

Third General Assembly Meeting

WP2: A strategy to deliver neutrons for Europe and beyond

WP Co-Leaders

- **Andreas Schreyer**, Director for Science, ESS
- **Mark Johnson**, Assoc. Dir. and Head of Science Division, ILL
- **Lambert van Eijck**, Vice-Chair, ENSA; TU Delft



BrightnESS² is funded by the European Union Framework Programme for Research and Innovation Horizon 2020, under grant agreement 823867



WP 2 Objectives

Specifically, WP 2 aims to define the best way to provide **neutron instrumentation**, associated **characterisation methods** and **analysis tools** in a strategic and coordinated fashion to the European user community and beyond.



Andreas Schreyer, ESS

2.1

Establish a common roadmap and implementation strategy for future neutron capability.



Lambert van Eijck, ENSA

2.2

Define the needs of the user communities relative to new neutron-based methods, in alignment with ESS facility capabilities (Europe and South Africa).

Explore and implement more efficient ways to use neutrons, beginning with pilot programmes targeting engineering and soft matter/life sciences.

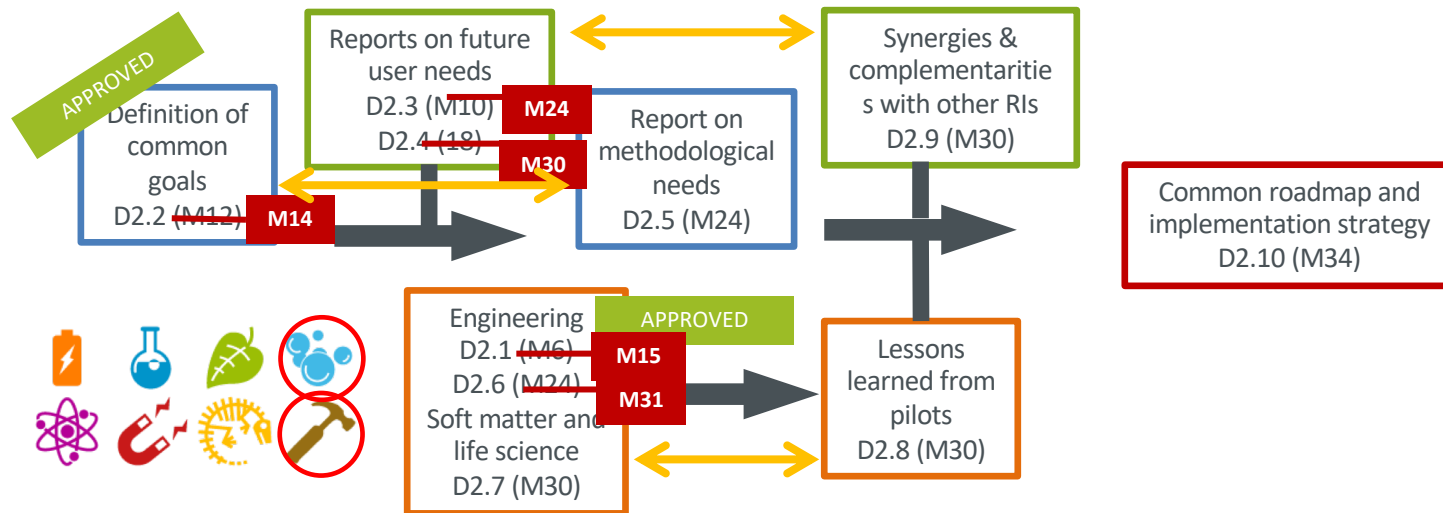
2.3



Mark Johnson, ILL



WP2 Deliverables and timeline



Task 2.1



OCT 2019

- Grenoble: LENS EB & GA approved WG1's draft outline of Vision/Landscape Document, Agreement to continue work with a writing workshop

MAR 2020

- 3-day workshop cancelled on account of Covid-19 outbreak

JUN 2020

- 2-day online writing workshop, "existing neutron strategies" document section drafted as input
- Hybrid outline/draft text document advanced to capture outcomes of LENS Writing Workshop #
- Replacement writer/editor recruited

SEPT 2020

- LENS Writing Workshop #2
- BrightnESS² midterm review: Presented status to EC
- Work on document ongoing by new writer editor

NOV 2020

- Circulation of Chapter 3 (Vision) of Landscape Document

DEC 2020

- Circulation of content of Chapter 1 + 2 of Landscape Document



brightness² Task 2.1: Detailed plans

JAN
2021

- LENS Writing Workshop #3 scheduled

SPRING
2021

- LENS Writing Workshop #4 (tbd)

JUNE
2021

- Full draft for review by LENS GA

OCT
2021

- Deadline for submission by BrightnESS²



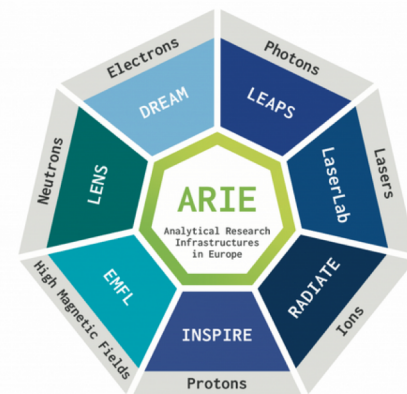
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brightness² Task 2.1: Engagement of LENS with stakeholders



Establishing good working relations with LEAPS and contributing to the development of ARIE position papers



BrightNESS² is funded by the European Union Framework Programme for Research and Innovation Horizon 2020, under grant agreement 823867

brightnESS² IMPACT: The European Neutron Science Community

- ✓ **Cooperation among European and national research infrastructures** has entered a new era of accelerated change. BrightnESS² has facilitated a conversation between neutron facilities, and is working to help them prepare for the future.
- ✓ **Bringing LENS from a concept to an operational organisation.**
BrightnESS² has been instrumental in with expanding relevance and increasing global visibility.
- ✓ **Established a systematic working relationship** between LENS and ENSA.
- ✓ **Initiated the process of defining new ways of working** across facilities to increase efficiencies.
- ✓ **Established good working relations** with other pan-European initiatives such as LEAPS, ARIE, ENSA, ESUO etc.



Task 2.2



Task 2.2: Progress and Results 2020 – User Needs

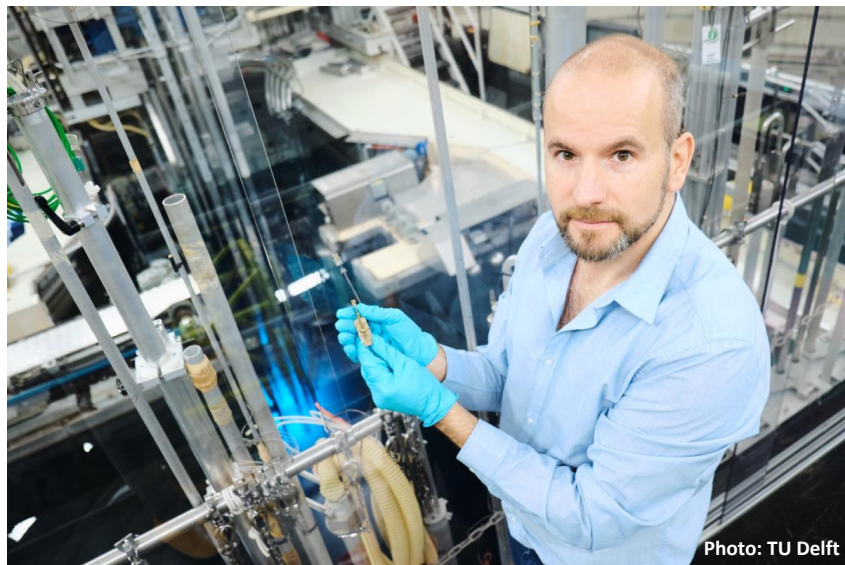


Photo: TU Delft

ENSA 'D2.3 Report on User Needs' Presentation

Lambert van Eijck

- Asst. Professor, Faculty of Applied Sciences, TU- Delft
- Vice Chair, ENSA

will present the **results and workplan** as a separate point on the agenda @ **17:45**

brightness² Task 2.2 Key activities over the past 6 months in South Africa

- Second South African Workshop (M18) replaced as series of virtual mini-symposia events (M20 – M21)
- Typically arranged as 2.5 hour virtual sessions that comprised talks by international and national experts, with involvement of inexperienced neutron users, concluded with consultative discussion:

Thrust Areas	International Expert Contributions	Participants
Neutrons for Engineers - 5 August 2020	Axel Steuwer, Univ. of Malta, Malta	± 50
Crystallography: Organic Chemistry - 25 August 2020	Monika Hartl, ESS, Sweden	± 40
Magnetism - 07 September 2020	Pascale Deen, ESS, Sweden	± 25
Geosciences - 10 September 2020	Vladimir Luzin, ANSTO, Australia	± 25
Energy Storage & Conversion Materials - 15 September 2020	William Brant, Uppsala University, Sweden; Charl Jafta, ORNL, USA	± 60
Palaeontology & Heritage Conservation - 18 September 2020	Burkhard Schillinger, MLZ, Germany	± 30
Catalysis /synthesis - 22 September 2020	David Lennon, Univ. of Glasgow, UK Monika Hartl, ESS, Sweden Stewart Parker, ISIS, UK	± 70
Crystallography: Inorganic Chemistry - 23 September 2020	Mikhail Feygenson, ESS, Sweden	± 40
Nanomaterials - 28 September 2020	Andrew Jackson, ESS, Sweden Alain Gibaud, Univ. of Le Maine, France	± 35

- Wide as possible scientific community participation invited, expert and inexperienced neutron users

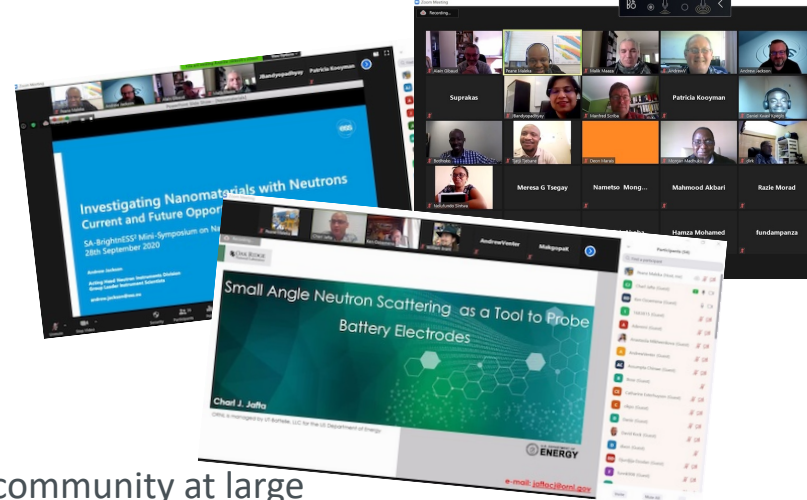


Impact

- Consolidate information on South African experienced users:
 - Local facilities
 - International facilities and collaborations
- Opportunity to expand user base:
 - Solicit advantages of neutron techniques to the scientific community at large
 - Educate community on what is possible by illustrating benefits of neutron techniques

Sustainability

- Through the Position Paper, motivate the scientific and financial cases for the South African government investment in neutron techniques as prominent thrust
- Expand capabilities to access local Research Infrastructure as foundation step to international Large Scale Research Infrastructure
- Expand capabilities to access international Large Scale Research Infrastructure, such as ESS, by establishing a formal user access agreement



Task 2.3



Pilots - Detailed Plan for 2021

Application of the NQL – measurements and report 2021

MEASUREMENTS

- **MPISI NECSA (SA), Jan 2021:** samples are at the airport going through customs (08.12.2020)
- **STRESS-SPEC, FRMII (DE) , Feb 2021:** depending on the reactor start clearance

NQL AS TRADE MARK

- under discussion at ILL management to propose options to partners in January 2021

DELIVERABLES

- **D2.6** shifted to July 2021. Eventual risk of including measurements from Munich if reactor cycle is again postponed due to legal or sanitary issues in February 2021
- **D2.8** Input from lessons learned in the pilot engineering



Impact NQL

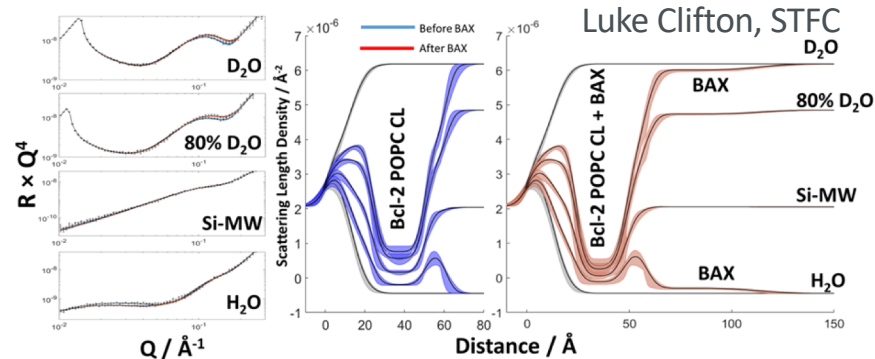
- **Common calibration protocol and guideline** for the instruments involved in Brightness2. Common industrial reporting (template in D2.1).
- **Trademark of NQL:** under discussion (ILL management)
- **Open to new collaborators:** spare set of calibration samples available at ILL

Sustainability Plan

- Dedicated website NEUSS (Neutron Strain Scanning): method, instruments and NQL. In progress (WordPress, ILL maintenance)
- **Dedicated workshops every 2 years at one of partners installations: under discussion, probable in the end of 2021 in FRMII-Munich.**



Pilots - Detailed Plan for 2021



- **March 2021: Two Neutron reflectometry experiments** carried out in collaboration with Lund and Umeå universities – Nov 2019 (Inter, STFC) and Nov 2020 (SURF, STFC, remote) – manuscript in preparation with LU.
- **Virtual meeting** with partners
- **Final report preparation** (Deliverable 2.7: report on deuteration for soft matter and life sciences: experimental results); manuscript preparation

brightness² TASK 2.3b Deuteration Pilot



EUROPEAN
SPALLATION
SOURCE



Science & Technology Facilities Council

ISIS



ACS
AUTHORCHOICE

<http://pubs.acs.org/journal/acsodf>

Article

Enzyme-Assisted Synthesis of High-Purity, Chain-Deuterated 1-Palmitoyl-2-oleoyl-*sn*-glycero-3-phosphocholine

Oliver Bogojevic and Anna E. Leung*

Cite This: *ACS Omega* 2020, 5, 22395–22401

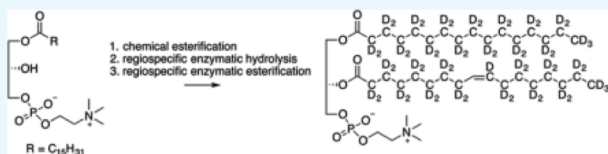
Read Online

ACCESS |

Metrics & More

Article Recommendations

Supporting Information



Impact

- **Novel results achieved at ESS** (first enzymatic synthesis of a deuterated phospholipid) have been published; will facilitate a neutron experiment at ISIS (delayed due to COVID-19)
- **Technique can be imported to partner laboratories** to enable provision of a suite of in-demand phospholipids to the wider neutron scattering community

Sustainability plan

- **Collaboration will continue through the Deuteration Network (DEUNET)**
- Applications for funding via Horizon Europe or other funding agencies will be considered
- **Scientists will be cross-trained at partner institutions in the DEUNET to facilitate knowledge transfer**



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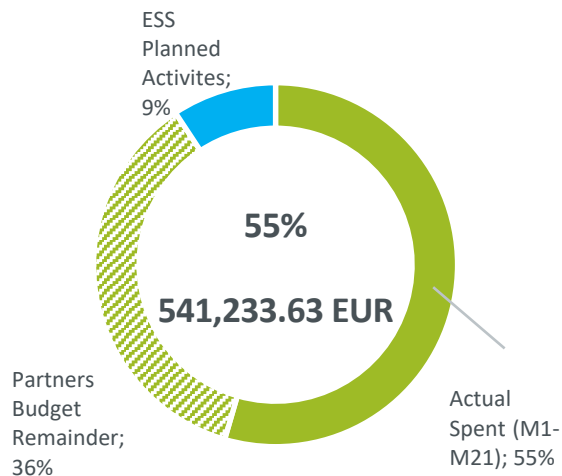
Financials



WP2 Expenditure and Overall Spending

Timeline: Month 1 – Month 21

Actual Spending (M1 - M21) Vs Planned Activities



WP2 Expenditure Per Cost Category



Partner	% Spend of Budget
ESS	48%
ILL	89%
UKRI	2%
TUM	68%
FZJ	55%
Wigner	53%
PSI	43%
NCBJ	74%
ITL	74%
Necsa	43%
ENSA	0%
TUD	58%

Sustainability – Vision/Landscape Document



- **Excellent science** using neutrons
 - Europe consolidates its **world-leading position** in neutron science
 - ESS established as the world-leading **flagship neutron facility**
 - **CANS fills a gap** in the European neutron facility landscape
 - **Accessible, sustainable** and optimally utilized neutron facilities in Europe
 - **ENSA a strong representative** of the neutron user community in Europe
- **LENS is a success**