cooling water tests | ODIN | Other | TG6/ ORR | Jesper Ringnér | Giuseppe Aprigliano | = | None |
| NIT-463 | TO DO | ODIN FOC-500 inspection incomplete | ODIN | Installation/SAT | TG6/ ORR | Erik Nilsson | Erik Nilsson | = | None |
| NIT-462 | TO DO | ODIN Chopper System alignment reports missing | ODIN | Installation/SAT | TG6/ ORR | Gabor Laszlo | Erik Nilsson | = | Documentation |
| NIT-433 | TO DO | ODIN: As built Eplan drawings | ODIN | TG5/SAR | TG6/ ORR | Safaa Zaki | Hussein Al-Sallami | = | None |

# ODIN

## TG5 celebration on 3rd March at ESS

### TG5 Ceremony
- Reception Flow -

| When | | Duration | Who/What | Screen background |
|---|---|---|---|---|
| | Slideshow | all day | Iceberg | Slideshow of the 4 Instruments |
| **16:45-** | Grab your glasses and plates | At arrival | People arriving | |
| **17:00** | Welcome and introduction | 3' | RC (Master of Ceremony)<br>- All Partner speakers in a group around a standing | ESS/NSS |

# ODIN

## TG5 celebration on 3rd March at ESS

# ODIN

## TG5 celebration on 3rd March at ESS

# AGENDA

- ❑ Updates since last STAP
- ❑ TG5 experience
- ❑ Previous STAP report – Comment on suggested actions
- ❑ Update x-ray setup
- ❑ First Science Strategy
- ❑ Summary

# STAP suggestions

**Dry-runs & user workflows**

- Perform realistic dry-runs (e.g. artifact tomography) — NOT DONE
- Define procedures for:
  - Sample reception / storage / shipment — NOT DONE
  - Handling activated samples — NOT DONE — Some PROGRESS
  - Hazard scenarios (sprinkler, laser alignment) — PROGRESS
- Test user-provided sample environments (load frames) — NOT DONE
- Include masking materials (Cd, $Gd_2O_3$) in dry-runs — NOT DONE
- DIC integration with beamline data (DMSC/ECDC support) — NOT DONE

# STAP suggestions

**Infrastructure / operations**

- Improve procedures for:
  - User equipment import/export NOT DONE
  - Integration of external sample environments NOT DONE
- Address lack of support from ESS labs for instrument science prep NOT DONE
- Review safety / bureaucracy vs usability (too restrictive) PROGRESS
- Fix practical issues (e.g. unsafe lifting platform) DONE
- Ensure support labs are close to beamline (<10 min access) NOT DONE

# STAP suggestions

**Instrument / hardware**

- MCP TOF detector purchase → good (risk reduction) — DONE
- Explore Lumacam for diffraction/scattering applications — NOT DONE (by ESS)
- X-ray CT:
  - Needs faster integration (PSS + license) — PROGRESS
  - Should be supported despite being outside TG5 — DONE
- Flux discrepancy (~10× lower than expected): — DONE
  - Investigate cause

# STAP suggestions

**Software & data**

- TOF data integration into DMSC → good progress
- Shuqi / NCrystal → critical for quantitative analysis
- Need:
  - Stress-testing with real data
  - Use data from external beamtimes
- Ensure full workflow (acquisition → reduction → analysis)

Lacking integration/intrinsic motiovation from DMSC counterparts

NOT DONE

NOT DONE

NOT DONE (for any relevant data)

DMSC pushback on real data due to format differences and uniqueness; multiple datasets already provided for stress testing as suggested by STAP

# AGENDA

- ❑ Updates since last STAP
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# X-ray setup update

## The source: Hamamatsu 300kV Microfocus L12721

HZB Helmholtz Zentrum Berlin

ess

## SPECIFICATIONS

| Parameter | | Description / Value |
|---|---|---|
| Maximum tube voltage ① | | 308 kV |
| X-ray tube voltage setting range | | 20 kV to 300 kV |
| X-ray tube current setting range | at 20 kV to 230 kV | 0 μA to 1000 μA |
| | at 231 kV to 300 kV | 0 μA to 500 μA |
| Cathode material | | Tungsten |
| Minimum resolution | | 4 μm ② |
| Maximum target power | | Approx. 200 W |
| Target type | | Reflection type |
| X-ray beam angle | | 40 degrees to 60 degrees |
| Target material | | Tungsten |
| X-ray output window material / Thickness | | Aluminum / 0.5 mm |
| Focus to object distance (FOD) | | 4.6 mm ± 0.4 mm |
| Protection<br>Interlock 1 / Interlock 2 | | External short-circuit method (Normally closed)<br>DC24 V / DC12 V |
| Input voltage (AC) | X-ray control unit | 100 V to 240 V (50 Hz / 60 Hz) ③ |
| | Power supply for turbo pump controller | 100 V to 240 V (50 Hz / 60 Hz) ③ |
| | Power supply for vacuum pump | 100 V to 240 V (50 Hz / 60 Hz) ③ |
| Power consumption (Max.) | X-ray control unit | 700 VA |
| | Turbo pump set | 300 VA |
| Rated output | | Continuous operation |
| Weight | X-ray tube unit / X-ray control unit | Approx. 111 kg / Approx. 11 kg |
| | Power supply for turbo pump controller | Approx. 1 kg |
| | Vacuum pump (diaphragm pump) | Approx. 4.3 kg |
| Operating ambient temperature | X-ray tube unit / X-ray control unit | +15 °C to +35 °C |
| Storage temperature | X-ray tube unit / X-ray control unit | +5 °C to +50 °C |
| Operating and storage humidity | X-ray tube unit / X-ray control unit | 20 % to 85 % (No condensation) |

**NOTE:** ①Maximum tube voltage during the warm-up period.
②X-ray chart use
③Auto switching

# X-ray setup update

## The detector: Varex PaxScan 2530HE (CT grade)

**Technical Specifications**

| | |
|---|---|
| Receptor Type | Amorphous Silicon |
| Conversion Screen | DRZ Plus, CsI |
| Pixel Area Total | 24.9 x 30.2 cm (9.8 x 11.9 in.) |
| Pixel Matrix Total | 1792 x 2176 |
| Pixel Pitch | 139 $\mu m^2$ |
| Energy Range | 20 kV - 16 MV |
| Fill Factor | 64.3% |
| Data Output | Gigabit Ethernet |
| Scan Method | Progressive |
| A/D Conversion | 16-bit |
| Frame Rate | 9 fps (1x1), 30 fps (2 x 2) |
| Exposure Control | User Sync input, Expose OK output |

**Power**

| | |
|---|---|
| Power Dissipation | 16.5 Watts nominal power consumption<br>12 to 32 V DC input range, 15 V typical<br>3A inrush current at power up with 15 V supply |
| Power Supply/Mains | 100 - 240 VAC, 47 - 63 Hz |

**Mechanical**

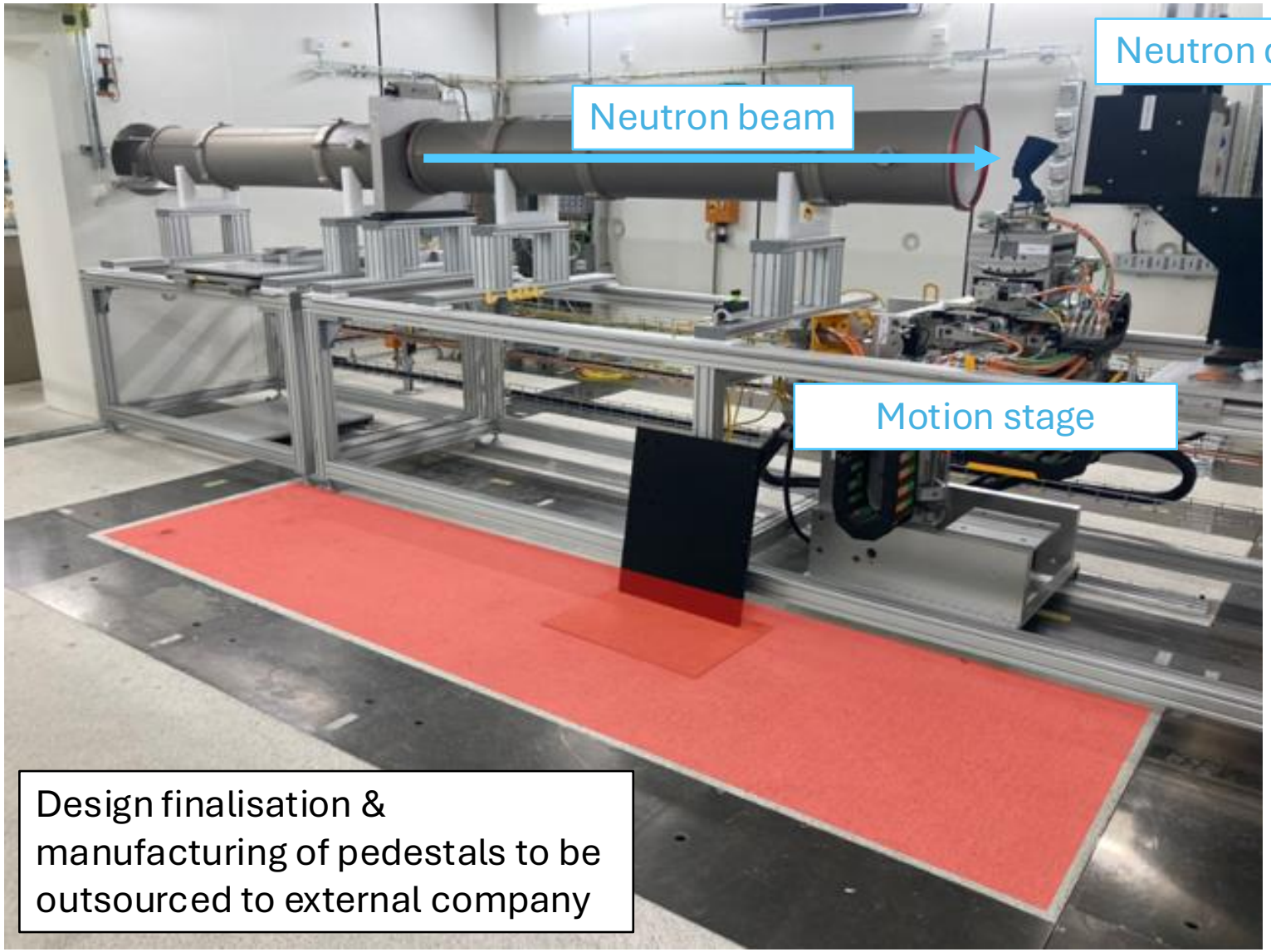
| | |
|---|---|
| Weight | 14.4 lbs ±0.25 lbs |
| Housing Material | Aluminum |
| Input Filtration | Carbon fiber plate (2.0 mm thick)<br>and aluminum (0.05mm thick) |

**Environmental**

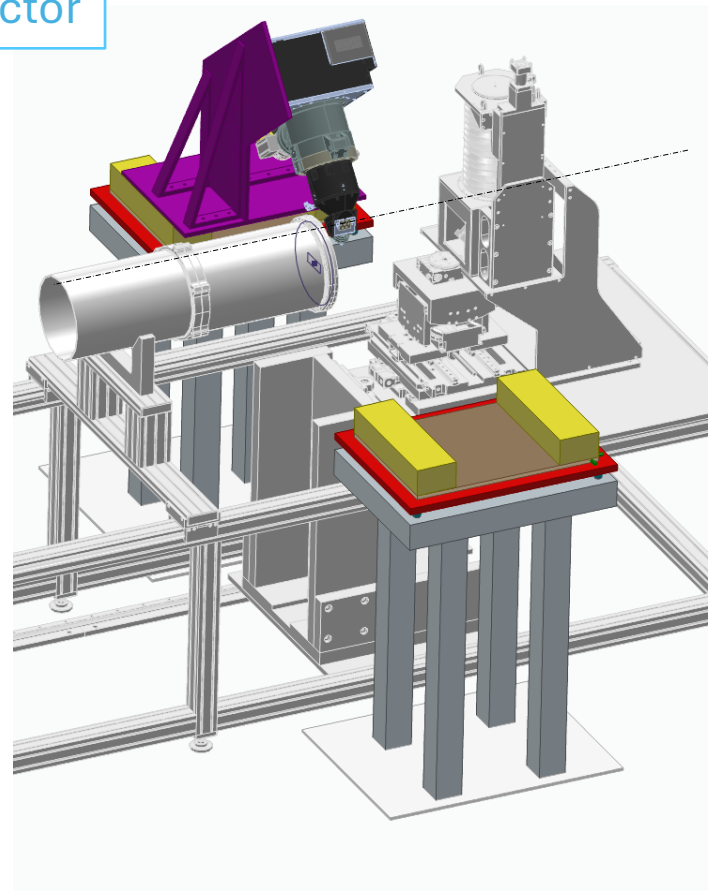
| | |
|---|---|
| Temperature Range - Operating | -10°C to +40°C (max.) |
| (Ambient) - Storage | -15°C to +50°C |
| Humidity - Operating & Storage (non-condensing) | 10 to 95% |
| Shock | IEC 60068-27 |
| Vibration | IEC 60068-6 |

# X-ray setup update

## Layout inside the cave



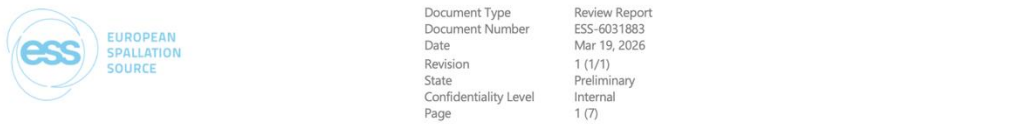

Design finalisation & manufacturing of pedestals to be outsourced to external company



In red, the area where the X-ray source with its pedestal should be placed

# X-ray setup update

## Documentation and licensing status


EUROPEAN SPALLATION SOURCE

| | |
|---|---|
| Document Type | Review Report |
| Document Number | ESS-6031883 |
| Date | Mar 19, 2026 |
| Revision | 1 (1/1) |
| State | Preliminary |
| Confidentiality Level | Internal |
| Page | 1 (7) |

DONE

- Concepts of Operations for PSS

PSR OF ODIN X-RAY SOURCE

ALMOST THERE!

- Interface Control Document for PSS
- X-ray Source Dose Rate Calculations
- Primary Safety Review of X-ray Source

| | Name | Role/Title |
|---|---|---|
| Owner | Stefanos Athanasopoulos | |
| Reviewer | Esko Oksanen | |
| Approver | Mikhail Feygenson | |


EUROPEAN SPALLATION SOURCE

| | |
|---|---|
| Document Type | Calculations |
| Document Number | ESS-6017700 |
| Date | Mar 2, 2026 |
| Revision | 1 (1/1) |
| State | Preliminary |
| Confidentiality Level | Internal |
| Page | 1 (7) |

COMING SOON

- Independent Safety Review of X-ray Source

ODIN X-RAY SOURCE DOSE RATE CALCULATIONS

| | Name | Role/Title |
|---|---|---|
| Owner | Stefanos Athanasopoulos | ODIN Commissioning Scientist |
| Reviewer | Alan Takibayev | Scientist |
| Approver | Mikhail Feygenson | Head of Diffraction and Imaging Division |

**Inclusion of X-ray source in ODIN license**

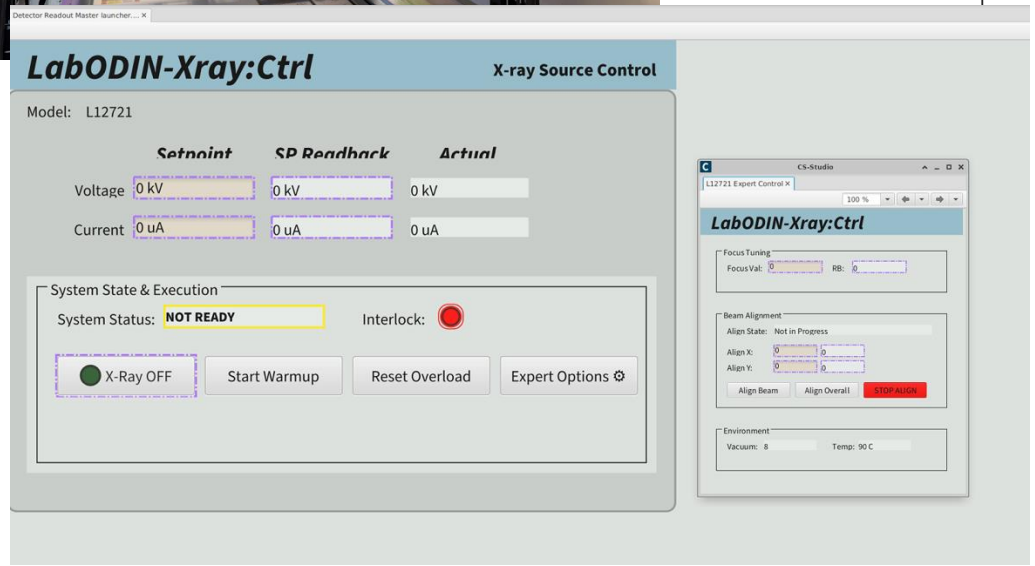
# X-ray setup update

## Integration status


X-ray source control panel

```
$ telnet 172.30.38.75 4001
Trying 172.30.38.75...
Connected to 172.30.38.75.
Escape character is '^]'.
sts
STS 5
```


| Command | Name | Description |
|---|---|---|
| | | **Status** |
| STS | Status check | Returns the X-ray tube status. Parameter and priority are as follows:<br>"5": NOT READY*1<br>"4": OVER<br>"1": WARMUP<br>"3": XON<br>"0": WARMUP YET<br>"2": STANDBY |



# X-ray setup update

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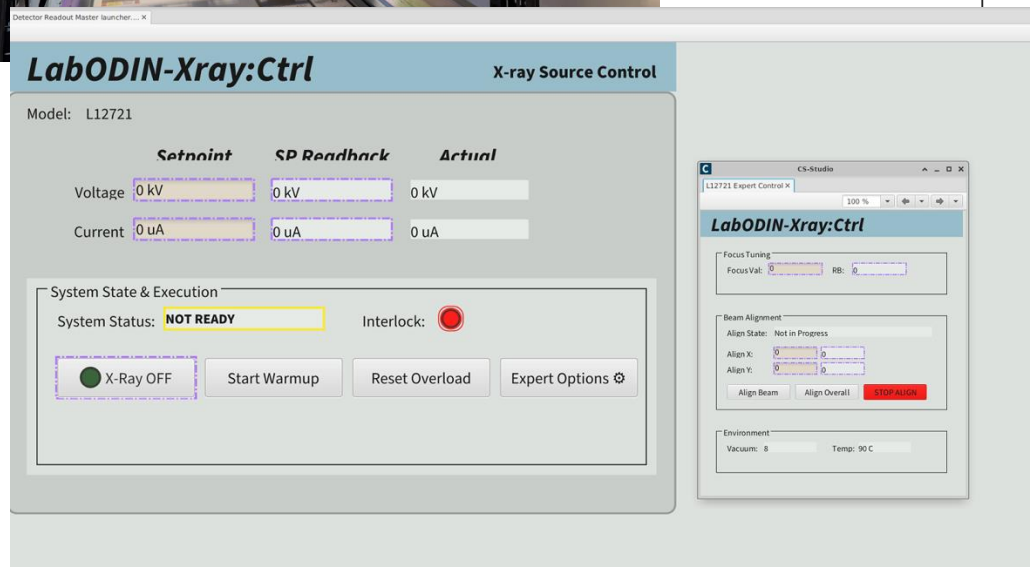


# AGENDA

- ❑ Updates since last STAP
- ❑ TG5 experience
- ❑ Previous STAP report – Comment on suggested actions
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- ❑ Summary

# First science strategy

## Partners

- **ESS team** leads commissioning and first science activities
- **TUM & PSI** → Strong in-kind partners, deeply involved since design phase – **Will play key role!**
- Build and maintain a **trusted collaborative network**
  - **In-house projects** with collaborators
  - **HyperspIN consortium** – Swedish initiative for first science at ODIN
  - **Lighthouse consortium** – Danish long-term initiative for biological cases (?)
  - More upcoming **new projects!**

## Technical outlook

- **Early flux** → ~$1\times10^{6}$ n/cm$^{2}$/s @200 kW, scaling to ~ $3\times10^{7}$ @2 MW. (sample position; L/D=350)
- **300 kV X-ray source** available in commissioning phase.

# First science strategy

## Process & principles

- **Commissioning is first priority** – First Science begins as subsystems come online
- Initial steps using **“white-beam” radiography/tomography**:
  - **No SE involved**, to showcase **baseline capability & workflows**
  - **Simple SEs involved** (e.g., loading rig) to transition to more **advanced instrument controls & data analysis** (e.g., strain)
- “Natural” transition to simple **wavelength-resolved measurements** – Our primary goal is to demonstrate reproducible performance
- Collaboration on **advanced modalities** (e.g., NGI) with leading partners (e.g., TUM & PSI)
- Maintain & update list of **candidate experiments** – Review with in-kind partners & STAP
- Planning & documentation:
  - **Goal definition** – Link to instrument capability to be demonstrated
  - **Integration into hot commissioning** – Early challenges must be contextualised
- Exploit **existing tools** and (build new) collaborations for **advanced data analysis** (e.g., CIL & SPAM)

# First science strategy

## Where ESS could be leading….

**Unprecedented quantification of neutron imaging data via ToF transmission spectra**

- Material decomposition
  - Hardware → detectors, scatter correction
  - Modelling → spectra & scattering
  - Novel contrast modalities → inelastic scattering, diffraction contrast
- Texture (cf. F. Malamud, PSI)
- A new/unified extinction model

**ToF tomography**

- Extension of above to tomography with 'noisy' data sets

**Sample environments**

- In-situ testing: Tensile/Compression/Torsion/3PB/4PB/Heating/Freezing (in-house + ongoing collaborations)
- Unique opportunity: generous instrument space + lab infrastructure

**We have ideas… but what's missing?**

- Time… (*we are swamped with tasks to get ODIN ready…*)
- Dedicated personnel to stay focused on these developments while working on a relevant science case
- End-to-end workflow: acquisition → analysis → publication

# First science strategy

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- **Dedicated personnel** to stay focused on these developments while working on a relevant science case
- **End-to-end workflow**: acquisition → analysis → publication

# First science strategy

## In-house projects with collaborators

**Hydrogen embrittlement**
- ReHeart (2 Postdocs, KTH+LU/ESS)
- ISOTOPE (1PhD, KTH, recently defended)
- ILL-ESS-KTH PhD (starting 2026)

**Solid state batteries**
- ANISSA (1 Postdoc, 3PhDs, UU, LTH, HZB, UM)

**Freezing cement mortar**
- MaU, LTH (ongoing, TEMP dedicated resource)

**Thermography / Sand heating**
- LTH (ongoing, TEMP dedicated resource)

**Wolter optics** (1st step towards a neutron microscope)
- 1 PhD,1 postdoc at DTU (starting 2026)

**Improving quantitative neutron transmission interpretation**
- Colaboration with ESS Spallation Physics Group & DMSC

# First science strategy

## In-house projects with collaborators

**Submitted 3 proposals to "VR ESS-ISIS Bilateral Call on Instrumentation & Methods"**

- **Polarization/SEMSANS** – PIs: Max Wolff (UU), Elizabeth Blackburn (LU).
- **Development of neutron grating interferometry and application of diverse neutron scattering and imaging methods for unravelling the hierarchical structure of edible soft matter** – PI: Marjorie Ladd Parada (KTH).
- **MINDI**: Mechanics-Informed Neutron Diffraction and Imaging for Degradation and Phase Transformation in Structural Metals – PI: Carl Dahlberg (KTH).

**Upcoming: Röntgen-Ångström Cluster (RÅC) – Germany-Sweden**

*ESS semi-initiated* **Multi-Directional Neutron Dark-Field Tomography (MD-NDFT)** Stockholm University

- tensor tomography: multiscale characterization of anisotropic structures in macroscopic samples.
- new grating geometries, automated alignment systems, and data analysis pipelines

*ESS initiated* **ESS initiated RAC on Hydrogen Embrittlement**

- KTH (CFO Dahlberg, J Pan) & TUM+FAU (M. Fritton, S. Neumeier, R.Gilles)

*ESS contacted* ***L*aser powder bed fusion (LPBF) (**LLT-RWTH+Fraunhofer ILT Aachen + Luleå University of Technology)

- development of a system for imaging during laser powder bed fusion (LPBF)
- study the process while printing materials with complex compositions such as magnetocaloric materials and HEA

# First science strategy

## In-house projects with collaborators

**Submitted 3 proposals to "VR ESS-ISIS Bilateral Call on Instrumentation & Methods"**

GRANTED

- **Polarization/SEMSANS** – PIs: Max Wolff (UU), Elizabeth Blackburn (LU).
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NOT GRANTED

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- KTH (CFO Dahlberg, J Pan) & TUM+FAU (M. Fritton, S. Neumeier, R.Gilles)

*ESS contacted* ***L*aser powder bed fusion (LPBF) (**LLT-RWTH+Fraunhofer ILT Aachen + Luleå University of Technology)

- development of a system for imaging during laser powder bed fusion (LPBF)
- study the process while printing materials with complex compositions such as magnetocaloric materials and HEA

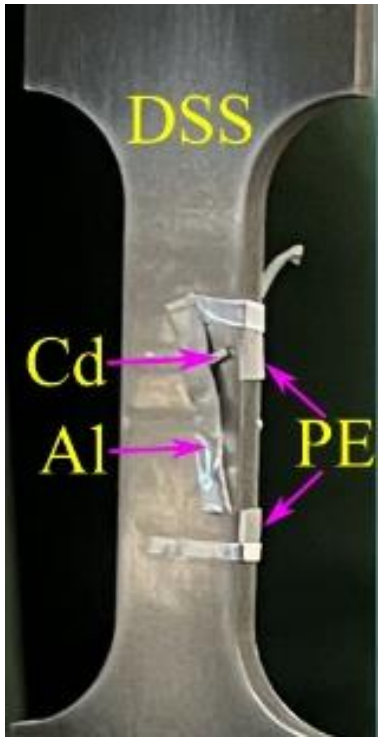
# First science strategy

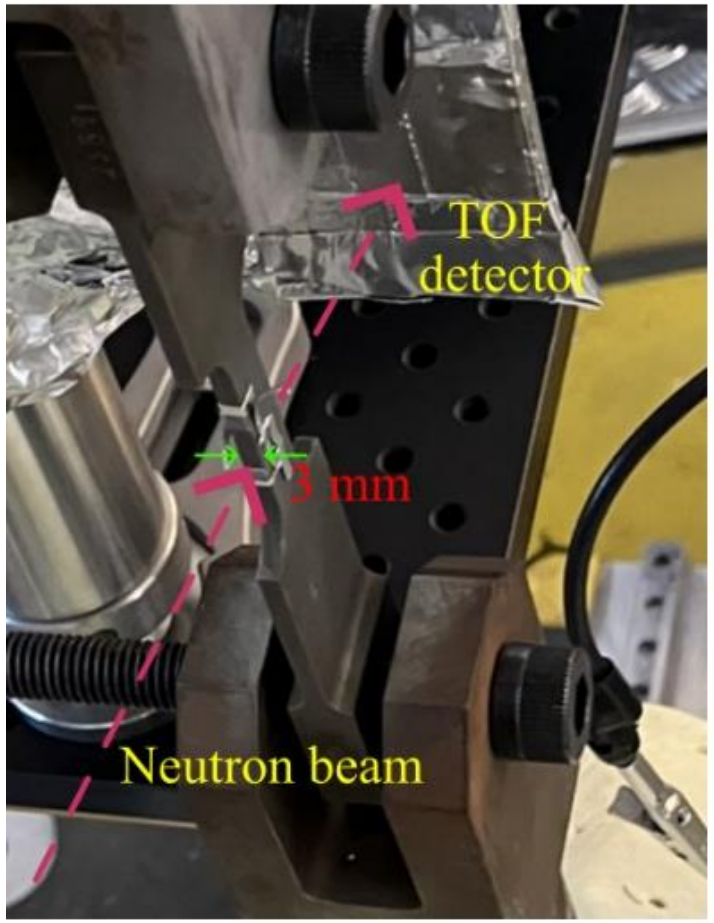

Shuqi Xu

## In-house projects: Hydrogen Embrittlement -> Improved TOF quantification

- Establish Reference Measurements: Mimic H by PE sheets

8mm
Duplex-Stainless Steel



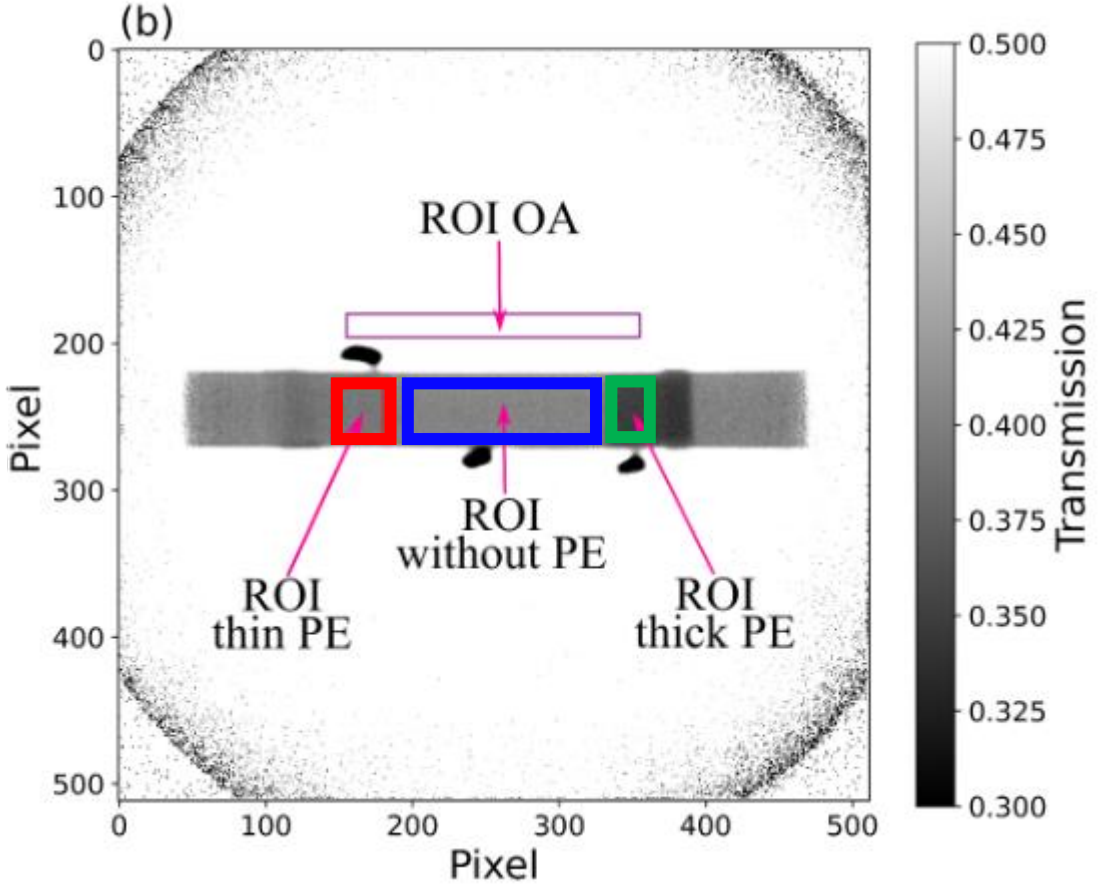

| Grade | C | Si | Mn | Cr | Ni | Mo | N | Ti | V | Al | Fe |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DSS | ≤0.03 | ≤0.8 | ≤1.2 | 25 | 7 | 4 | 0.3 | - | - | - | balance |
| Austenitic superalloy | 0.04 | 0.2 | 0.2 | 14.5 | 25 | 1.25 | - | 2.1 | 0.3 | 0.15 | balance |

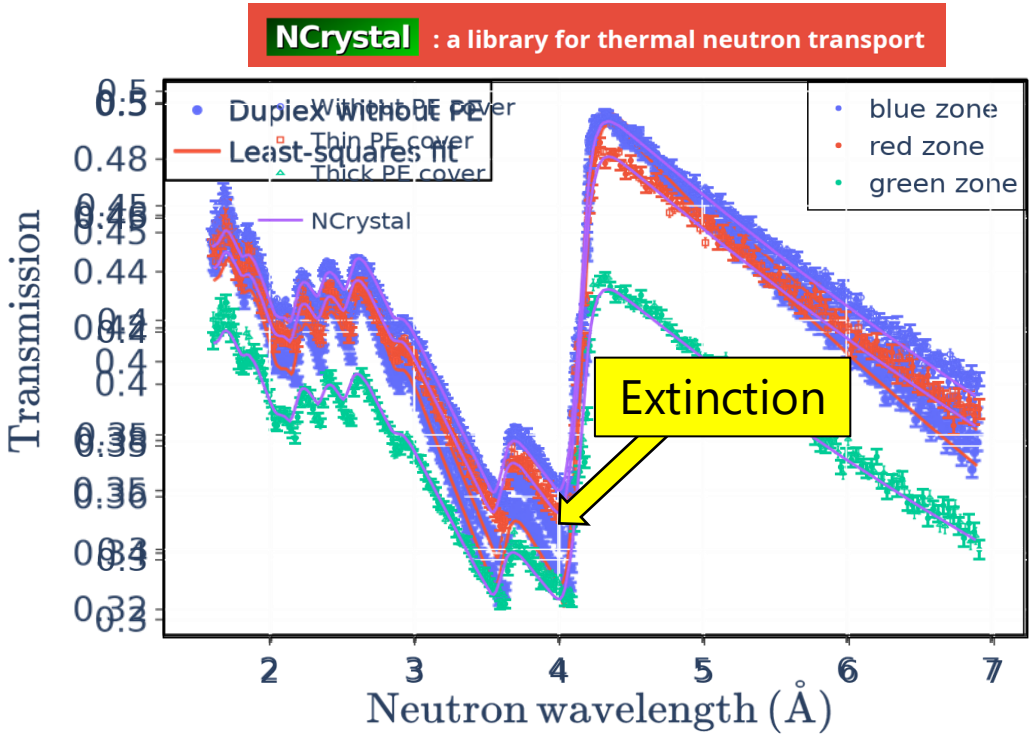
# First science strategy


Shuqi Xu

## In-house projects: Hydrogen Embrittlement -> Improved TOF quantification

1) Establish Fit for **Sample Composition**
2) Mimic H with **PE sheets**
3) Derive PE thickness from Fit



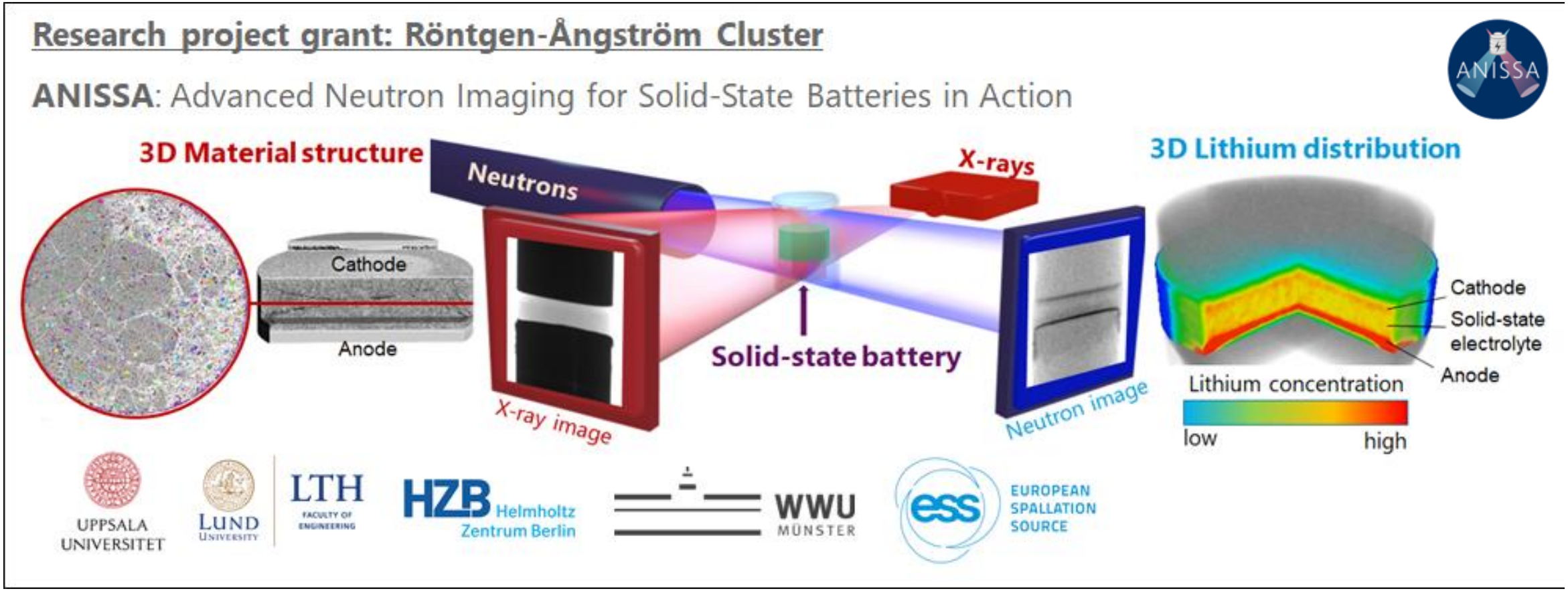




Fitted thickness:
thin PE: 44±2 µm
thick PE: 230±2 µm

≈98 wt.ppm H
≈ 495 wt.ppm H

# First science strategy

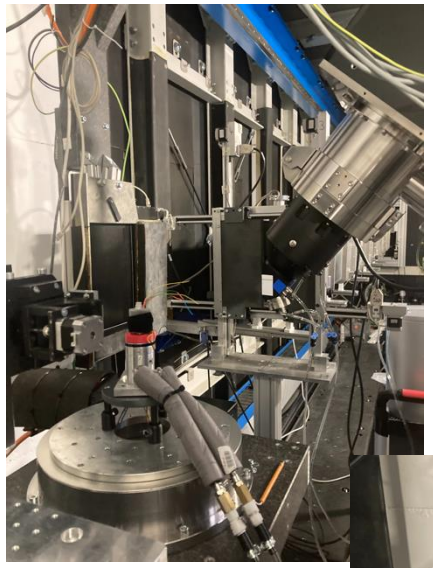
## In-house projects: Solid state batteries

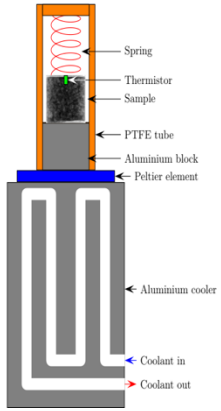


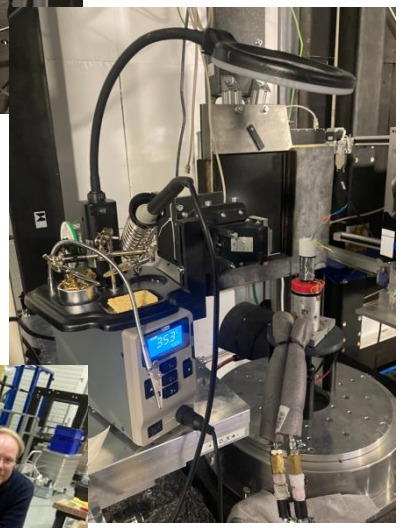
# First science strategy

MSc Thesis project of Tanja Peric

## In-house projects: Freezing cement mortar



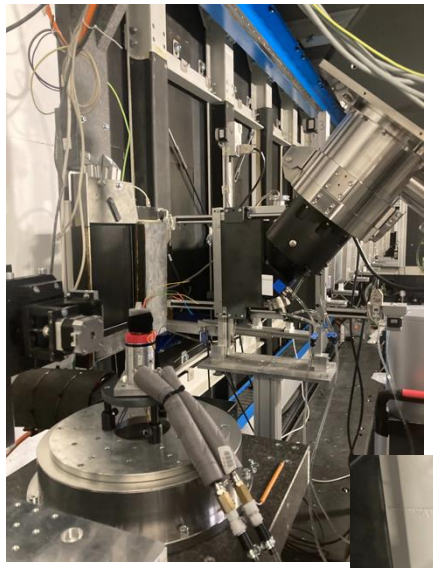


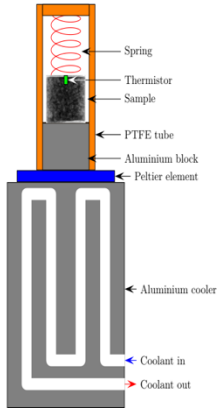



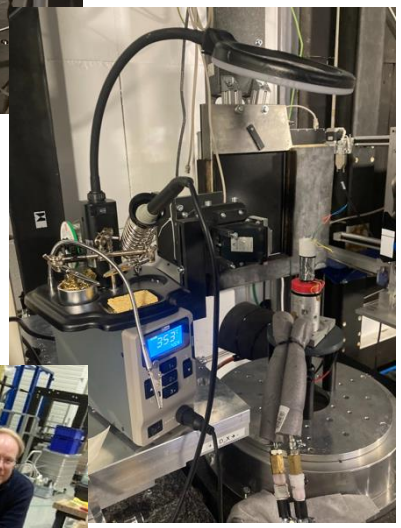
# First science strategy

MSc Thesis project of Tanja Peric

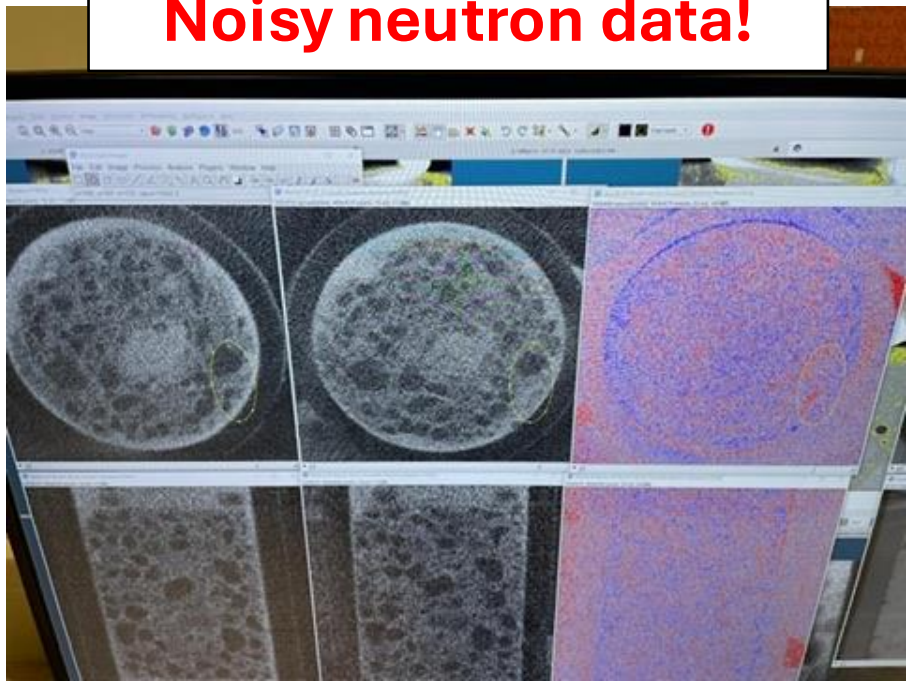
## In-house projects: Freezing cement mortar





**Noisy neutron data!**



VISA

```
Starting Pixel Search Local (with 64 processes)
  CC=0.99522  |##################################################| Time: 0:01:42
CC stats: 0.0 0.9927461567674699 0.9986719489097595
ps_rs counts: {-5: 18, 1: 3843}

Starting local dic for 3861 nodes (with 64 processes)
  it=1000  dPhiNorm=0.0276  rs=+1  |##########################| Time: 2:16:39

{-7: 18, -3: 539, -1: 18, 1: 14, 2: 3272}
```

Local WS

```
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CC stats: 0.0 0.9927533756448518 0.9986719489097595
ps_rs counts: {-5: 18, 1: 3843}

Starting local dic for 3861 nodes (with 48 processes)
  it=662  dPhiNorm=0.0058  rs=+2  |##################################################| Time: 0:02:08

{-7: 18, -3: 552, -1: 12, 1: 14, 2: 3265}
```
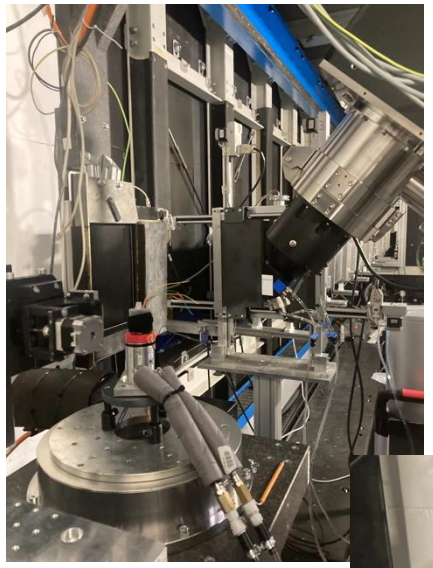
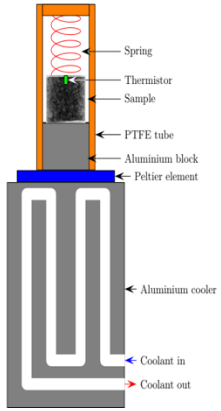
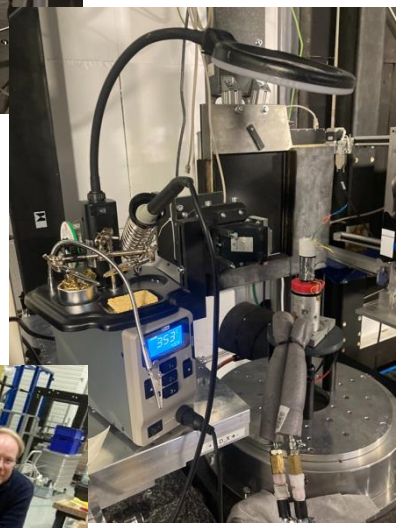

# First science strategy

MSc Thesis project of Tanja Peric

## In-house projects: Freezing cement mortar



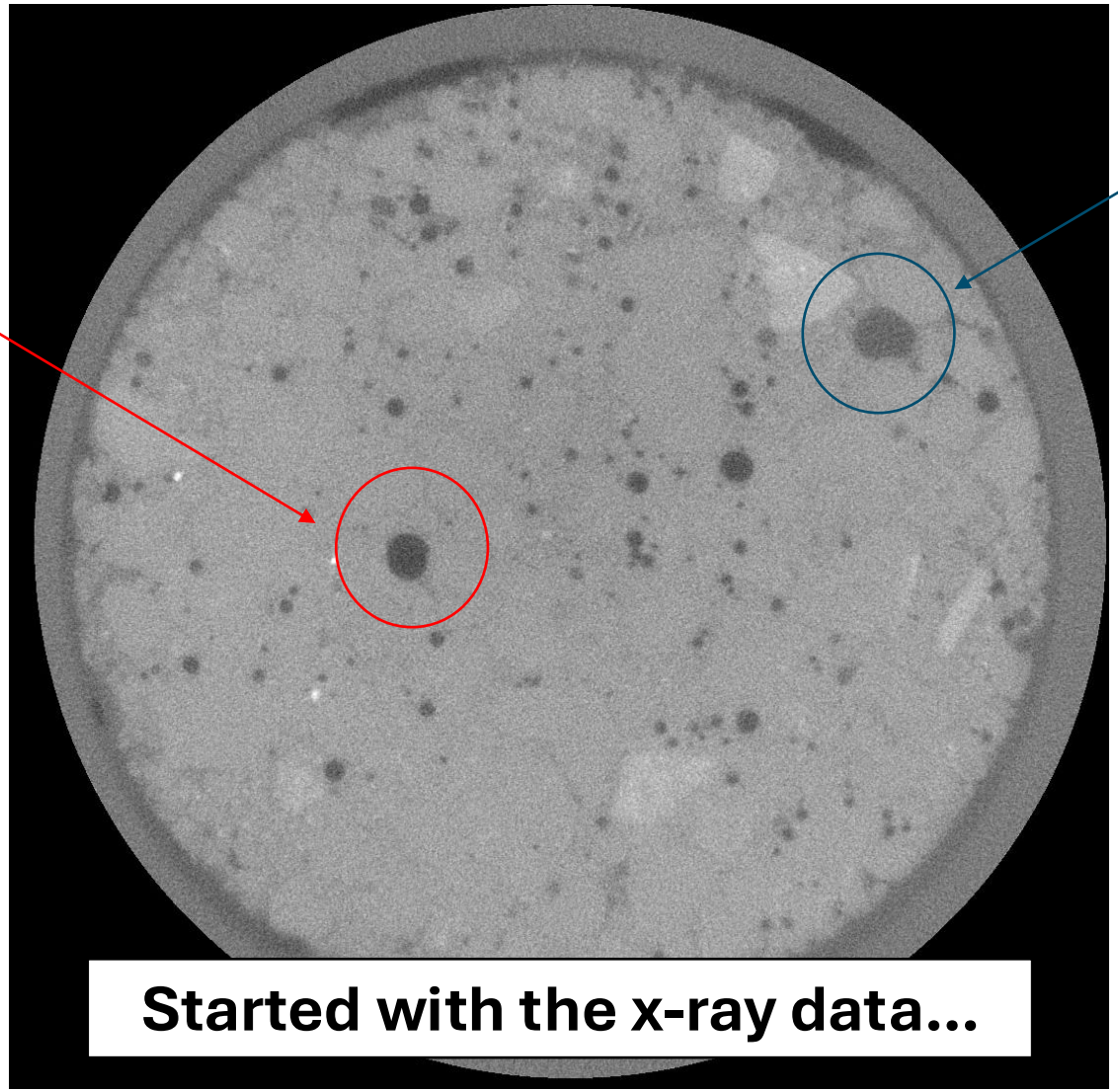


Reference dataset

Inner

Outer

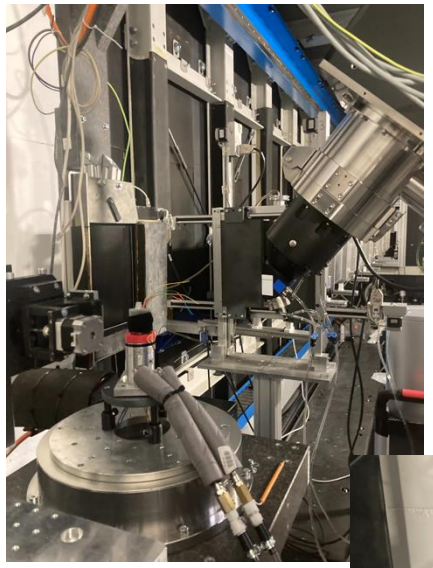


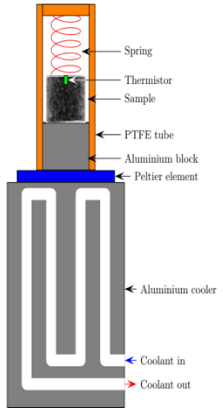
**Started with the x-ray data...**

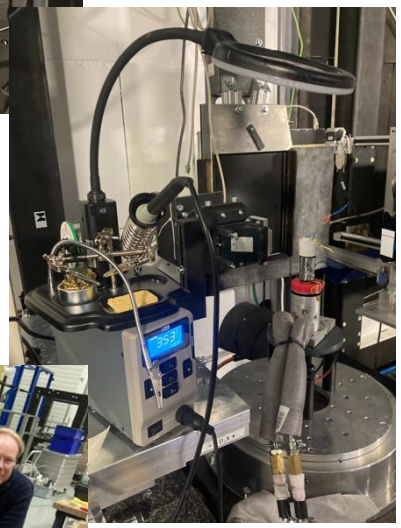
# First science strategy

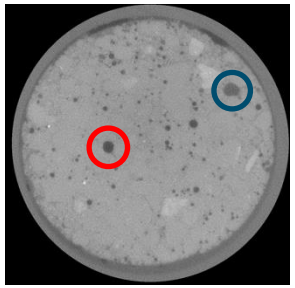
MSc Thesis project of Tanja Peric

## In-house projects: Freezing cement mortar

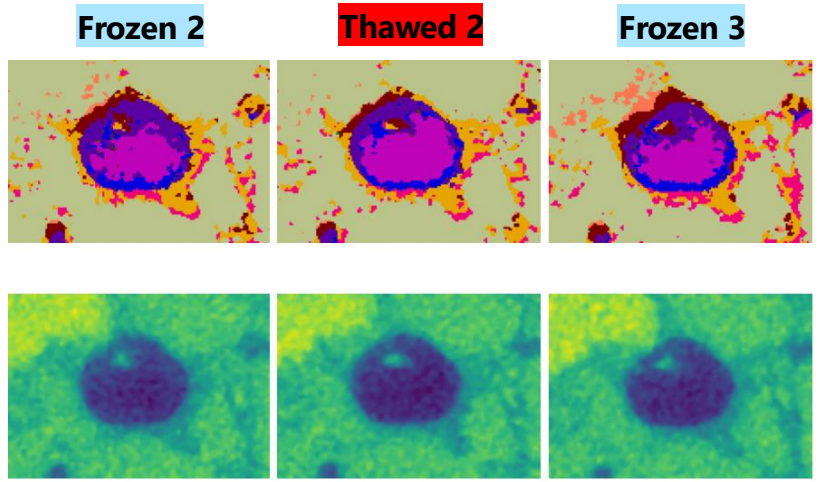




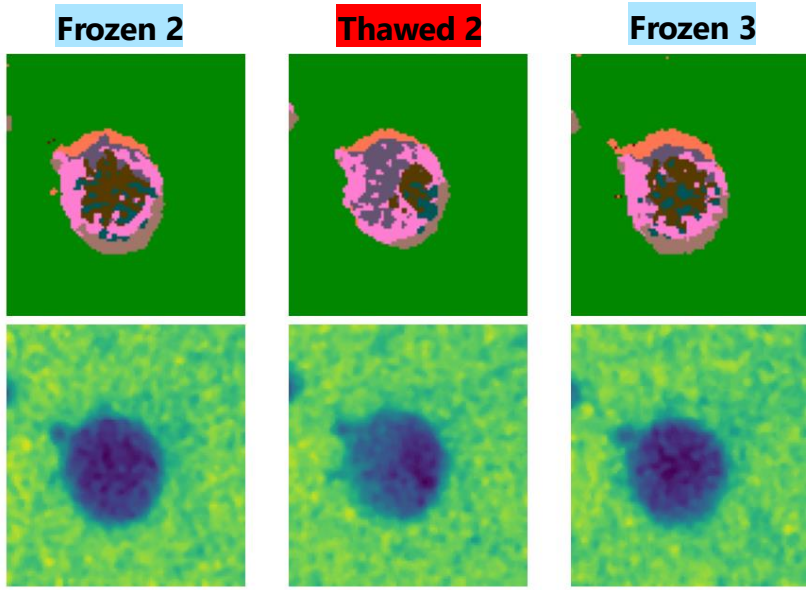





Outer pore




Inner pore



# First science strategy

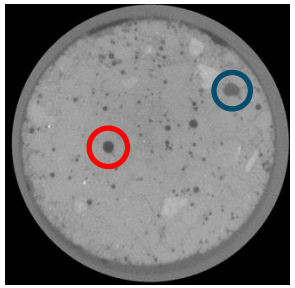
MSc Thesis project of Tanja Peric

## In-house projects: Freezing cement mortar

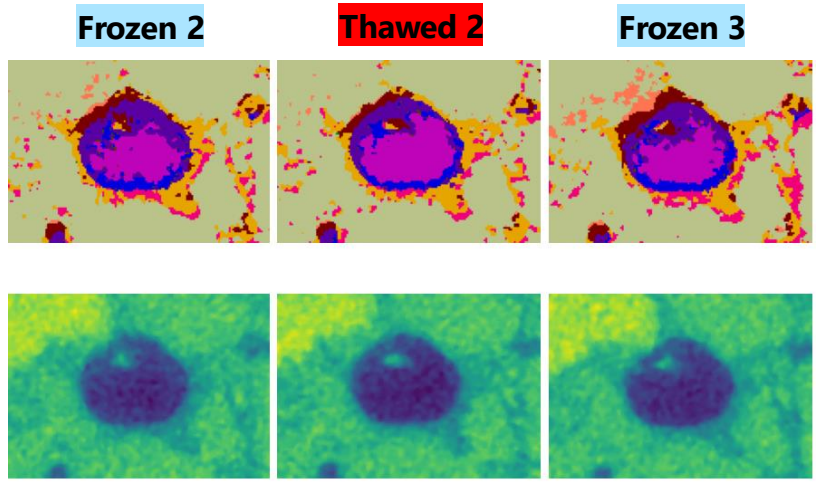
COMING SOON

**Back to the noisy neutron data…**

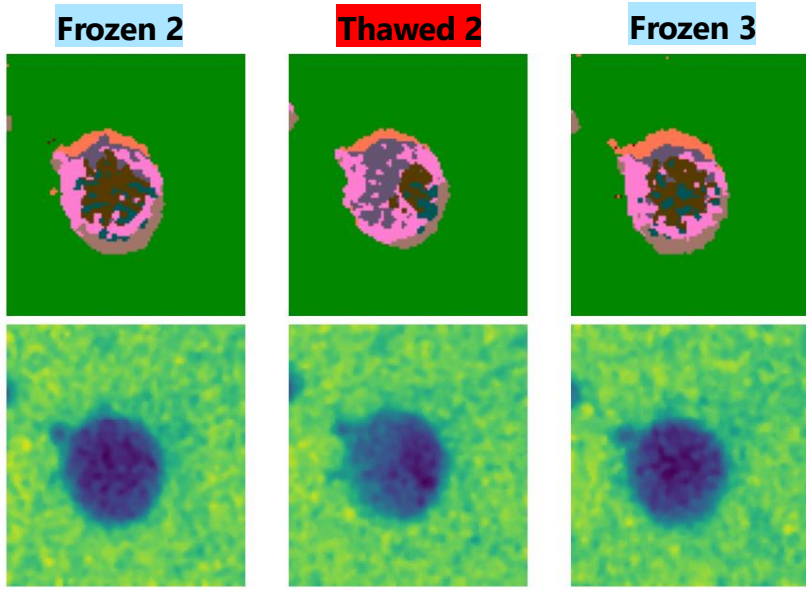
CIL workshop @ ESS
April 2026

Outer pore




Inner pore



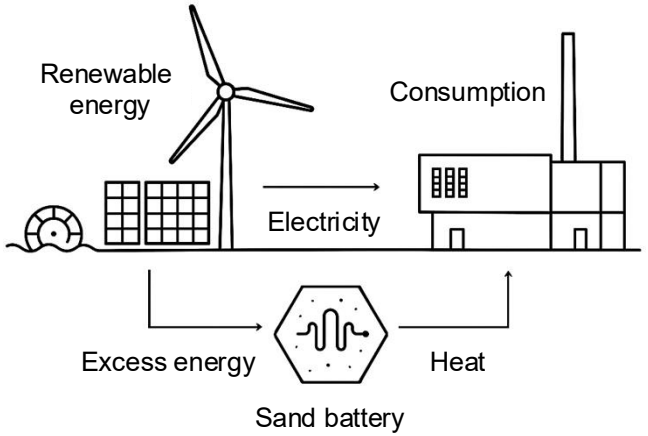

CIL CORE IMAGING LIBRARY

CCPi TOMOGRAPHIC IMAGING

# First science strategy

Post-MSc project of Joel Henriksson

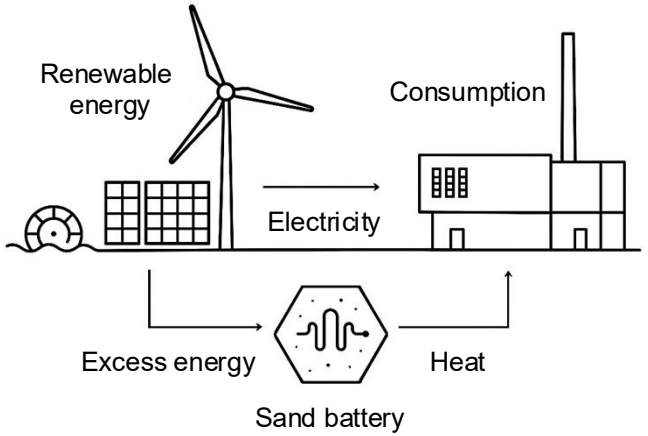
## In-house projects: Thermography / Sand heating

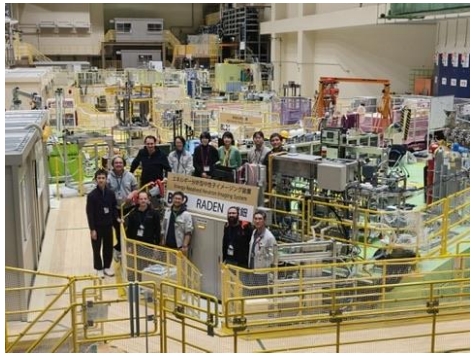


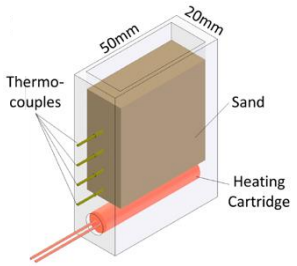
# First science strategy

Post-MSc project of Joel Henriksson

## In-house projects: Thermography / Sand heating



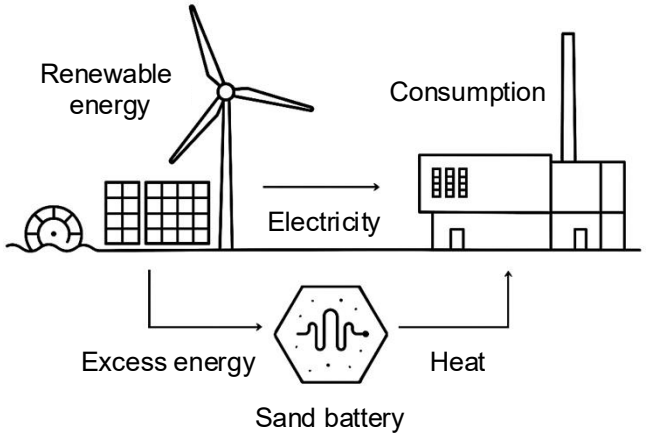



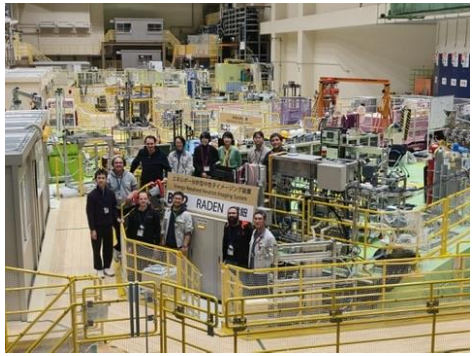


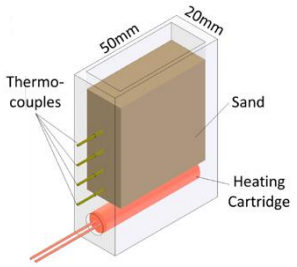
# First science strategy

Post-MSc project of Joel Henriksson

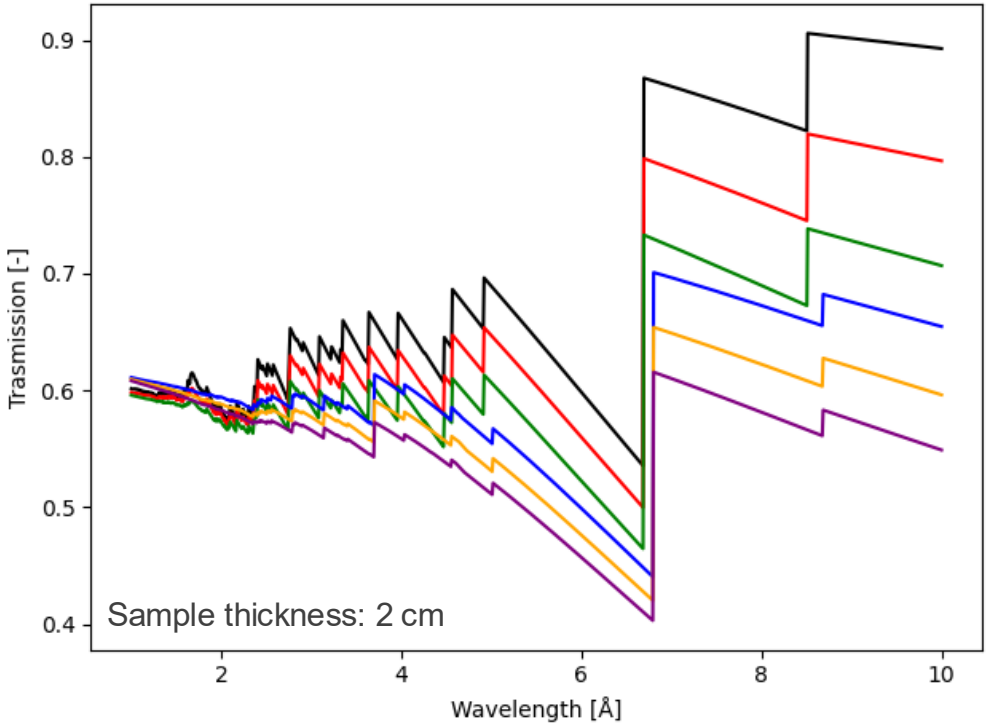
## In-house projects: Thermography / Sand heating

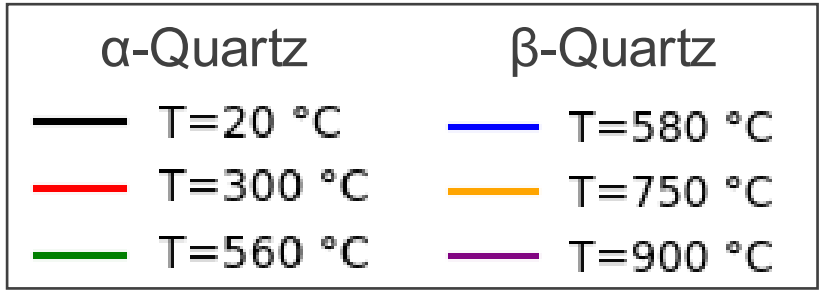





NCrystal simulations

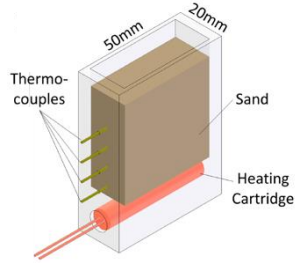


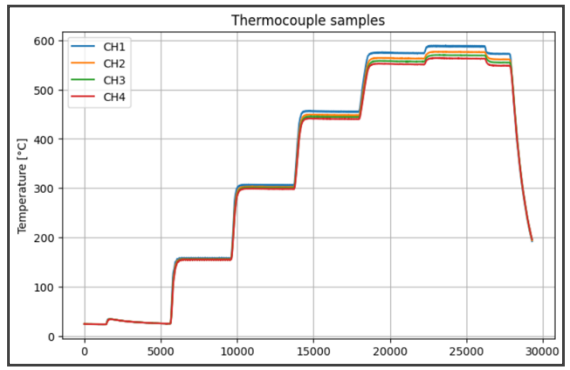



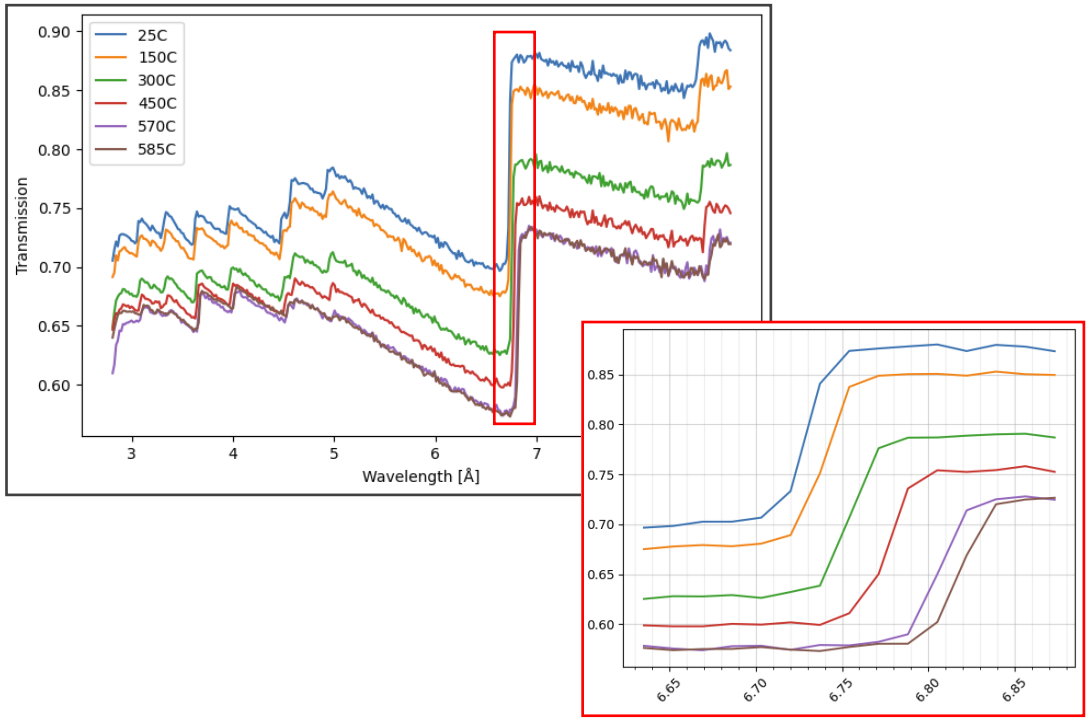
# First science strategy

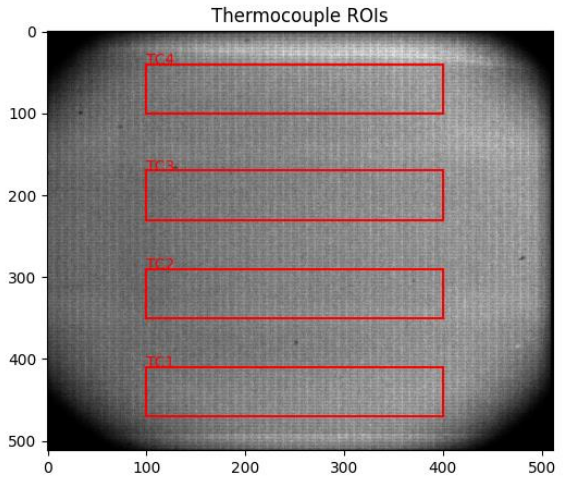
Post-MSc project of Joel Henriksson

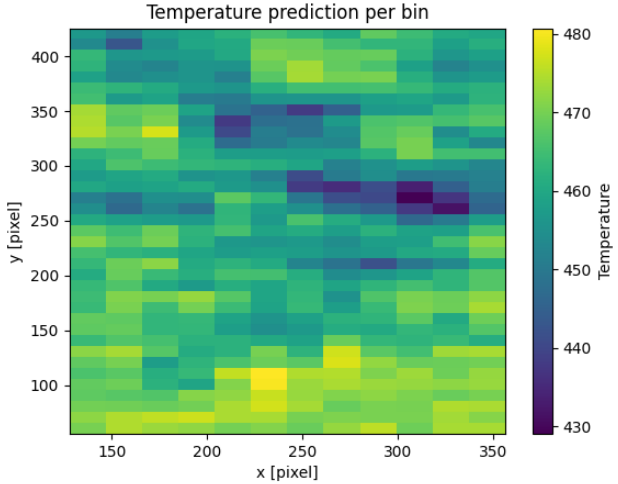
## In-house projects: Thermography / Sand heating

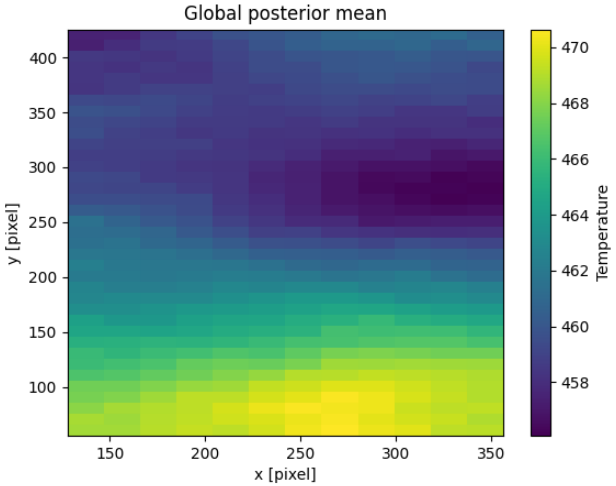


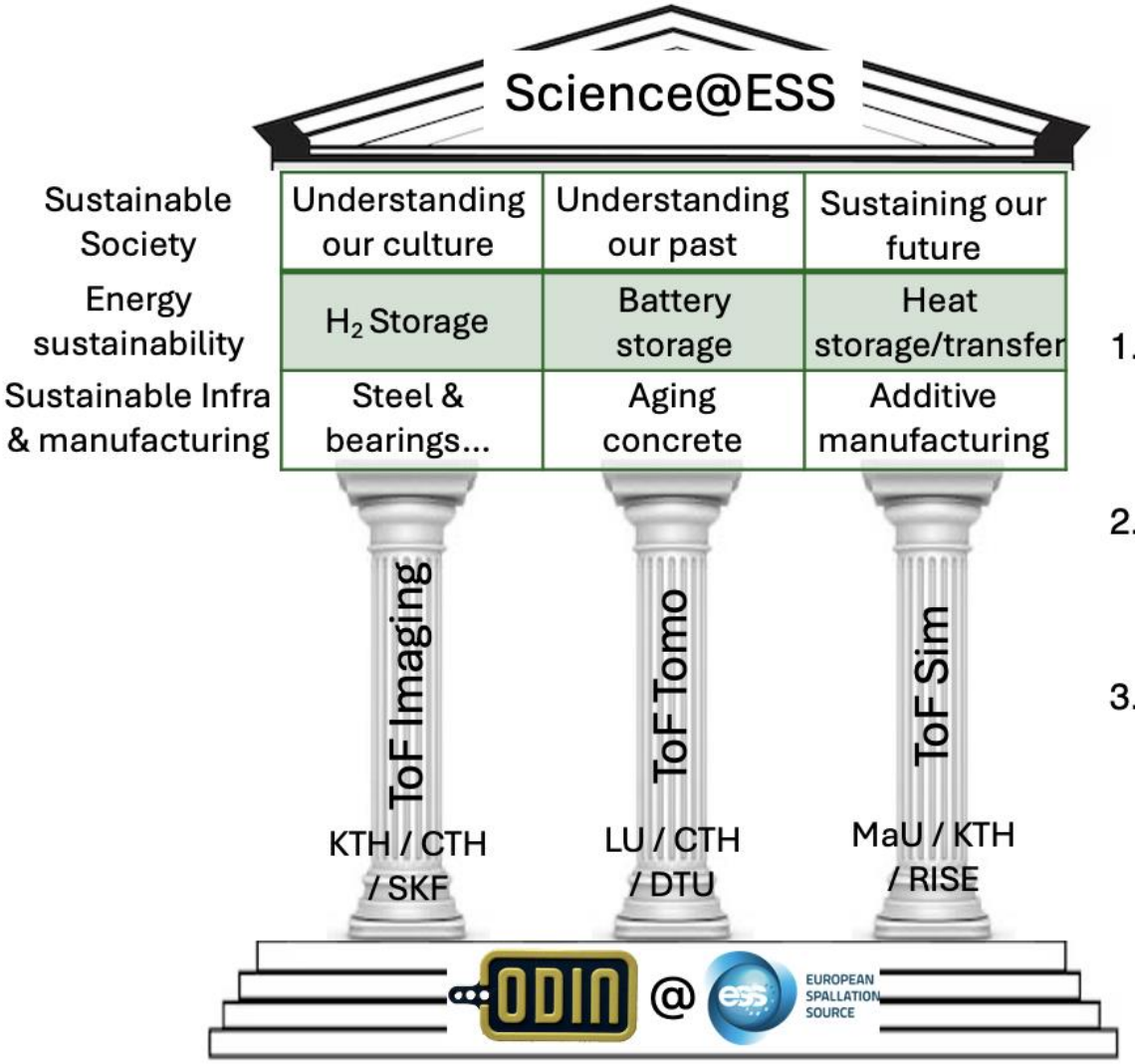



# First science strategy

## HyperspIN – Swedish initiative for first science at ODIN

GRANTED




1. ToF-Imaging: Crystalline Insights with hyperspectral Imaging
   - Lead: Dahlberg, KTH
   - Associated: CTH?, UU?, SKF?
2. ToF-Tomo: Decoding Materials and processes in 3D with ToF Tomography
   - Lead: Hall, LU
   - Associated: Dijkstraa (CTH), Jørgensen (DTU)
3. ToF-Sim: Pioneering ToF Imaging for new challenges and materials
   - Lead: Hektor, MaU
   - Associated: Söderberg (KTH), RISE

# AGENDA

- ❑ Updates since last STAP
- ❑ TG5 experience
- ❑ Previous STAP report – Comment on suggested actions
- ❑ Update x-ray setup
- ❑ First Science Strategy
- ❑ Summary

# Summary

**Lessons from integrated tests**

- Stress-test full system
- Stress test detector data (mimic LumaCam data stream -> via nexus stream using data from JPARC/ISIS)
- Align chopper conventions
- Improve coordinate system for instrument control

**User workflows & dry-runs (STAP recommendations)**

- Sample handling, logistics, activation
- Realistic dry-runs incl. user equipment

**Software & data readiness (STAP recommendations)**

- Validate full workflow with real data
- Improve coordination with DMSC (clearer deliverables, closer integration
- Converter sripcts from ‘standalone’ data to ESS nexus type data (so DMSC tools can also be used)

**Improve decision-making & reduce overhead**

- Strengthen trust in instrument expertise for faster decisions
- Minor fixes and operational improvements have become easier already, build upon that…
- Reduce administrative burden from unclear documentation requests

**First science prep**

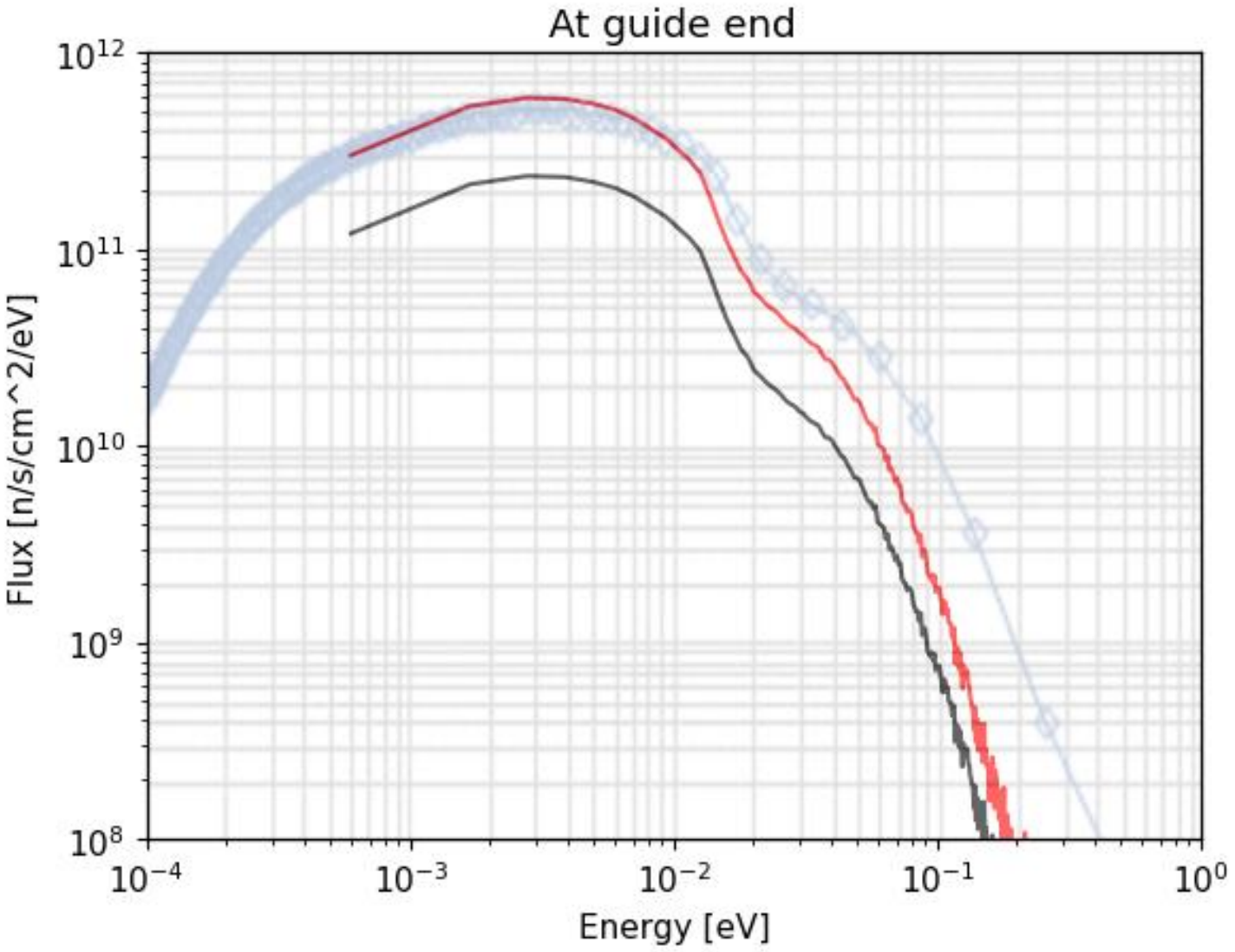
- Include calibration experiments and standard samples
- Ensure sufficient resources (HW+MP) for full TOF imaging data analysis by the instrument team


THANK YOU!
ODIN

# ODIN

## New McStas results

Mads Bertelsen
Søren Schmidt




**Results for white beam, no choppers**

**End of guide** (4.27 cm x 2.24 cm^2):

- Total intensity 2.98E10 n/s
- Average flux **3.31E9 n/s/cm^2**
- See figure with comparison to earlier results, black curve is 2 MW (red is 5 MW for comparison)

Yes, it matches closely (at relevant energies accessible with McStas)

# ODIN

## New MCNP results

Mads Bertelsen
Søren Schmidt

**Summary:**

- NBOA geometry updated using CAD drawings
- Distance from ISCS coordinate center to NBOA match almost perfectly, at most a 0.18 mm offset horizontally
- Supermirror reflectivity model in entire guide updated from using McStas default (which are quite pessimistic) to something that looks a lot more like what Swiss Neutronic advertises on their webpage

**Known issues**

- Model does not support gravity
- Custom component for bi spectral extraction does not support different m values for the different sides, so the first 30 cm h ave m=4 on top and bottom simulated, while only m=2 is installed

**Results for white beam, no choppers, 2 MW**

- **End of guide** (4.27 cm x 2.24 cm^2):
  - Total intensity 2.98E10 n/s
  - Average flux **3.31E9 n/s/cm^2**
  - See figure with comparison to earlier results, black curve is 2 MW (red is 5 MW for comparison)

- **Pinhole** 3.0 x 3.0 cm^2
  - Total intensity 2.40E10 n/s
  - Average flux 2.67E9 n/s/cm^2

- **Sample** (center, **L/D 350** with the 3.0x3.0 cm pinhole and 10.5 m distance)
  - Peak flux in center 1x1 cm^2: **2.92E7 n/s/cm^2** (L/D 300 approx.: 4E7 n/s/cm^2)
  - Average flux over 30x30 cm^2: 1.49E7 n/s/cm^2
  - Instrument suite paper claims 1.2E9 n/s/cm^2 at L/D 300 and 2 MW (unknown if peak or detector average)

# ODIN

## New McStas results

New MCNP simulations for ODIN from our spallation physics group for Activation Analysis:

Let's quickly compare.

McStas at 2WM:
McStas: 2.92E7 n/s/cm^2 n/s/cm^2 (L/D 350)

MCNP at 5MW:
Pos 1: 64m (L/D =233):4.0E+08 n/s/cm2
Pos 2: 64m (L/D =466): 1.4E+08 n/s/cm2

If we scale McStas to 5WM and L/D=233, we get 2.64E+08 n/s/cm2 . That's pretty close!?