# Scientific Support Division Update

HANNA WACKLIN-KNECHT

2024-10-22

Aug 2024- Head of Scientific Support
2023-2024 Senior Scientist, I2S (CLS)
2018-2022 Life Scientist (DEMAX)
2011-2018 Instrument Scientist/ICC
Neutron Reflectometry (FREIA/GISANS)

DeuNet

EUROPEAN SPALLATION SOURCE

LUND UNIVERSITY

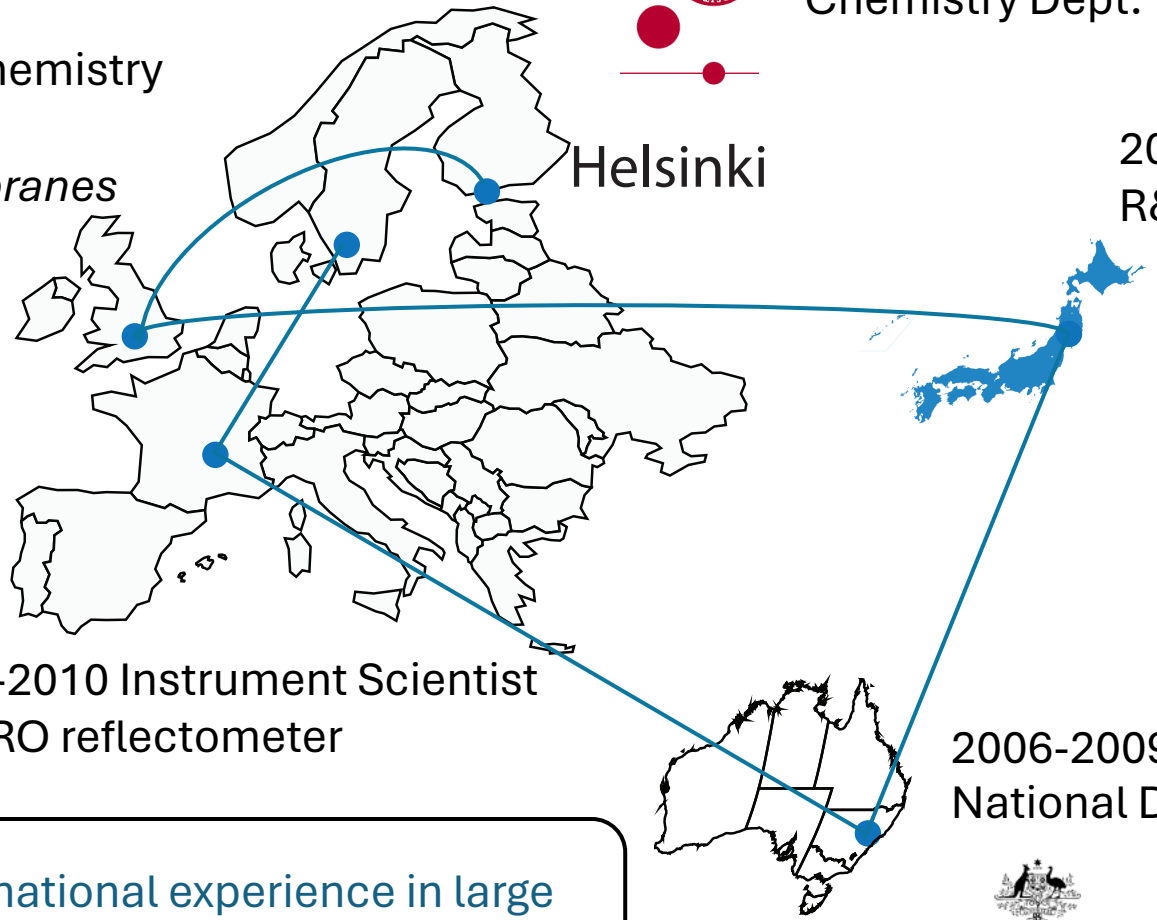
2015 - Adjunct Assoc. Professor
Physical Chemistry (docent)

2011-2016 Adjunct Assoc. Professor
Chemistry Dept. CPH

2000-2004 DPhil Physical Chemistry
2003-2005 BBSRC Postdoc
*Neutron reflection/biomembranes*

1995-1999 MSci Chemistry

Imperial College London




2005-2006 UK-Toshiba Fellow
R&D Centre Kawasaki

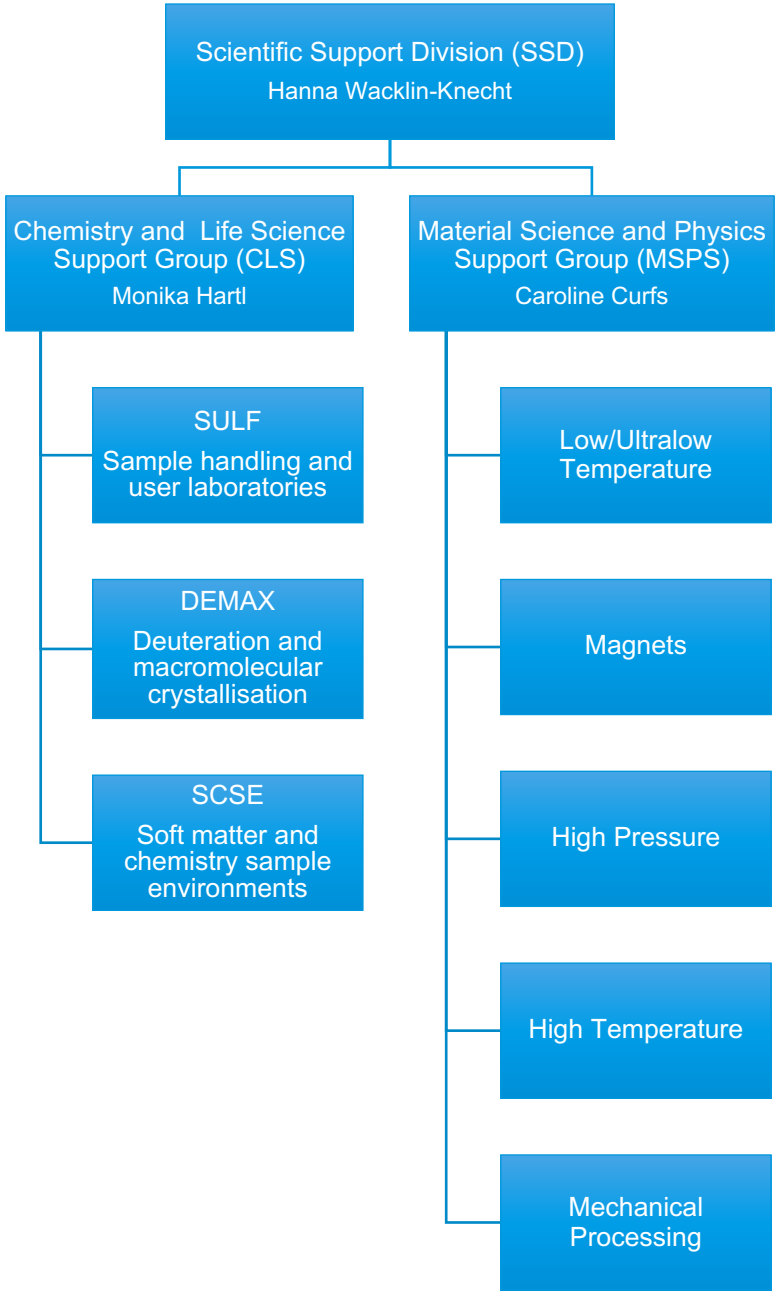

NEUTRONS FOR SCIENCE

2009-2010 Instrument Scientist
FIGARO reflectometer

2006-2009 Postdoc
National Deuteration Facility

Australian Government | ANSTO

25 years of international experience in large scale infrastructures, academia and industry

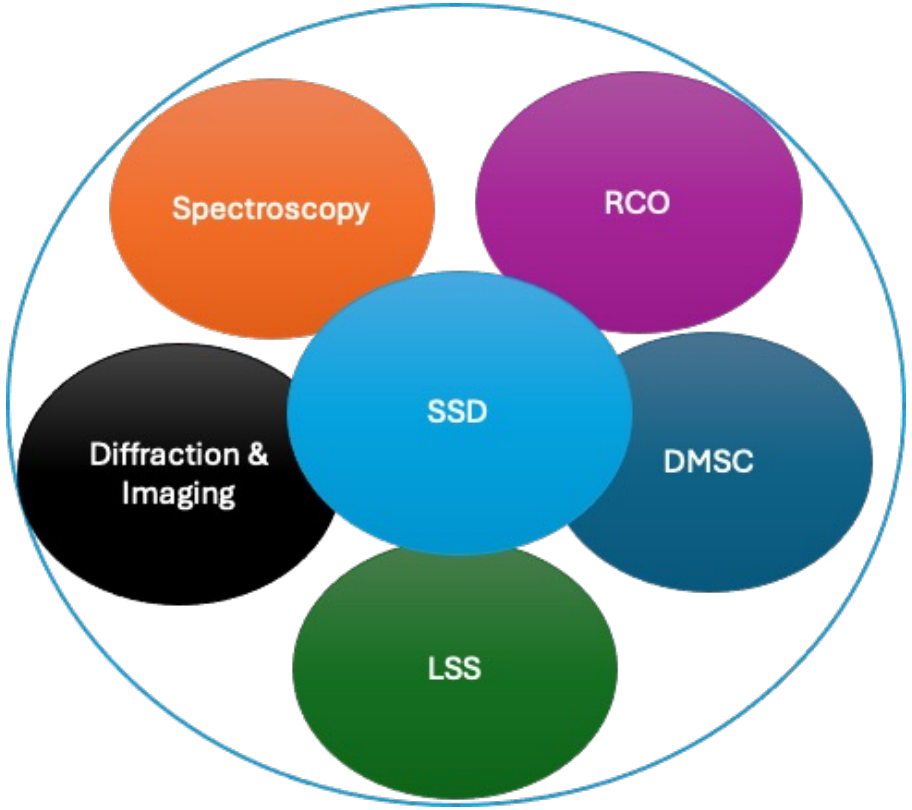

Scientific Support Division (SSD)
Hanna Wacklin-Knecht
Chemistry and Life Science Support Group (CLS)
Monika Hartl
Material Science and Physics Support Group (MSPS)
Caroline Curfs
SULF
Sample handling and user laboratories
DEMAX
Deuteration and macromolecular crystallisation
SCSE
Soft matter and chemistry sample environments
Low/Ultralow Temperature
Magnets
High Pressure
High Temperature
Mechanical Processing

# Scientific Support Division (SSD)

Provides sample environment and laboratory services required **for user science on ESS instruments**

Supports science directorate scientifically and technically in **delivering the user programme**

**Provides a platform** for carrying out in-house science, method development and project support




The instruments are the scientific gateway of ESS

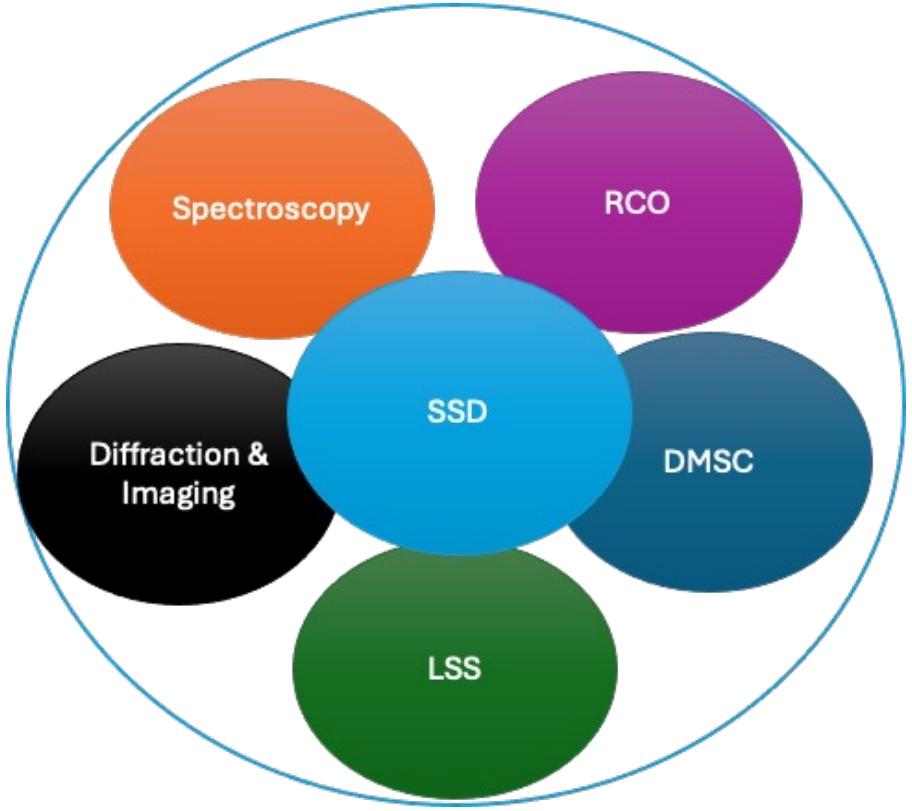
# Scientific Support Division (SSD)

The services provided are **stakeholder-driven**

**The model for scientific support is collaborative** and utilizes all expertise at ESS

**Outside the user program, access is provided** to facilities for in-house R&D driven by instrument staff

**Other support activities should be driven by project priorities** and typically resourced by the stakeholder




The instruments and their users are the primary stakeholders of SSD

# Support for instruments and users:

## Sample environment:

- Development and design of SE
- Support and maintenance of SE
- Installation and operation support for all SE
- Provision of spares
- Mechanical/control integration & electronics for all SE
- Provision of a mechanical workshop
- Liquid helium management
- Operation of mechanical processing workshop

Responsibility for all SE being available, maintained, correctly installed and functional

## User Laboratories:

- Sample preparation and characterization facilities for users
- User training and access
- Maintenance of laboratories and equipment
- Prpvision of consumables
- Sample handling and storage
- Chemical waste management
- Support for instruments
- Scientific user support by local contacts
- Instrument scientists can be responsible for some equipment

Responsible for laboratory safety, training, maintenance and sample/waste handling

## Deuteration:

- Provision of deuterated samples for user program
- Chemical synthesis on-site (D04)
- Biological deuteration at Lund University (LP3)
- Macromolecular crystallisation for NMX
- Analysis certificate and DOI for all samples provided

Responsible for operating deuteration user service

# Service model:

## Sample environment:

- Has overall responsibility for SE but works in close collaboration with instrument staff to:
- Develop and design SE according to needs of instrument
- Carry out installation and testing (incl. user supplied SE)
- Train instrument staff on installation and operation
- Support each experiment with dedicated SE contact

## User Laboratories:

- Has overall responsibility but collaborates with instruments on:
- Optimization of laboratories to the instruments/users needs
- Prioritization of equipment
- Providing user training and technical support
- Provision of scientific support in laboratories
- Responsibility for advanced instrumentation
- Maintaining instrument sample preparation areas

## Deuteration:

- Provision of deuterated samples and crystals
- Non-commercially available materials for neutron scattering
- Access via user proposals for beamtime
- Primarily full-service mode
- Hosting experienced users possible depending on expertise
- Longer term collaborations for method development desirable

Adjusted and optimized support according to type of SE and instrument expertise

Technical support and maintenance to enable scientific support by scientists

Deuteration aimed at enhancing experimental capabilities on instruments

# The way to First Science and user operations

## Strategy for supporting science on ESS instruments

3. Develop a long term strategy for scientific support for SSO

2. Utilise all expertise and resources in CLS, MPS, instruments and external projects

1. Review & prioritise scope for first science

**2025->**

First science

24/7 essentials for common types of experiments

**2027->**

First user proposal call

Support first instruments:

- more specialised SE and lab equipment
- automation if critical to early exp

**2028 ->**

Towards steady state ops

- Advanced SE + characterisation and sample prep facilities
- in-situ techniques
- automation

**Support for:**
World leading science
Partnerships
Science Village
Industry

# Ensuring readiness of for first science:

## Establish a clear path to completing project and build a service-oriented team

**Establish a clear path for completing SE and laboratories:**

- Perform a capability gap analysis (equipment, services, modes of operation) by reviewing current status and plans
- Work with instrument divisions, STAPs and first science workshops to *define an up-to-date, stakeholder driven scope and model for service provision*
- Develop a clear set of goals to meet for first science, start of user operations and steady state respectively
- Develop a clear process for reaching the identified goals

**Build a strong service-oriented division:**

- Streamline common in-house support tasks to optimize the quality of support provided
- Develop a shared user service model with the instruments and inclusive working culture
- Work on the interfaces to the rest of ESS to obtain optimal support for the division
- Develop an optimal division structure with clear roles/responsibilities
- Establish/implement a clear plan for competence development

**Three main activities Q4/24 – Q2/25:**

1. **"Road to operations" workshops** at montly SSD meetings to discuss use case scenarios and roles/responsibilities and communication/interfaces during operations.
2. **Internal review of sampe environment and lab equipment needs** for first science an beyond
3. **Preparation of a user community and facility usage survey** to aid prioritisation of scientific support capabilities at ESS

# Contributing to the overall scientific strategy of ESS

## Strengthening collaboration with instrument divisions and DMSC

Actively working together on scientific requirements, priorities and use cases

**Examples:**

- Discussing/developing different roles contributing to scientific support *(e.g. IOE/SE)*
- Solving common needs/problems (out-of hours user support)
- Facilitating joint development of labs/SE
- Creating a strategy together for the overall scientific support for users
- Involving eachother in collaborations/ projects/grants whenever possible
- Involving IS/IDS in SSD as technique specialists

# Support the instruments to collaborate with other laboratories, networks and and funding programs to enhance the scientific scope and user support at ESS

Participate in facility collaborations and networks

Engage with local partners

Learn from other partnerships

Identify& engage in relevant consortia

Network with university centres and programs

Collaborate with instrument staff to:

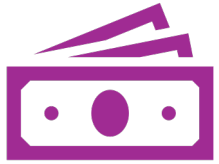
- Work with RCO on funders and funding opportunities and could contribute to neutron science at ESS
- Work with RCO on an ESS model for COFUNDs and PhD schools
- Work with key partners on relevant grant initiatives
- Idendify and seek relevant in-kind and funding opportunities for SSD together with instruments and DMSC

# Challenges

Building a strong user support team together with instruments

Shifting focus to first science and user program while completing project

Recruiting and training staff to build competence and experience for operations

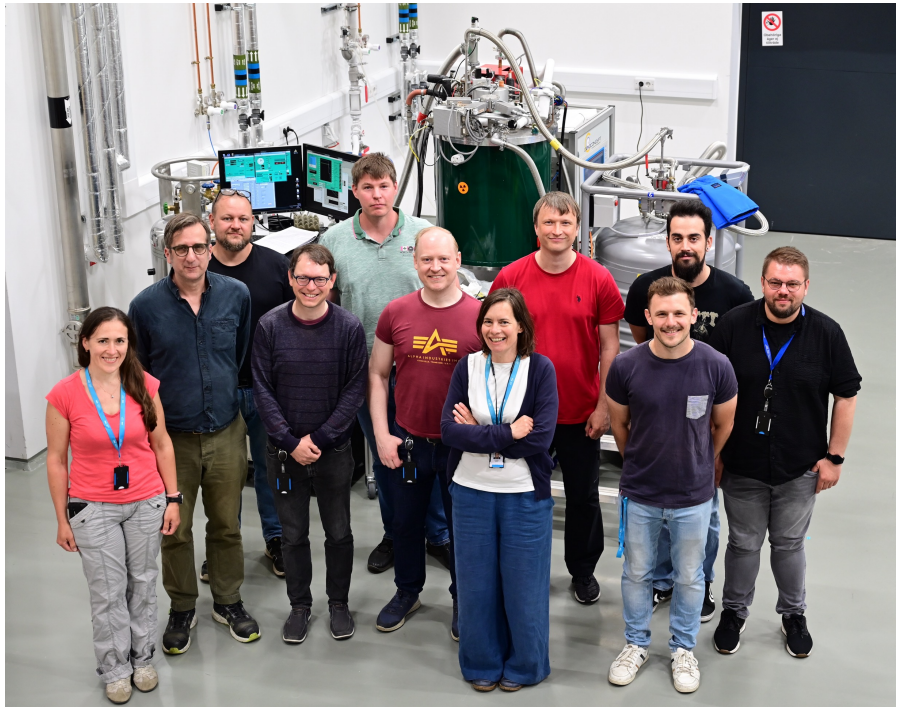


Funding  and prioritisation SE and lab equipment

# Material Science and Physics Support

## Systems to be delivered before end of 2027

| | |
|---|---|
| Low Temperature | 6 cryofurnaces<br>10 cryostats (7 wet/3 dry)<br>3 dilution fridges and 1 $^{3}$He insert |
| Magnets | 8 magnets from 2.5 T to 15 T |
| High Pressure | 10 HP cells (5 gas, 4 liquid and 1 clamp)<br>5 compressors (4 automatic and 1 manual)<br>5 Paris Edinburgh presses with gas loader |
| High Temperature | 3 ILL-type furnaces (2 Niobium/1 Vanadium),<br>1 induction, 1 lamp, and 1 hot air blower |
| Mechanical Processing | 2 stress rigs (uniaxial and torsion/rotation)<br>1 thermo-mechanical instrument (dilatometer) |



Caroline Curfs, Niklas Ekström, Andreas Hagelberg, Alex Holmes, Damian Paliwoda, Yulia Pedersen, Luca Sagliano, Lauritz Saxtrup and Oleksiy Zadorozhko; Richard Ammer (-> ODIN IOE)

# MSPS cont.

## Priorities for HC and CC

| Instrument | | Cold Commissioning | | Hot Commissioning | |
|---|---|---|---|---|---|
| | | SES | Timeline | SES | Timeline |
| TRANCHE 1 | **DREAM** | Hot Air Blower/Cryostream | 10.24 – 03.25 | ILL-Type furnace | 07.25-03.26 |
| | **BIFROST** | 15T magnet / Wet cryostat | 11.24-04.25 | | |
| | **ODIN** | | | Tortion/rotation rig | 07.25-03.26 |
| TRANCHE 2 | **ESTIA** | 2.5 T WBM/Flow cryostat | 07.25-12.25 | | |
| | **SKADI** | | | Electromagnet | 10.26-06.27 |
| | **BEER** | 60kN stress rig | 07.26-12.26 | Dilatometer | 01.27-09.27 |
| | **MAGIC** | 8T magnet / Wet cryostat | 04.26-09.26 | | |
| TRANCHE 3 | **HEIMDAL** | ILL-Type furnace/Dry cryostat | 10.26-03.27 | | |
| | **T-REX** | Wet cryostat | 07.26-12.26 | He3 insert | 01.27-09.27 |
| | **MIRACLES** | Dry cryofurnace | 07.26-12.26 | Wet cryostat | 01.27-09.27 |
| | **CSPEC** | Rotation stick | 10.26-03.27 | Spectro magnet | 04.27-12.27 |
| | **VESPA** | Dry cryostat | 04.27-09.27 | | |

# Progress

## Magnets in scope

**15T for BIFROST** (2nd hand from HZB)
- Done: Tested, basic control integration (Octopy)
- Next step: Mechanical integration

**6.5T for ESTIA** (2nd hand from HZB)
- Tested up to 6.5 T with new electronic racks
- Next step: Control (via Octopy) and mechanical integration

**15T for POOL** (2nd hand from HZB)
- Leak tested at room temperature
- Next step: test at field and integration

**2.1T WBM for ESTIA**
- HTS 110 compatible with flow cryostat and polarisation
- SAT done
- Design for mechanical integration done
- Next step: Control integration and mechanical integration

15T magnet for BIFROST

2.1T WBM for ESTIA

**8T for Diffraction for MAGIC**
- Large aperture magnet
- Production to start Jan 25
- Planned to arrive at ESS Q4/25-Q1/26

**Magnet for Spectroscopy**
- Design study done for a 14T
- Next step: Call for tender – *would like to understand better user base for 14T ?*

**1T Electromagnet**
- For SANS, DREAM and ESTIA
- Simulation for polarisation done
- Requirements set
- Procurement on going

**17T magnet (Lund University)**
- Control integration done (Octopy)

**From instrument's wish list:**

\+ **10T horizontal SANS magnet**

5T magnet for SANS and second 2.1 T WBM replaced by a 10T horizontal split pair magnet for SANS as the next one.

# Progress

## Low Temperatures

**Pools cryostats and cryofurnaces**

- 3 wet cryostats, 3 dry cryostats, 3 wet cryofurnaces and 1 dry cryofurnace for MAGIC, BIFROST, LOKI, SKADI, DREAM, HEIMDAL, T-REX and MIRACLES
- **Tender awarded to AS scientific**
- Detailed specifications for each system on-going

**Cryofurnace for Electro-chemistry (DREAM)**

- Dry cryofurnace dedicated to electrochemistry and diffraction
- Large sample space (100 mm)
- In Production, delivery planned Q4/24

**Cryostat for MAGIC (**2nd hand from FRMII)

- Leak test done

Pumping cart

**Automatic pumping cart**

- includes pumps, temperature control and He and N2 level meters
- 6 in production

Wet cryostat for MAGIC

**Dilution fridge** (2nd hand from HZB)

- Refurbished and successfully tested down to 27 mK
- Next step : control integration

**Others:**

- 1 for 8T magnet (previous IK) + 1 for Pool
- Tender and specifications on going

HZB dilution fridge



a pool wet cryostat

# Progress

## High-Pressure (all instruments)

**Gas, Liquid and clamp cells**

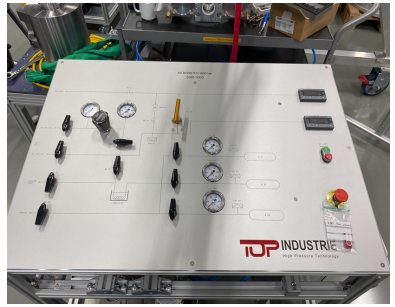
- Received at ESS and some tested without beam
- Training to manufacture more done

**10kBar compressor for gas cells**

- Received at ESS
- SAT done

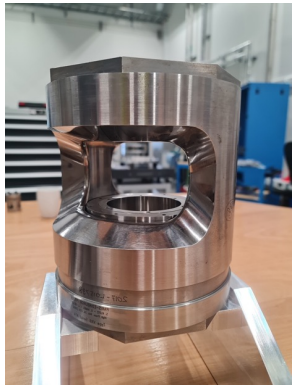
**Other compressors**

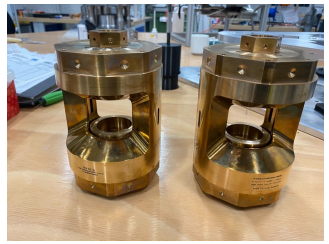
- Vinci pump and PACE 5000 control integrated




**PE presses and gas loader**

- 3 PE presses at ESS
- Gas loader: SAT done





**Diamond anvil cell (DAC)**

- available for the Lab single X-tal XRD

**Cryostat for High-Pressure (IK)**

- Custom-made wet cryostat built by ILL
- Construction finished
- FAT planned 11.24
- Planned to be ready in 2025

# Progress

## High Temperature and Mechanical processing

**ILL-Type furnaces (DREAM and HEIMDAL)**

2 Niobium 1650 C and 1800 C (2nd hand)

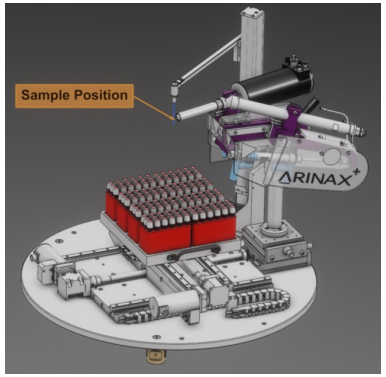
- Transfer from LLB still delayed
- Refurbishement needed

1 Vanadium 1100 C

- Specifications on going

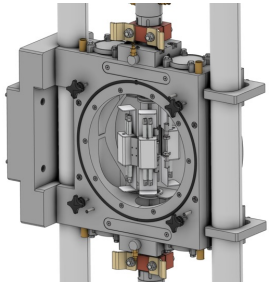
**Hot Air Blower/Cryostream (DREAM and HEIMDAL)**

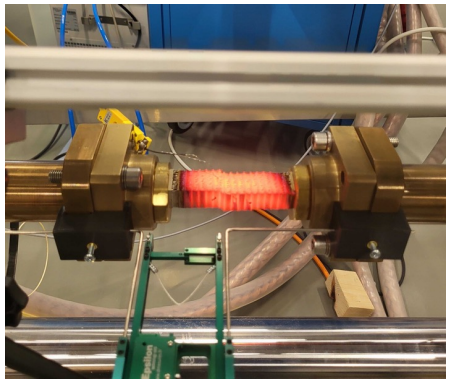
- From 100 K to 800 C
- Sample changer
- Design completed
- Mounting on going
- Control box on going
- Planned to be available Q4/24-Q1/25

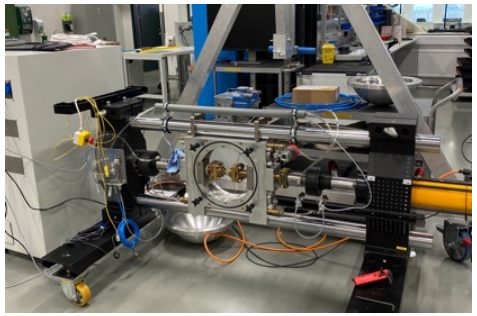



**UHT furnace (BEER)**

- Lamp furnace up to 1800 C
- Vacuum or inert atmosphere
- Adapted to the NPI
- Design on going with ISIS





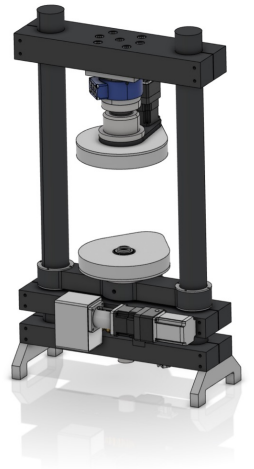


**NPI stress rig (BEER)**

- 60 kN unixial deformation rig: tension and compression
- Conductive heating (800 A / 15 V)
- At ESS
- Software update on going
- Collaboration with Alfa Laval for use case started

**Tortion/rotation rig (ODIN)**

- Design finished – PDR done
- Off-the-shelf pieces arrived at ESS
- Construction planned Q4/24-Q1/25



**Dilatometer (BEER)**

- Specifications on going

# Labs and workshops

## B02 and E03

B02:

- currently used by ECDC for testing of control integration)
- will be returned to MSPS before supervised zone is operational
- will be used to test, safety check and integrate SE arriving at ESS


E03: Main MSPS operational SE workshop

# Labs & workshops to install

## E03 SLIME lab

- Installation started
- Currently used by instruments to test e.g. shutters, BE filters
- Will be used from some SATs requiring space (e.g. 2.1T WBM)
- Will temporarily house high-pressure bunker
- Planned to support **BEER and ODIN** users for mechanical engineering
  - Deformation rigs
  - Furnaces
  - Equipment for sample preparation

Polarisation group has asked if MEOP station could be housed here – implications for other users under discussion

# Labs & workshops to install

## D08 (next to ODIN)

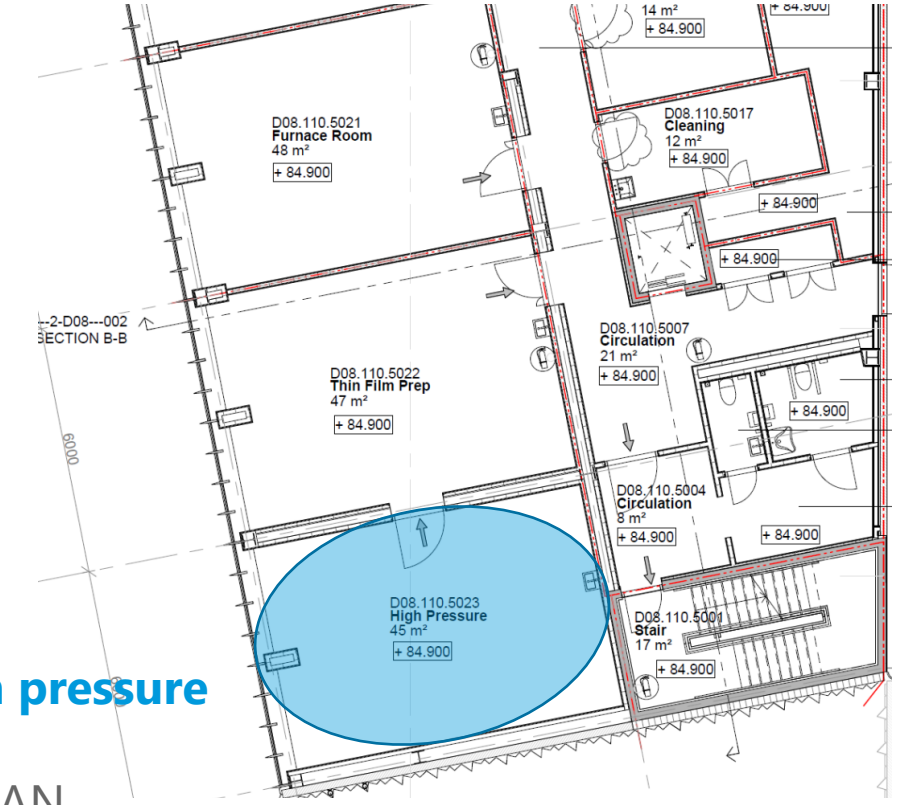
**Ready to move in by middle of 25**

**Sample environment**
Maintenance and storage of cryos, magnets, furnaces for ODIN, DREAM, ESTIA,…

**High Pressure**
PE presses, Liquid, gas and clamp cells
Compressors


**Ground floor**

**First floor**




**High pressure**
DAC
RAMAN

# Division Updates

## CLS – Main deliverables before end of 2027

**SULF**
Sample handling and user laboratory facilities

Finish installation of laboratories
Permit (INP) to operate RML
Provide consumables and equipment for First science
Finalise user training, sample handling, chemical safety

**DEMAX**
Deuteration and macromolecular crystallisation

Provide deuterated samples for First science experiments
Develop robust methodologies for user program

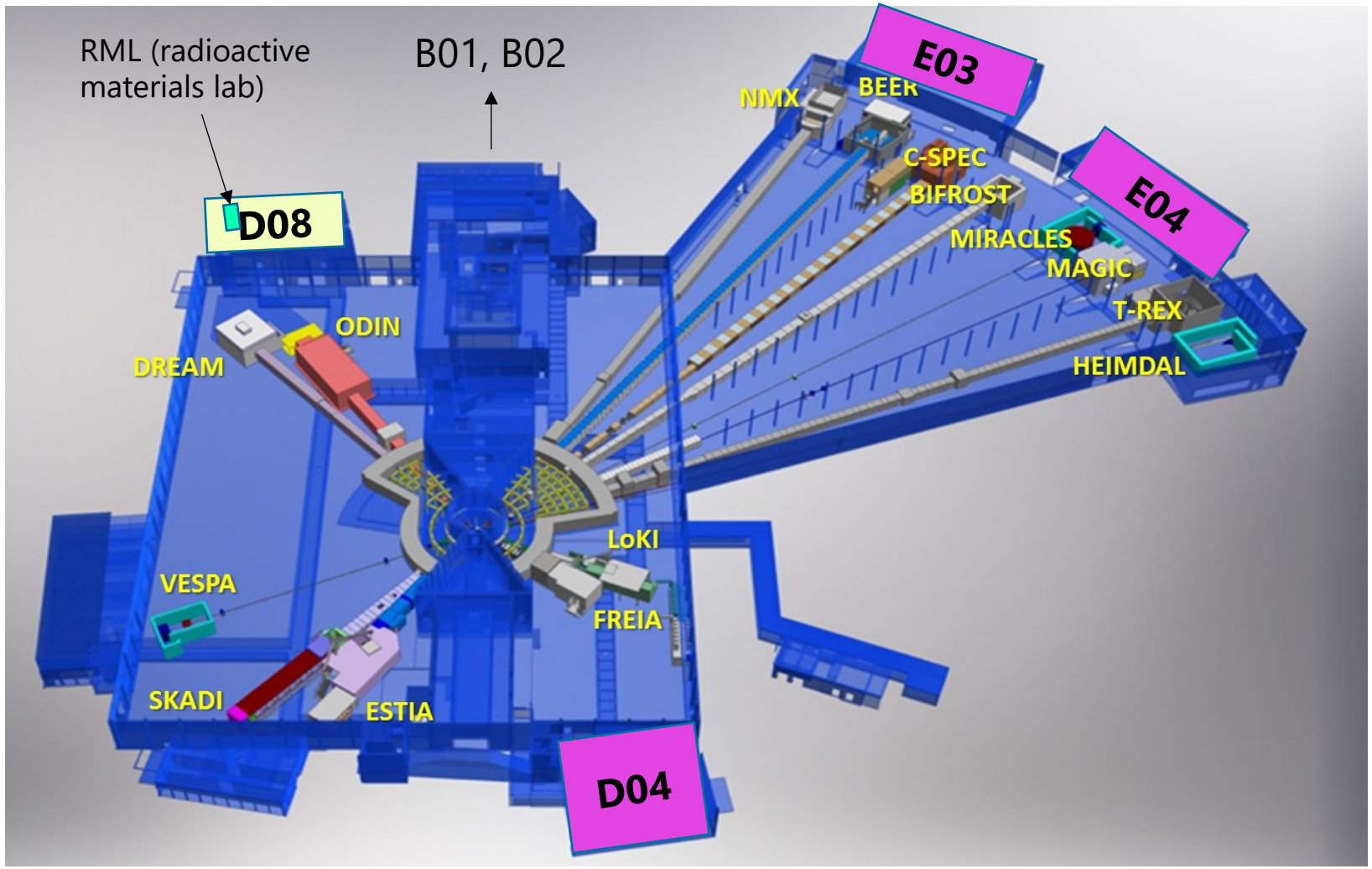
**SCSE**
Soft matter and chemistry sample environments

Provide/Support prioritized soft matter and chemistry SE for Loki, ODIN, ESTIA, SKADI, FREIA
Develop later SE with instruments

Zoe Fisher, Anna Leung, Jia-Fei Poon
Monika Hartl, Katrin Michel, Melissa Sharp, Ghazaleh Roostaei, Nick Weisend
Alice Corani, Harald Schneider

# Chemistry and Life Science Support

## Locations




Chemistry and Life Science Supports :

- 1120 m$^2$, 25 rooms
- 4 buildings

Offices in:
D08, E04

# Lab and workshop Installation 2024

## D08 laboratories/workshops and two small rooms at D04

D08 furniture and electrical installation complete

Tender being evaluated

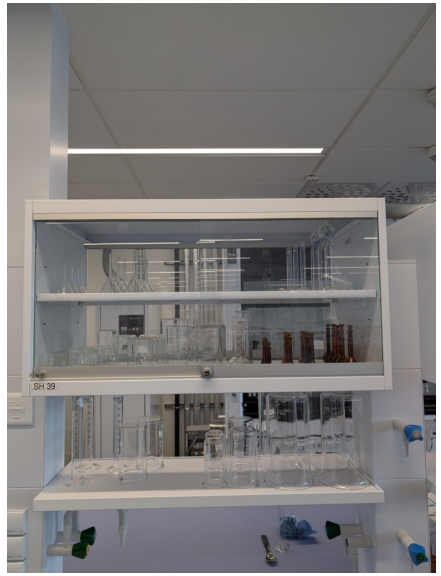
(a) utilities (water, DI water, cooling water, ventilation)

(b) gas/vacuum

Plan: start in Q1/25 and end Q2/25.

# D04 lab commissioning

## D04 soft matter lab is ready for general users



Added: small-scale equipment
- Tip sonicator
- Vacuum furnace
- UV/VIS
- Balances

Glassware/consumables in place
Procedures, safety, PPE in place

SCSE lab D04:

E04 chemistry laboratories:  operational since 2 years
- instrument teams invited to safety induction
- Support provided for project users with analysis and testing of  materials, unknown substances and other issues
- Support instrument teams for beamtime preparations at other facilities

# Radioactive Materials Lab (RML)

## Waiting on permission to use as controlled zone

- Radiation monitoring equipment: infrastructure installed, monitors will arrive soon -> Radiation Protection Group is responsible

The RML will be used to support the machine directorate in material analysis when starting up.

The RML will be for neutron users handling samples that have higher activation or when activated samples need to be modified in a system that cannot be contained.

<u>Current use:</u>

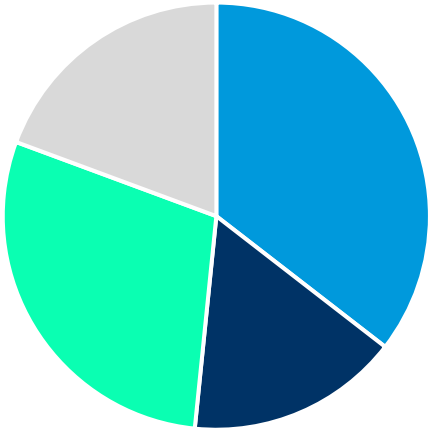
- RML will house GC system for Target Division to check He gas for target cooling (Helium circulator): installation November
- Tensile testing of Proton beam window successfully completed in spring (Accelerator Division, Engineering)
- Filling of catalyst into vessel for target cooling water completed in spring

# DEMAX

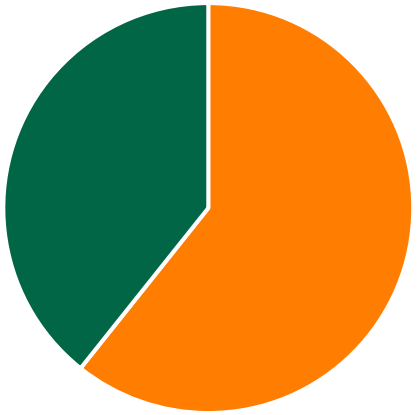
## Proposal statistics

- over 100 unique users since starting (2019)
- 40 papers in peer-reviewed journals published or has under review
- In last proposal call (2022) + Rolling Access ( -> Sep 2024) 36 proposals requesting 62 molecules/services

Intended neutron scattering technique




Type of deuteration required

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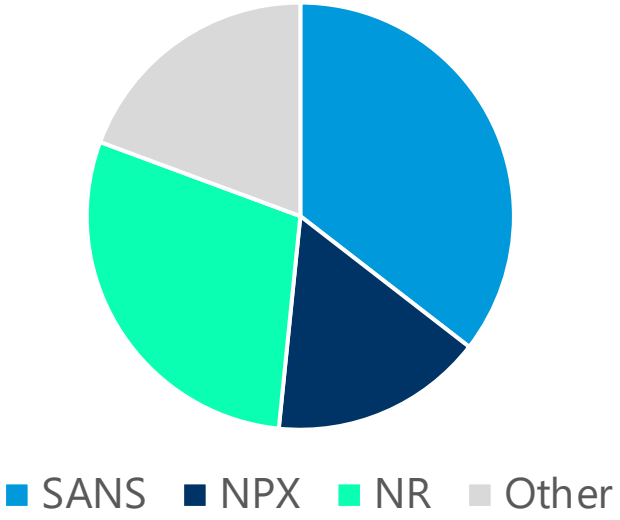


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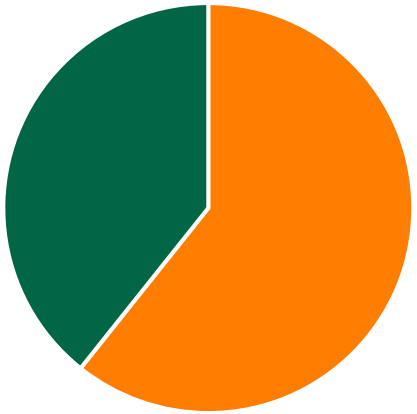


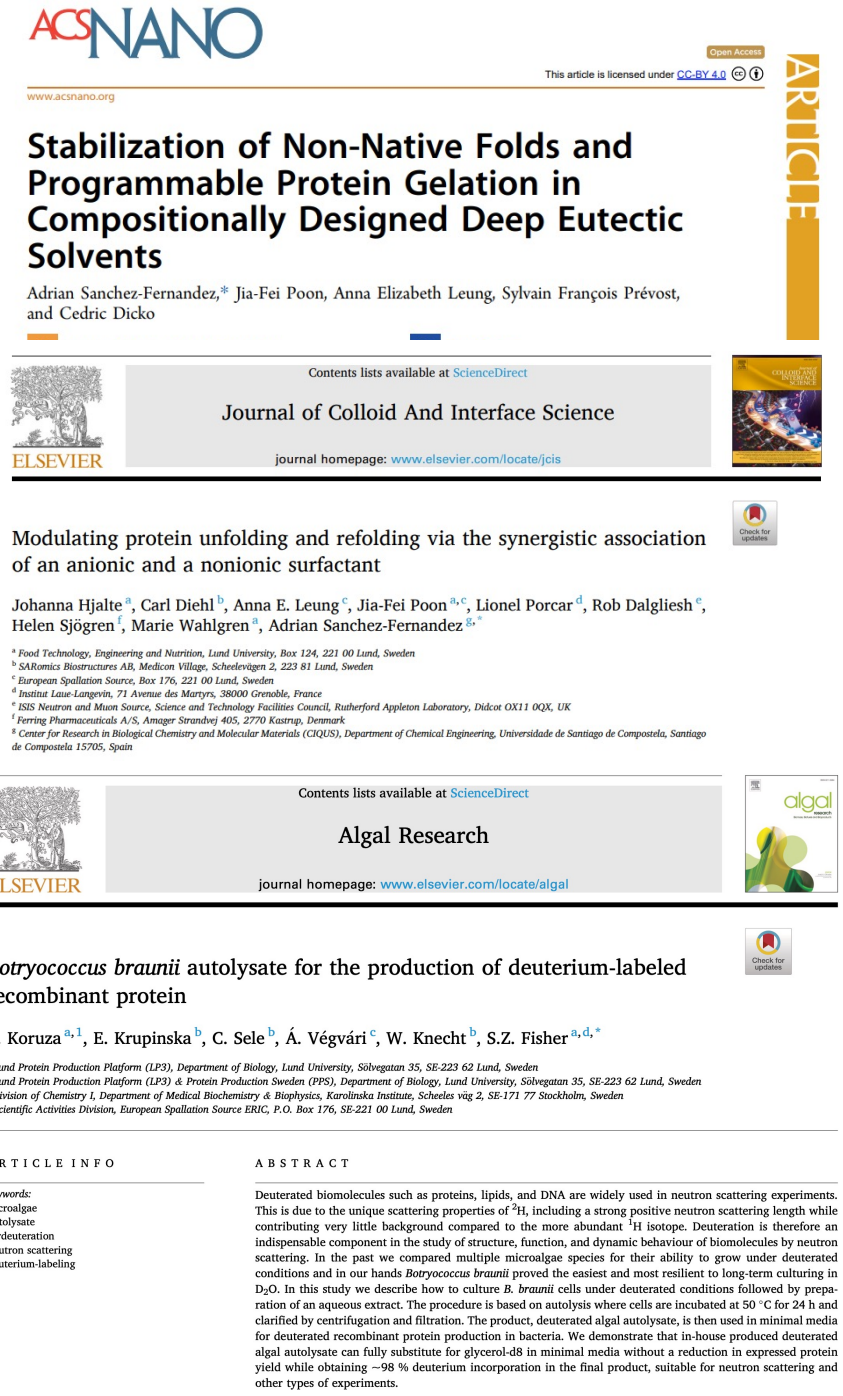

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ARTICLE

**Stabilization of Non-Native Folds and Programmable Protein Gelation in Compositionally Designed Deep Eutectic Solvents**

Adrian Sanchez-Fernandez,* Jia-Fei Poon, Anna Elizabeth Leung, Sylvain François Prévost, and Cedric Dicko

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ELSEVIER

**Modulating protein unfolding and refolding via the synergistic association of an anionic and a nonionic surfactant**

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ELSEVIER

**_Botryococcus braunii_ autolysate for the production of deuterium-labeled recombinant protein**

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ABSTRACT

Deuterated biomolecules such as proteins, lipids, and DNA are widely used in neutron scattering experiments. This is due to the unique scattering properties of $^{2}H$, including a strong positive neutron scattering length while contributing very little background compared to the more abundant $^{1}H$ isotope. Deuteration is therefore an indispensable component in the study of structure, function, and dynamic behaviour of biomolecules by neutron scattering. In the past we compared multiple microalgae species for their ability to grow under deuterated conditions and in our hands *Botryococcus braunii* proved the easiest and most resilient to long-term culturing in $D_2O$. In this study we describe how to culture *B. braunii* cells under deuterated conditions followed by preparation of an aqueous extract. The procedure is based on autolysis where cells are incubated at 50 °C for 24 h and clarified by centrifugation and filtration. The product, deuterated algal autolysate, is then used in minimal media for deuterated recombinant protein production in bacteria. We demonstrate that in-house produced deuterated algal autolysate can fully substitute for glycerol-d8 in minimal media without a reduction in expressed protein yield while obtaining ~98 % deuterium incorporation in the final product, suitable for neutron scattering and other types of experiments.

# DEMAX: News & updates

New equipment installed at D04 chemistry labs expands out capabilities on site

## Shimadzu NEXUS™ GS-MS

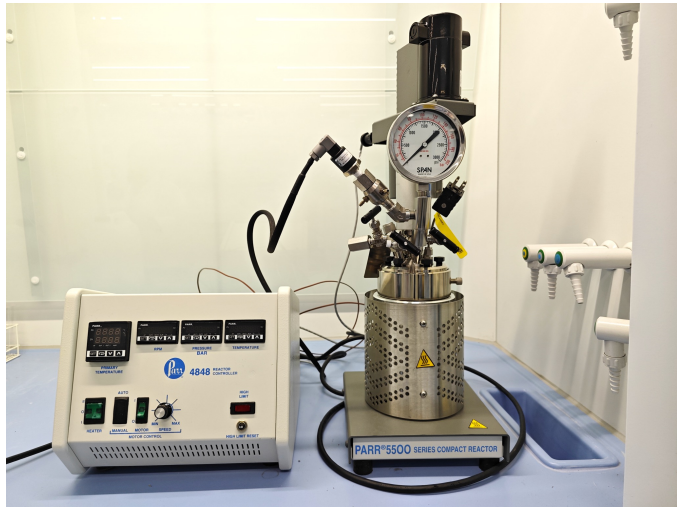
-Autosampler, 150 vials

-Helium as carrier gas

-Electron Ionisation (EI) MS with the possibility to use chemical ionisation (CI) in the future

-columns for lipidomic analysis

- NIST library of MS data




## Second Parr High Pressure Compact Reactor

-450 mL vessel

-Max temp 350 °C, max pressure 200 bar

- Fortest reactions and method development

# SCSE Priorities

| | | Date CC | CC | Date HC | HC |
|---|---|---|---|---|---|
| Tranche 1 | DREAM | Q1-2025 | Cryofurnace/Quentin setup | Q1-2026 | Vacuum furnace/ Quentin' changer |
| | LOKI | Q1-2025 | SANS Sample changer | Q1-2026 | Rheometer |
| | ODIN | Q1-2025 | Syringe pump | Q1-2026 | Robin stress rig |
| | TBL | Q1-2025 | n/a | | n/a |
| | BIFROST | Q2-2025 | Wet cryostat / 15T magnet | Q1-2026 | Wet cryostat / 15T magnet |
| | NMX | Q2-2025 | | Q2-2026 | |
| Tranche 2 | ESTIA | Q4-2025 | Flow cryostat / Solid liquid sample changer | | Flow cryostat / Solid liquid sample changer |
| | BEER | Q4-2026 | Deformation rig | Q2-2027 | Dilatometer |
| | MAGIC | Q3-2026 | Cryostat/8T magnet | | 8T magnet |
| | SKADI | Q1-2026 | Sample changer (temperature controlled) | Q2-2026 | Electromagnet / Rheometer / Syringe pumps/mixing setup / Stopped flow if available |
| | CSPEC | Q1-2027 | Cryofurnace + rotation stage | Q3-2027 | High field magnet (6T) |
| Tranche 3 | MIRACLES | Q4-2026 | Dry cryostat | Q3-2027 | 8-Sample changer with CCR/ Wet cryostat Humidity chamber/ Laser pump-probe |
| | HEIMDAL | Q4-2026 | Blue furnace / Cryostat | | Blue furnace / Cryostat |
| | TREX | Q4-2026 | Cryofurnace | Q3-2027 | He3 insert |
| | FREIA | Q4-2026 | Solid-liquid cell sample changer / Langmuir trough/ Julabos & temperature controllers / Static trough | Q3-2027 | HPLC & syringe pumps |
| | VESPA | Q3-2027 | Cryostat | | running Cryostat |

Instrument

SCSE

# Current status

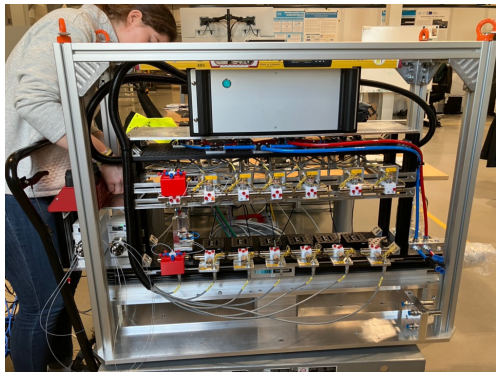
| | | |
|---|---|---|
| **LOKI** | | |
| Sample changer CC | | Follow the project and support the mechanical and control integration if needed |
| Rheometer HC | ✓ | Support the control and the mechanical integration |
| **Odin CC** | | |
| Syringe pump | ✓ | Done, Tubing, connectors |
| **Estia** | | |
| Sample changer CC | | Get a functioning setup for CC |
| **SKADI** | | |
| Sample changer CC | | Follow the project and support the mechanical and control integration |
| **FREIA CC/HC** | | |
| Solid liquid cell sample changer | | Adapt the ESTIA sample changer to FREIA |
| Troughs | | Static air-liquid troughs } automation RÅC grant Kiel/Lund Uni |
| | | Langmuir troughs |
| In-situ Ellipsometry/ATR-FTIR | | Grant project - follow and support the project – CDR completed Sep 2024 |
| Stopped flow LOKI FS | | |
| Humidity chamber FS | | |
| Electrochemsitry FS | | |
| Gases manifold FS | | |
| - Up to 200 bar isorb | | |
| - 0 to 30 bar | | |
| LPP | | test and development |
| Sample stick | | For gases and EC |
| Julabo | | Maintenance scheme, trolley |

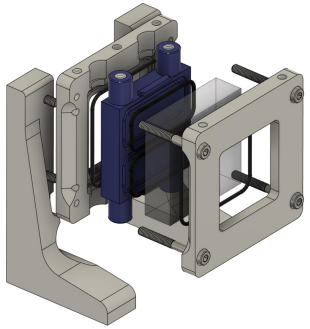
# SCSE News

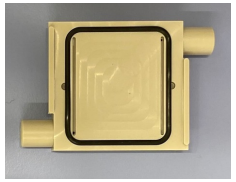
## Instrument projects supported by SCSE

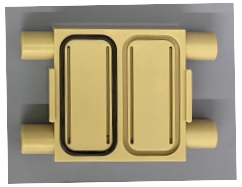
### Reflectometry Solid liquid cell (ESTIA/FREIA):

Sample changer solid/liquid cell ESTIA is completed. Final test at PSI (H.B.): 7 cells, 50x50 mm, 5-50 ˚C.





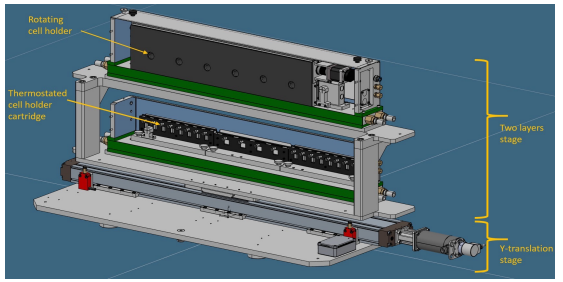




Cells successfully tested at PSI in sept.

- Fast assembly
- Quick change from horizontal to vertical orientation

### SANS Loki :




*SANS sample changer*, thermalized and rotating cell holder, 2 rows of cells holders, 24 narrow cells/row:

- Temperature read out box done (outsourced)
- Translation stage received
- Test with B4C coating ongoing
- Parts are ordered and/or being manufactured

*NURF cell* insitu optical probe setup for flow cell, done.

# CLS – SCSE News

## SCSE projects soft matter

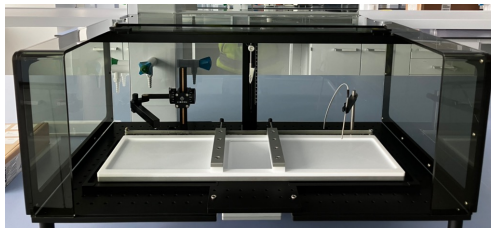
### Reflectometry (ESTIA /FREIA):

Sample changer solid/liquid cell FREIA:

- Ongoing, waiting for ESTIA sample changer final test feedback.

Combined Ellipsometer/IR setup: Swedish IK with Linköping University:

- Critical design review done
- procurement of the IR and ellipsometry instruments ongoing.

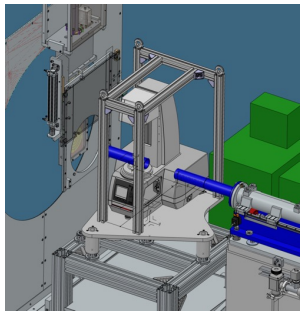


LB/LS Dipping trough D04

Troughs: RÅC grant with Kiel University, Lund University and ESS:

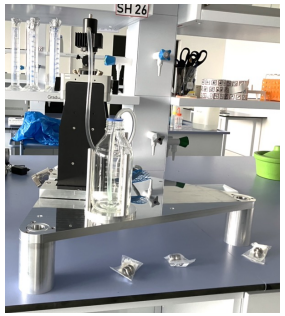
- Automatisation design of static troughs started July ’24
- Langmuir troughs (Kiel U.): includes laminar flow Langmuir troughs for subphase exchange, started July ’24

### SANS:



Rheometer:

- Mechanical integration, manufacturing ongoing
- Final test for the control integration




Stopped Flow:

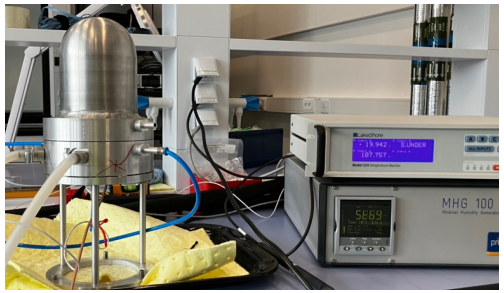
Mechnical integration done, test and control integration ongoing. Parts for the control box ordered.

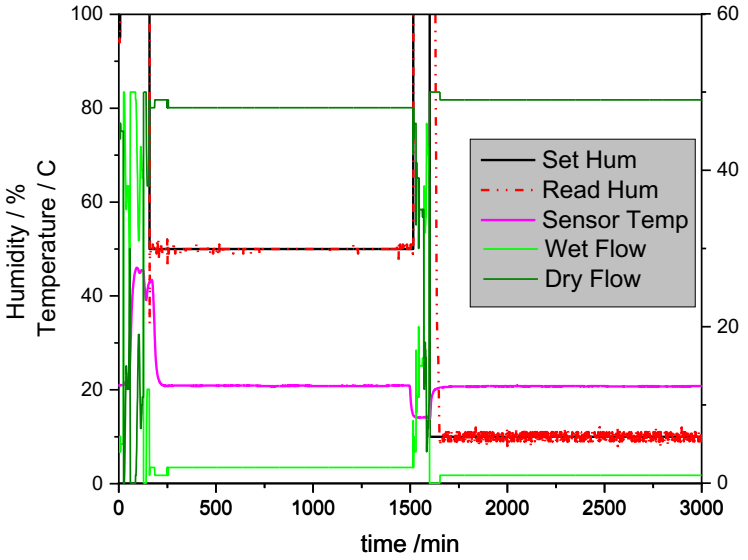
# CLS – SCSE news

## SCSE projects - Chemistry

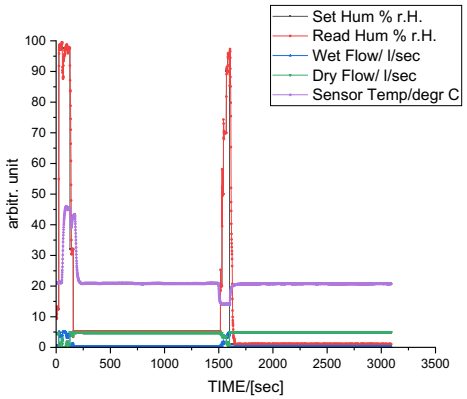
Humidity chamber

Tested and improved, still need to test Al sample chamber with neutrons.






Stable at various % humidity (shown here 2%, 5%, 10% and 50%

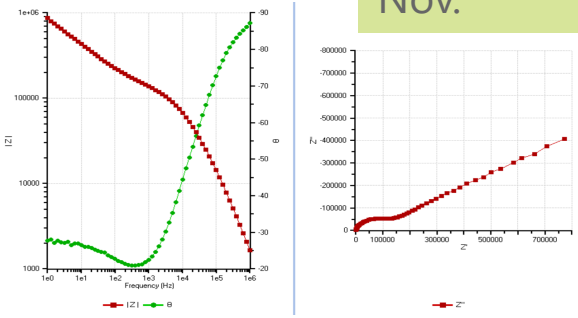



Electrochemistry/Battery cells:

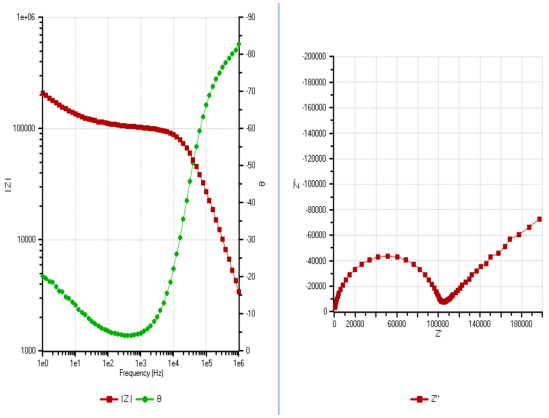
Tested in the lab ongoing, impedance measurements

- Versatile Cell, Spectroscopy:

To be tested at SNS in Nov.



- Battery cell, diffraction :

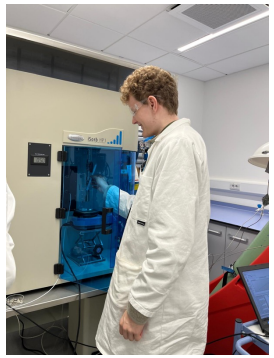


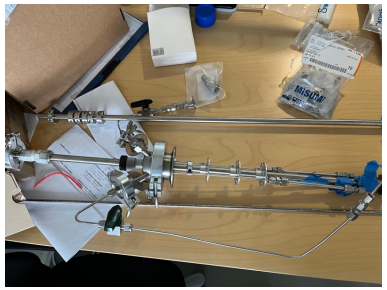
# CLS - Softmatter and Chemistry SE (SCSE)

## SCSE projects - Chemistry

Gas manifold high pressure <200 bar

Project with Intern Philipp M., sample stick for gases (200 bar) from 10K to 673K





Low pressure Manifold 30 Bar:

- Gas lines and parts received
- Pressure gauges and flowmeter specification undergoing.

Julabo trolley :

Prototype done, part has been ordered

**Small accessories and others**

Syringe pumps

HPLC pumps

Potentiostat

Julabos

Drop levitator

Reaction and flow cells

# Questions?