



STAP Spectroscopy overview

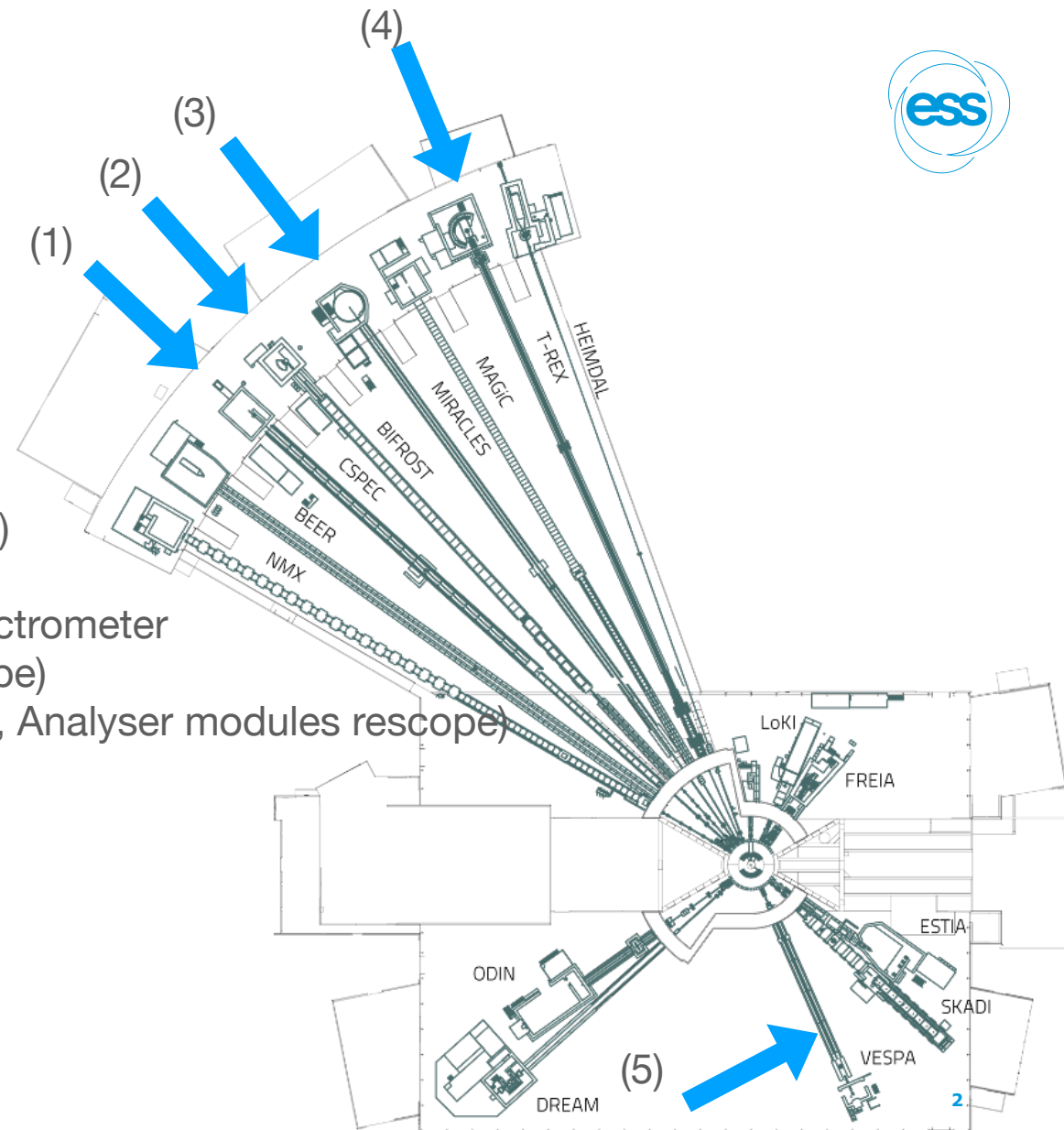
Staffing
Instruments overview
Scientific culture

PASCALE DEEN

Spectroscopy division



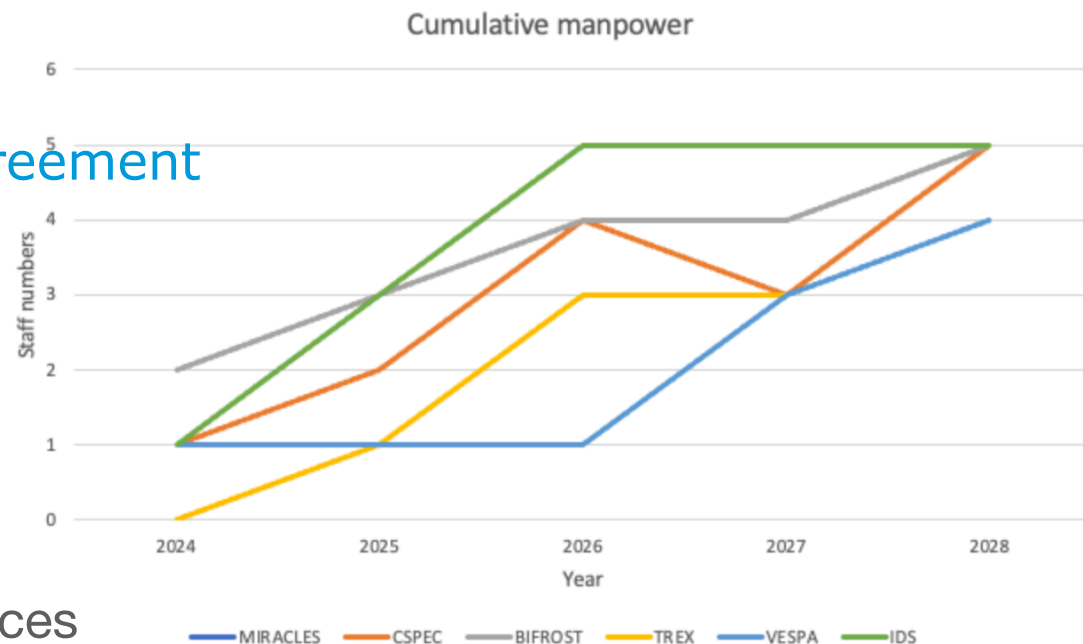
- 1) CSPEC Cold chopper spectrometer ([Rescoped](#))
- 2) BIFROST Extreme Environment Spectrometer
- 3) MIRACLES High resolution Backscattering spectrometer
- 4) TREX Bispectral chopper spectrometer (Rescope)
- 5) VESPA Vibrational Spectrometer ([Rescoped T0](#), Analyser modules rescope)



SAC33: Spectroscopy division

Staffing expectation (on-site):

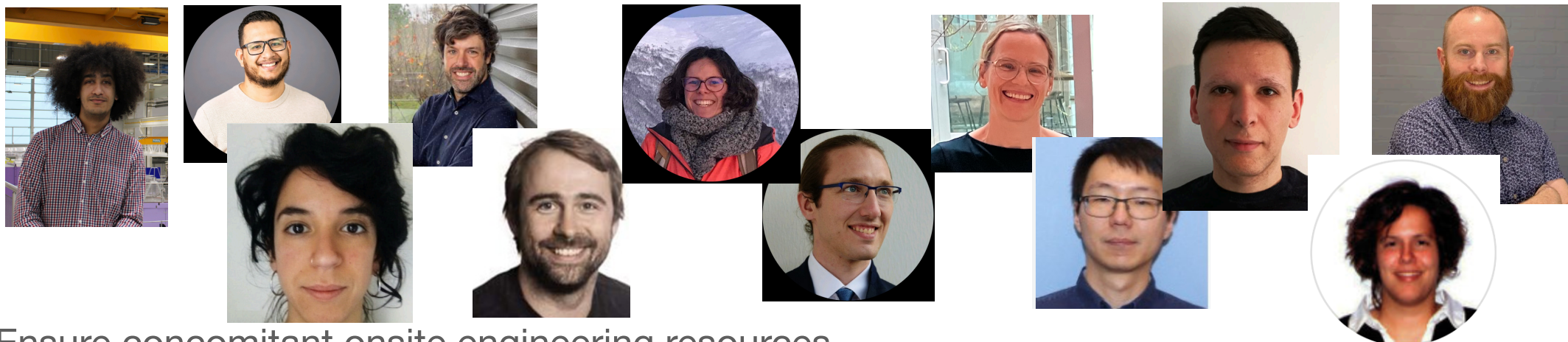
Contingent on SSO Review & Council agreement



Ensure concomitant onsite engineering resources

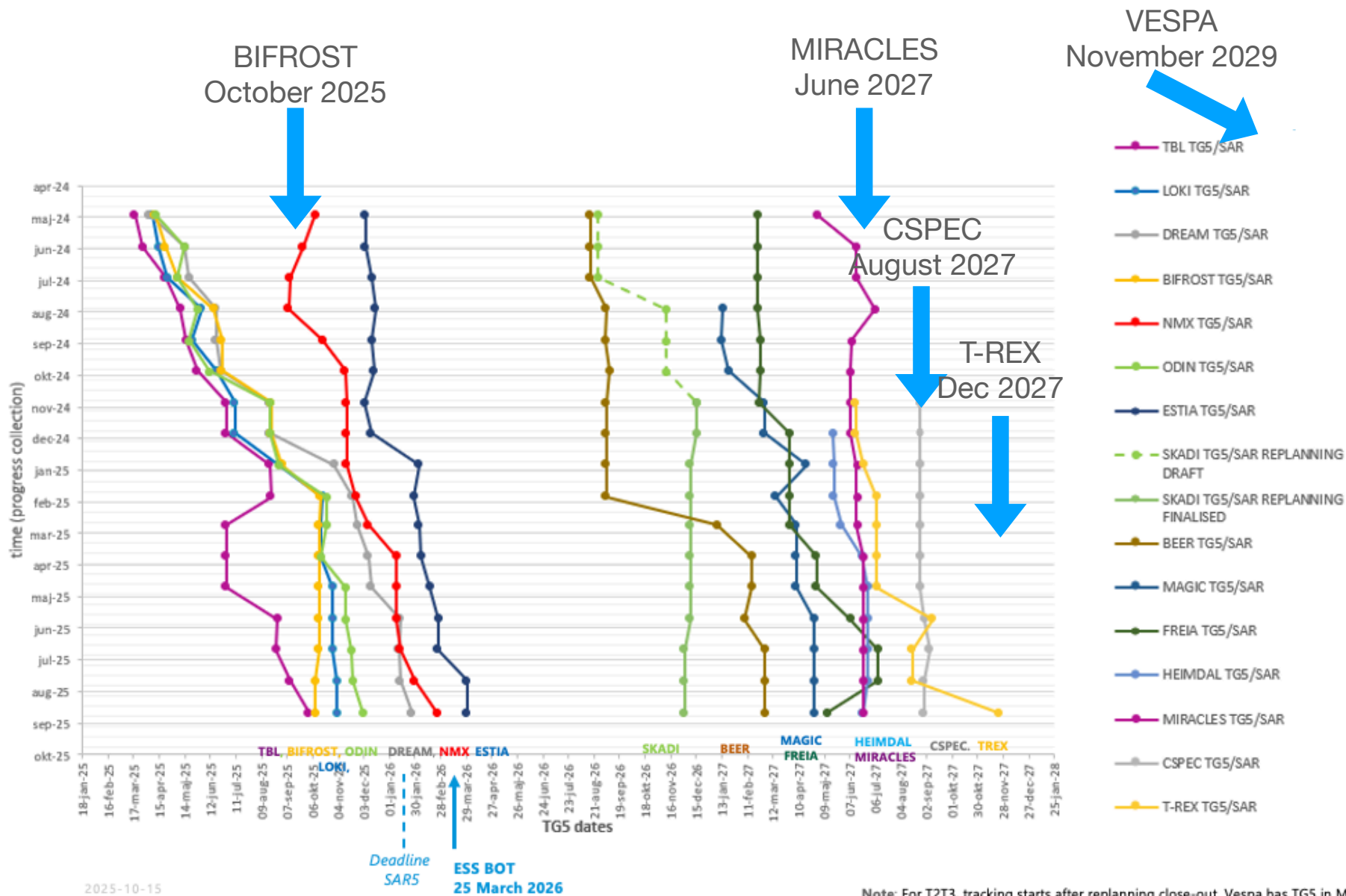
Instrument	TG5 Date	2024						2028					
		Scientist 1	Scientist 2	Scientist 3	IOE	Post-Doc	Data scientist	Scientist 1	Scientist 2	Scientist 3	IOE	Post-Doc	Data Scientist
MIRACLES	Q2 2027	0	0	0	0	0	0	1	1	1	1	0	1
CSPEC	Q1 2027	1	0	0	0	0	0	1	1	1	1	1	1
BIFROST	Q3 2025	1	0	0	1	0	1	1	1	1	1	1	1
TREX	Q2 2027	0	0	0	0	0	0	1	1	1	1	0	1
VESPA	Q1 2028	1	0	0	0	0	0	1	1	1	1	0	1
Spin echo	??												
Bold means Q3/4													
Data Scientist													
Total for year						Spec Division	4					Spec Division	22
Note: VESPA Scientist 2 can be a computational material scientist.						IDS	1					IDS	5
Note: Bifrost scientist 2 is in-kind from KU													

SAC35: Spectroscopy division Staffing expectation (on-site): Contingent on SSO Review & Council agreement



Ensure concomitant onsite engineering resources

		2024						2028					
Instrument	TG5 Date	Scientist 1	Scientist 2	Scientist 3	IOE	Post-Doc	Data scientist	Scientist 1	Scientist 2	Scientist 3	IOE	Post-Doc	Data Scientist
MIRACLES	Q2 2027	0	0	0	0	0	0	1	1	1	1	0	1
CSPEC	Q1 2027	1	0	0	0	0	0	1	1	1	1	1	1
BIFROST	Q3 2025	1	0	0	1	0	1	1	1	1	1	1	1
TREX	Q2 2027	0	0	0	0	0	0	1	1	1	1	0	1
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BIFROST: Extreme environment spectrometer

TG5: SAR: September 2025, ISRR: November 2025

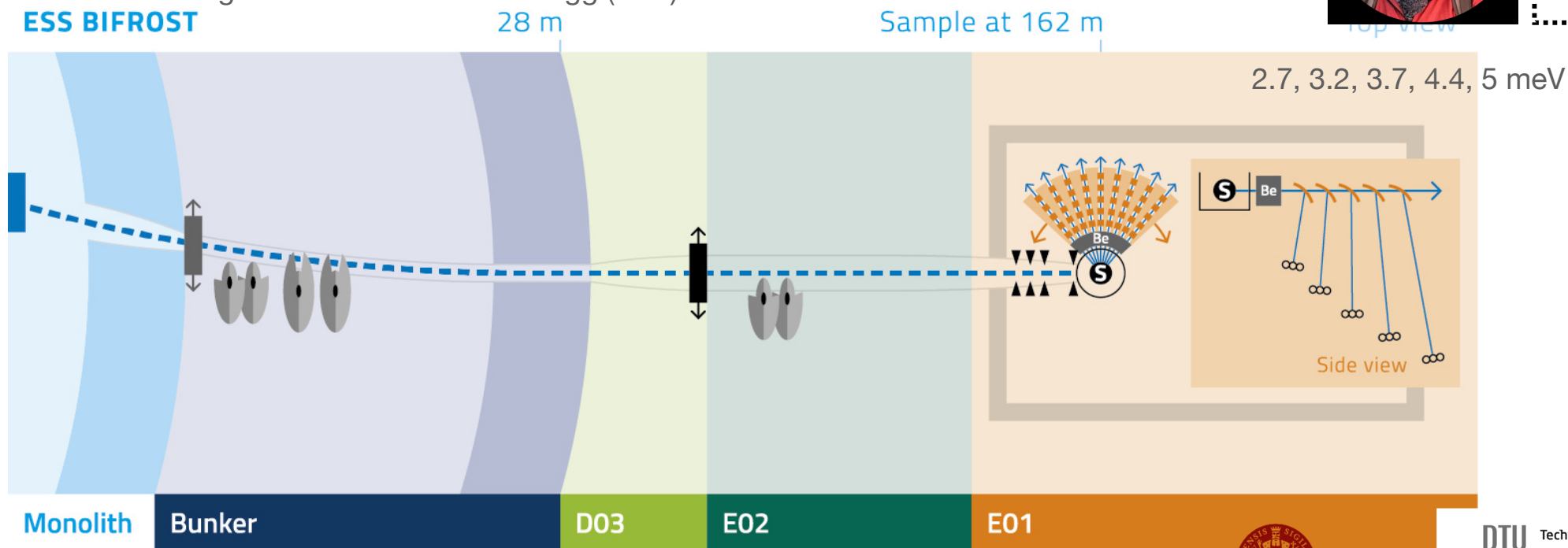
Lead scientist: Rasmus Toft-Peterson (ESS/DTU), +Scientist (Recruitment) , Data Scientist: Greg Tucker

IOE: Manon Chesneau

Lead instrument engineer: 80 % Liam Whitelegg (ESS)



BIFROST



$$\lambda_i = 1.5-6 \text{ \AA}$$

Radius of curvature = 1500 m: 1 x out of line of sight (Prior to bunker wall)

Bandwidth = $1.7 \text{ \AA}$

Sample = $1 \times 1 \text{ cm}^2$ - $0.1 \times 0.1 \text{ cm}^2$

Horizontal $7 - 135^\circ$, Vertical angular coverage = $\pm 1.4^\circ$



DTU Technical University of Denmark



BIFROST: Extreme environment spectrometer

Progress April 2025:



- Bifrost is fully energised (except 1 Vacuum rack)
- Local motion testing started
- Integrated testing completed June 2025:

Beam attenuation, divergence jaws and sample slits

Tank and sample stack motion, filter temp. readout

Monitors

Choppers

Miscellaneous (pressure gauges, pump control etc)

Sample environment

- Shutter, hatch and PSS testing: technology groups & PSS.
- Prepare documentation for TG5

Installation to do:

- Polyethylene installation
- Cave roof completed
- Installation of cryogenic lines & workstation for sample mounting
- Fire suppression installation (some concern).



BIFROST:

October 2025:

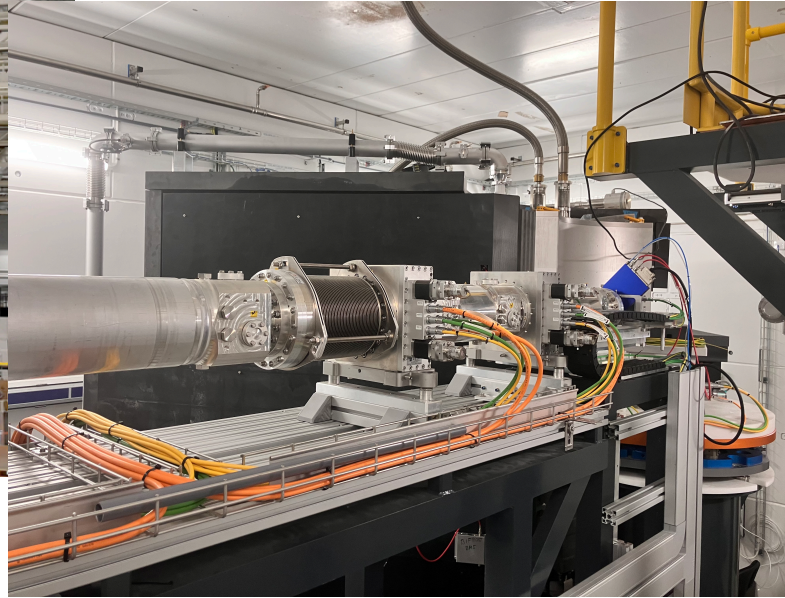
Cave blocks finalised, Electrical and Conventional Utilities completed



Installation done:

- Polyethylene installation
- Cave roof completed
- Installation of cryogenic lines & workstation for sample mounting
- Fire suppression installation

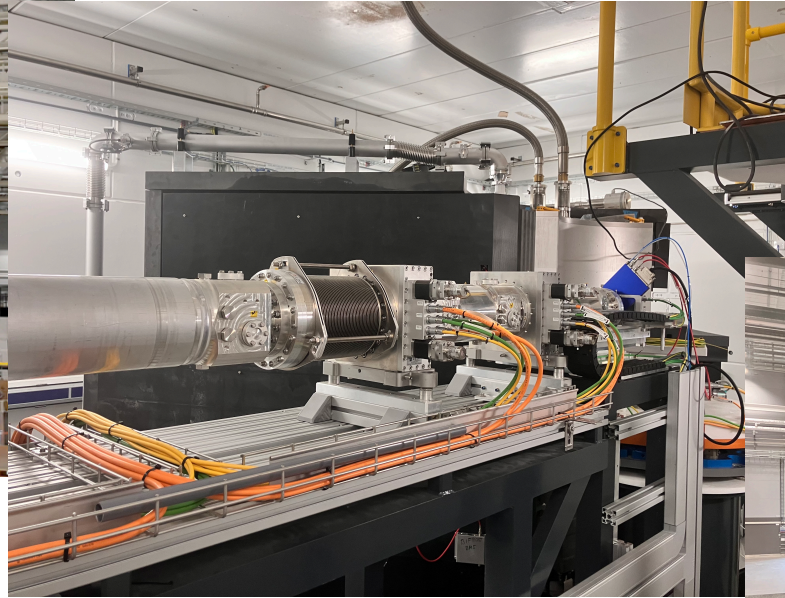
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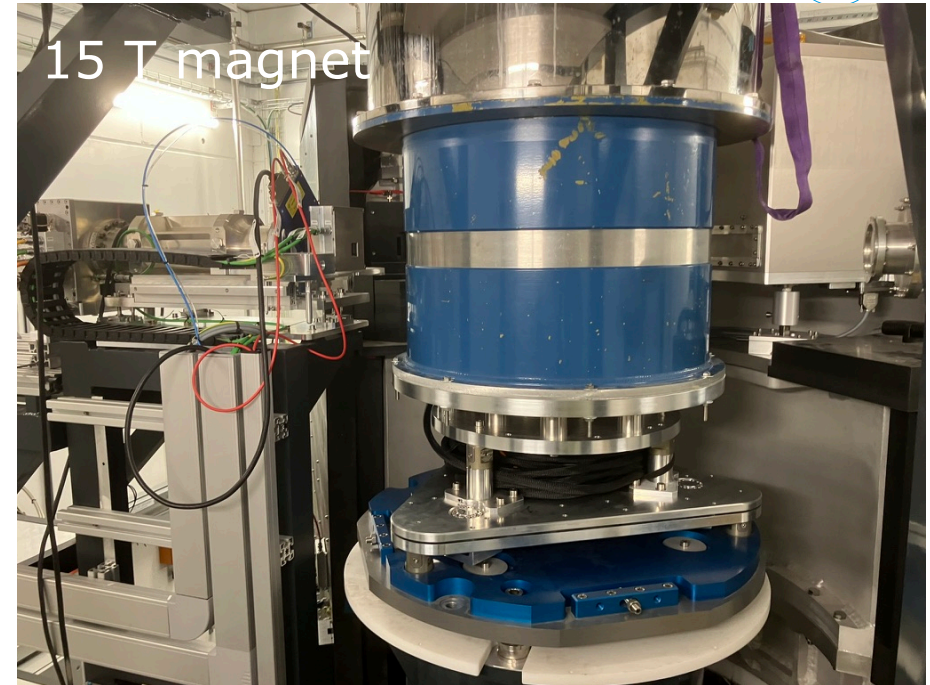
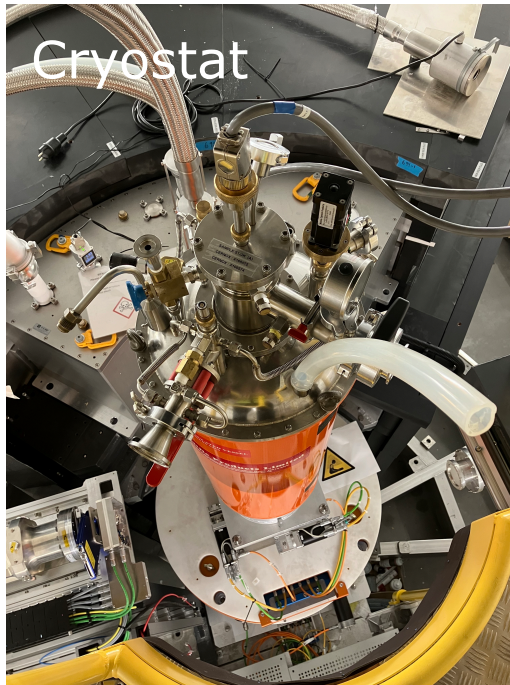


Installation done:

- Polyethylene installation
- Cave roof completed
- Installation of cryogenic lines & workstation for sample mounting
- Fire suppression installation

SAMPLE ENVIRONMENT FOR BIFROST

Testing of the orange cryostat & 15 T magnet



Helium recovery

- Installed and commissioned, helium has been recovered and sent to liquefier.

Orange cryostat:

- Cooled on instrument, connected to instrument helium recovery.
- NICOS control is working (some final updates still needed but communication and basic control tested)
- Will be cooled again on instrument with full NICOS controls in November when new IOE starts.

15 T magnet (tested in lab)

Physically installed on Bifrost with adapter and force testing rig. Rotation stage working with magnet in place. Fits, no clashes.

BIFROST : From partner to ESS



BIFROST System Acceptance Review Meeting

Friday 5 Sept 2025, 08:45 → 16:20 Europe/Stockholm

Tycho-Brahe

Pascale Deen (European Spallation Source ERIC)

Description Please be invited to the BIFROST System Acceptance Review Meeting.

BIFROST Site Tour will be offered on the 2nd September at 09:00-12:00. Invitation will be sent separately to the Reviewers, the Instrument Team and NSS Technology Leads.

NSS Issue Tracker (NIT)

Status: To be resolved before

0

TG3/ CDR

0

INSTALLATION

1

LOCAL TEST

3

ENERGIZATION

0

TG5/ SAR

0

SRR

0

SAR5

0

SRR5

21

TG6/ ORR

97 filtered issues (338 hidden)

Issue Count by To be Resolved before

NSS Issue Tracker Tickets / Rich Filter Controller

Open

Done

Bunker

S&SS

Polarisation

BEER

BIFROST

CSPEC

DREAM

ESTIA

FREIA

HEIMDAL

LOKI

MAGIC

MIRACLES

NMX

ODIN

SKADI

TBL

TREX

VESPA

No Instrument

Issue source

To be Resolved before

Created by

Status

Discipline

JQL

NSS Issue Tracker Tickets / Rich Filter Results

Key	Status	Summary	Instrument	Issue source	To be resolved before	Assignee	Reporter
NIT-347	TO DO	Bifrost Control hutch HVAC	BIFROST	Installation/SAT	TG5/SAR	Liam Whitelegg	Giuseppe Aprigliano
NIT-331	TO DO	Cable tray hindering the extraction of supporting pillar for patch panels in Bifrost	BIFROST	Installation/SAT	ISRR	Alejandro Tobias Quispe Mamani	Alejandro Tobias Quispe Mamani
NIT-330	TO DO	Grounding cables hindering choppers extraction	BIFROST	Installation/SAT	TG5/SAR	Tahere Rostami	Alejandro Tobias Quispe Mamani
NIT-329	RESOLVED	Beam monitor in-bunker patch panel orientation check	BIFROST	Installation/SAT	TG5/SAR	Liam Whitelegg	Alejandro Tobias Quispe Mamani
NIT-320	RESOLVED	BM1 Patch Panel and RH	BIFROST	Other	TG5/SAR	Liam Whitelegg	Liam Whitelegg

Instrumentation Safety Readiness Review (November 2025)
Ready for Beam on Target
Will continue testing detectors / monitors / data chain. 12

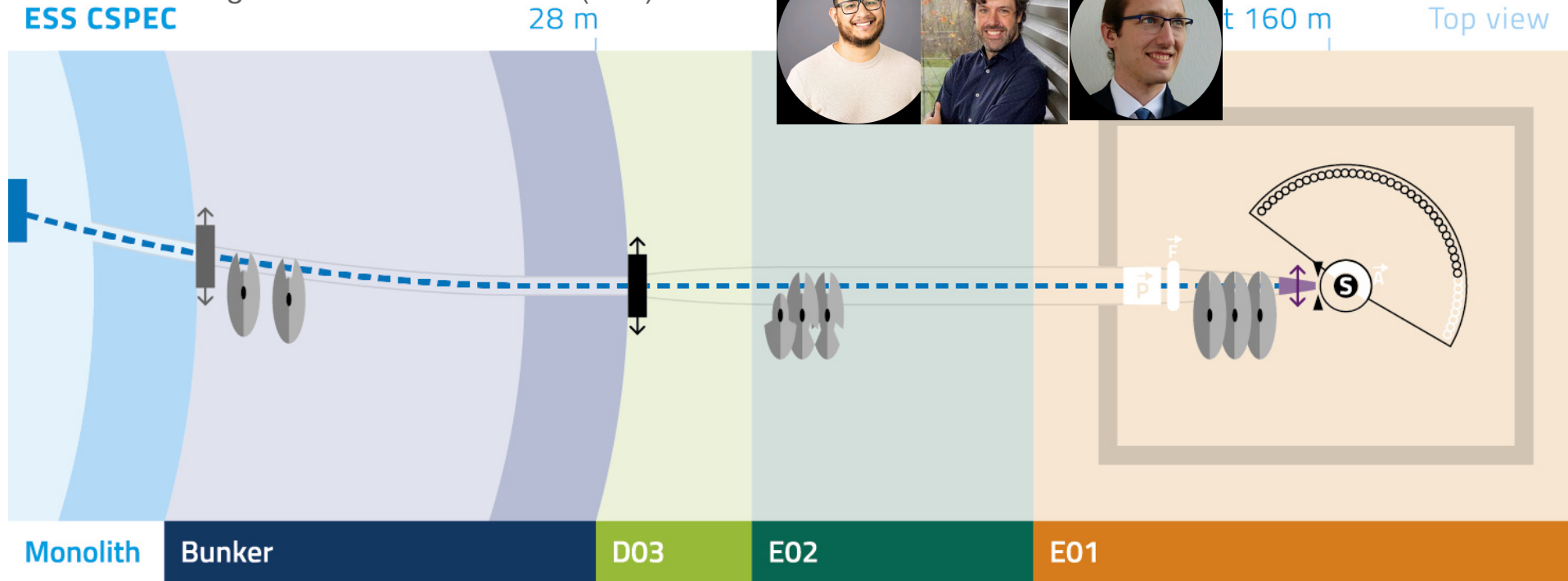
CSPEC: The cold chopper spectrometer of the ESS

TG5: August 2027

Scientists: Daria Noferini (ESS), Christian Balz (magnetism) : Data Scientists: Greg Tucker & Christian Beck

IOE: Jackson Da Silva

Lead instrument engineer: Fernando Moreira (ESS)



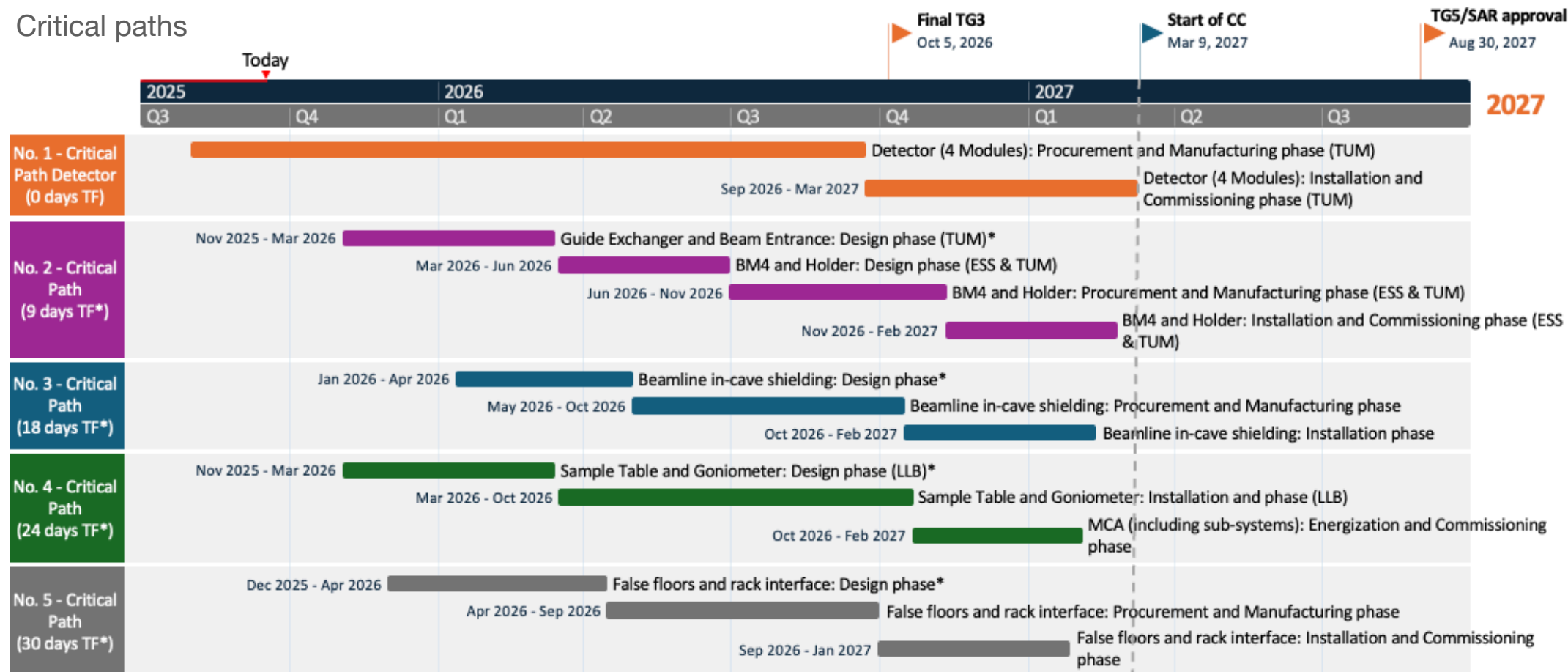
- Cold neutrons (2-20 Å), $\Delta E/E = 1.5\%$ @ 4 Å.
- Focus flux on range of sample areas $4 \times 2 \text{ cm}^2 \rightarrow 1 \times 1 \text{ cm}^2$.
- Signal to noise = 10^5 (@5 Å, Vanadium).



CSPEC: The cold chopper spectrometer of the ESS

TG5: August 2027

Critical paths



Design phase ends at CDR approval

Procurement and Manufacturing phase ends at FAT closure of open points

Installation and Commissioning phase ends at SAT approval

TF: number days of **total float** to Instrument's TG5

*Resource constraints

Note: Detector modules 5-7, cryofurnace, 3He insert (dilution fridge) and sample changer is part of the instrument scope but currently not linked to TG5 in P6

CSPEC: The cold chopper spectrometer of ESS

Concerns & actions (April 2025) & (October 2025)



Working in a linear manner: Could really do with further engineering resources & technical writer to ensure timeline (beyond the IPL provided). *Design tasks have been assigned to NSS pool designers, we still have design tasks which are missing resources.*

CSPEC & NSS & In-kind partners under discussions but remains a concern

Common projects not prioritised for Tranche 2/3 instruments: electrical and conventional utilities, monitors, detector scope BUT team also do not have resources to focus on these.

Focus remains on T1 but solutions are being found (e.g. CEP/CUP contracts, detector solutions)

ESS documentation criteria and requirements are difficult for many of our partner companies and laboratories to fulfil - leads to delays. Working actively to readjust.

Remains an issue but under review.

Critical path is detector delivery for 4 modules at TG5, start with 1.

Under review.

CSPEC: Cold Chopper Spectrometer of ESS



Completion of cave and crane installation

Installation of BW choppers in bunker.
All choppers tested and accepted



CSPEC: Cold Chopper Spectrometer of ESS



Completion of cave and crane installation

Installation of BW choppers in bunker.
All choppers tested and accepted



Motion control units



Testing of cave block door.



CSPEC: Cold Chopper Spectrometer of ESS



Completion of cave and crane installation

14 T magnet tendered.
Cryofurnace tendered.

RESCOPING: Full detector coverage with 5 bar ^3He (procured). ILL detectors under manufacturing.

Installation of BW choppers in bunker.
All choppers tested and accepted



Motion control units



Testing of cave block door.

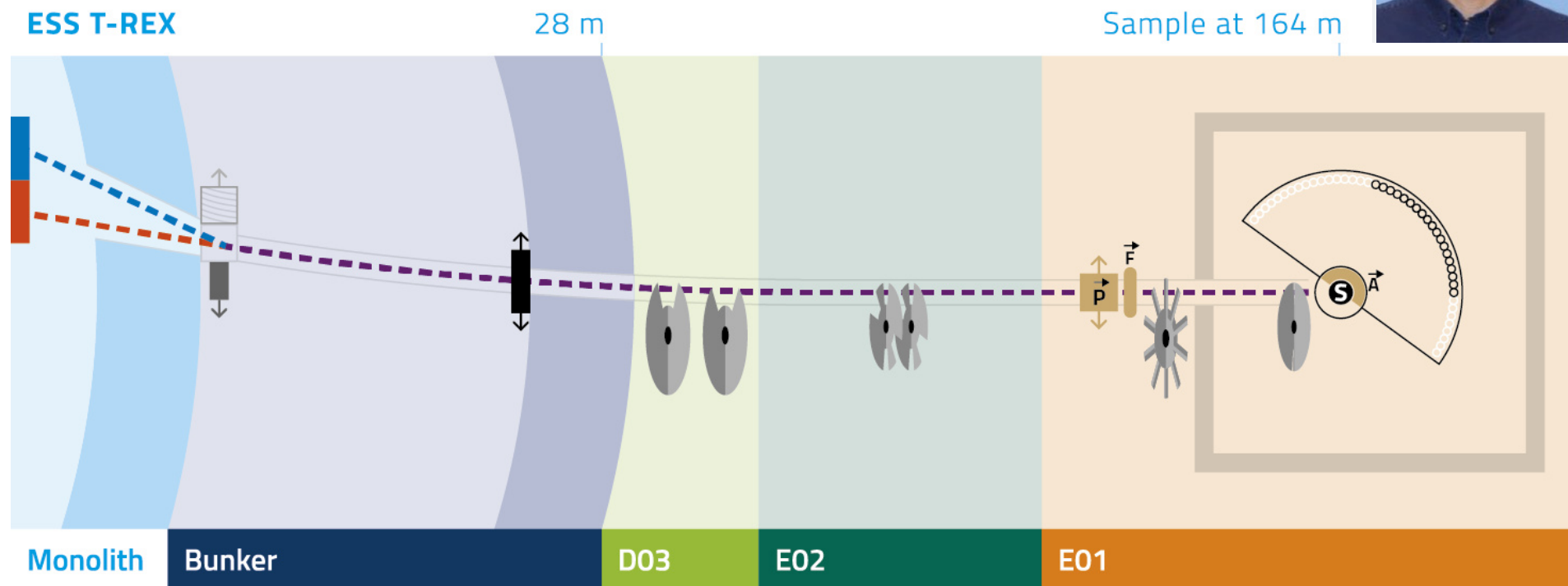
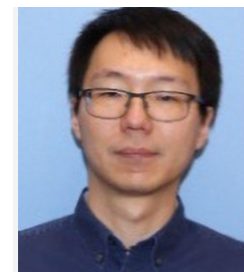


T-REX: Bispectral chopper spectrometer with PA

TG5: December 2027

Lead scientist: Christian Franz (Julich), Mohamed Aouane (ESS): Data Scientists: Bing Li (Jan 2026)

Lead instrument engineer: Marcel Serwe (Julich)



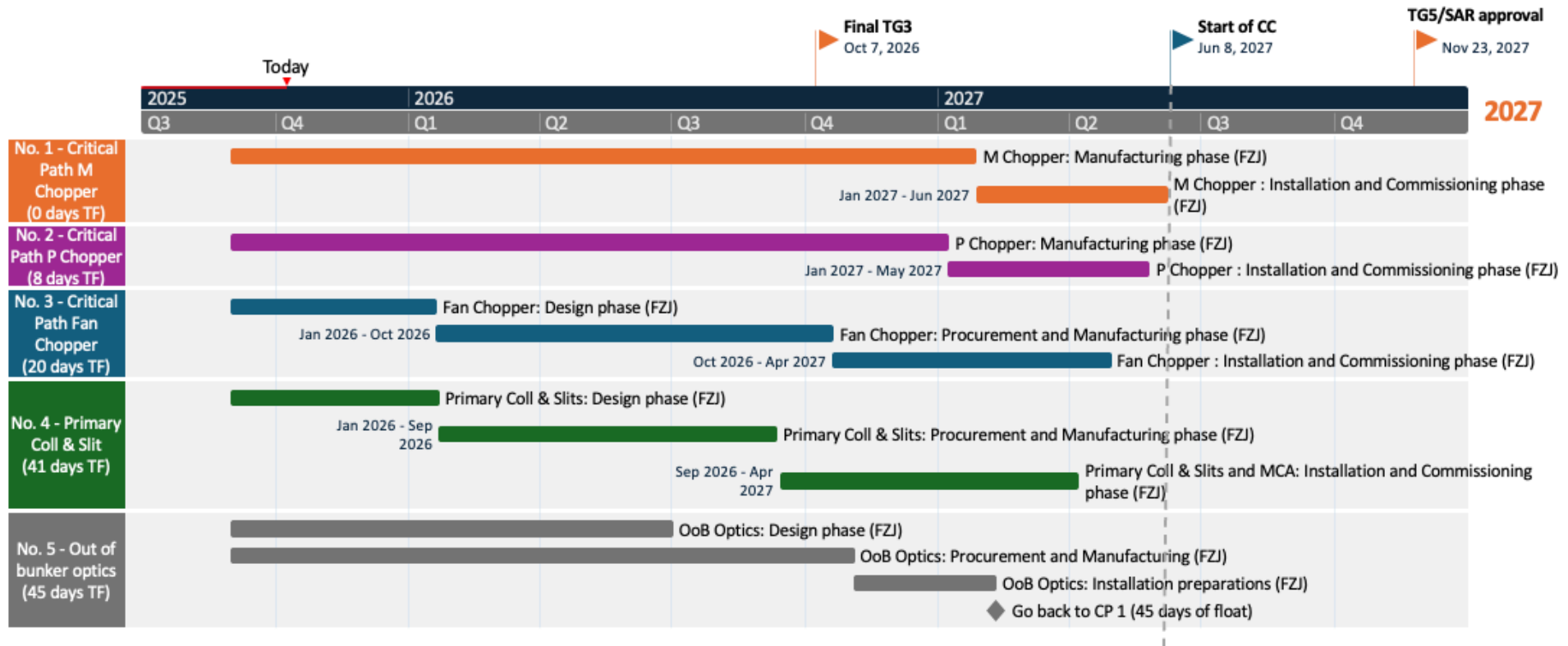
- Bispectral extraction ($0.7\text{--}6.5\text{ \AA}$, $2\text{--}160\text{ meV}$), 1%–7% energy resolution.
- Focus flux on sample area $3 \times 1\text{ cm}^2$ (Div: $\pm 0.25^\circ$ in the thermal band to $\pm 1^\circ$ in the cold regime).
- Polarisation using PASTIS XYZ set-up.
- Novel B10 detector technology



T-REX: Bispectral chopper spectrometer with PA

TG5: December 2027

Critical paths



Design phase ends at CDR approval

Procurement and Manufacturing phase ends at FAT closure of open points

Installation and Commissioning phase ends at SAT approval

TF: number days of **total float** to Instrument's TG5

Cave has 6 months of float and is no longer top 5 CP

Note: MG detector boxes 2-4 (including 18 modules) is part of the instrument scope but currently not linked to TG5 in P6

TREX: The bispectral chopper spectrometer with PA.

Concerns & actions (April 2025/October 2025)



Common projects not prioritised for Tranche 2/3 instruments: electrical and conventional utilities, monitors, detector scope.

Focus remains on T1 but solutions are being found (e.g. CEP/CUP contracts, detector solutions)

ESS documentation criteria and requirements are difficult for many of our partner companies and laboratories to fulfil - leads to delays. Working actively to readjust.

No staff member on site:

Recruitment completed for instrument scientist

Concomitant recruitment of engineering resources.

On-site engineer & on-site scientist

Critical path is detector delivery.

Critical path is Cave & MCA

Data chain & workflow: no current focus.

Data Scientist will start in January 2026.

Further concerns

Late component delivery (Cave)

Integration of PA (ESS requirements) - resolved.

Sample environment : Cryofurnace for PA under design, 14 T magnet tendered.

Choppers

Shielding

Rescoping of detectors

T-REX: Bispectral chopper spectrometer with PA

Installation of blocks in the bunker over the TREX instrument



T-REX: Bispectral chopper spectrometer with PA



Installation of blocks in the bunker over the TREX instrument

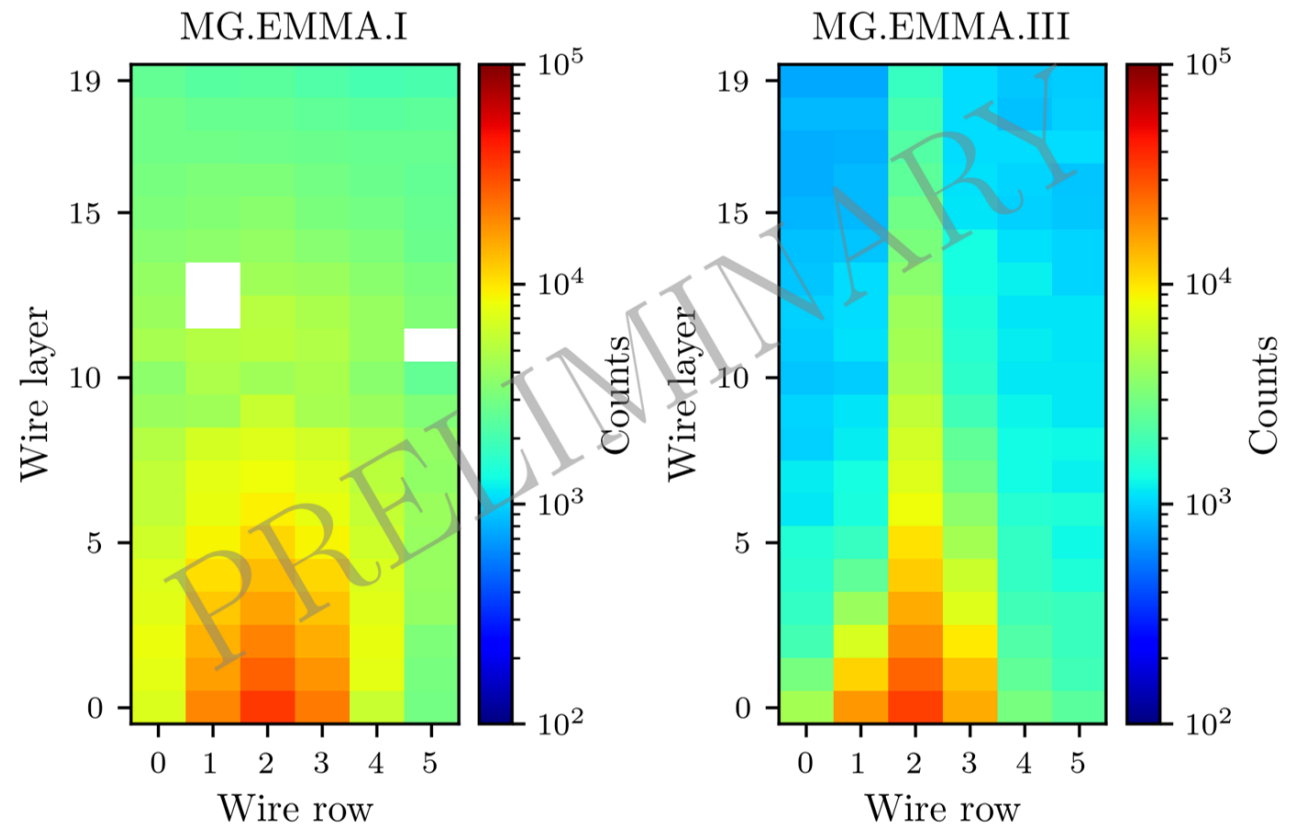
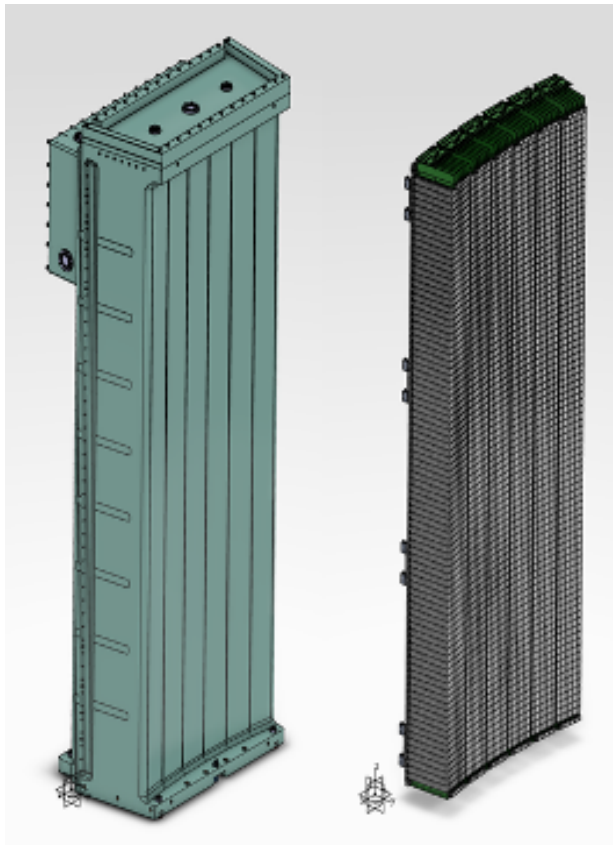


Installation of blocks in the bunker over the TREX instrument



^{10}B Multigrid detector: Ready for manufacturing.

STF (Lund University)



& Further very successful tests at ISIS
STAP discussion

TREX: The bispectral chopper spectrometer with PA.

Concerns
Choppers:



Figure 3: Left - M chopper disc M02 before test. Right - Test stand with remains from chopper disc after crash

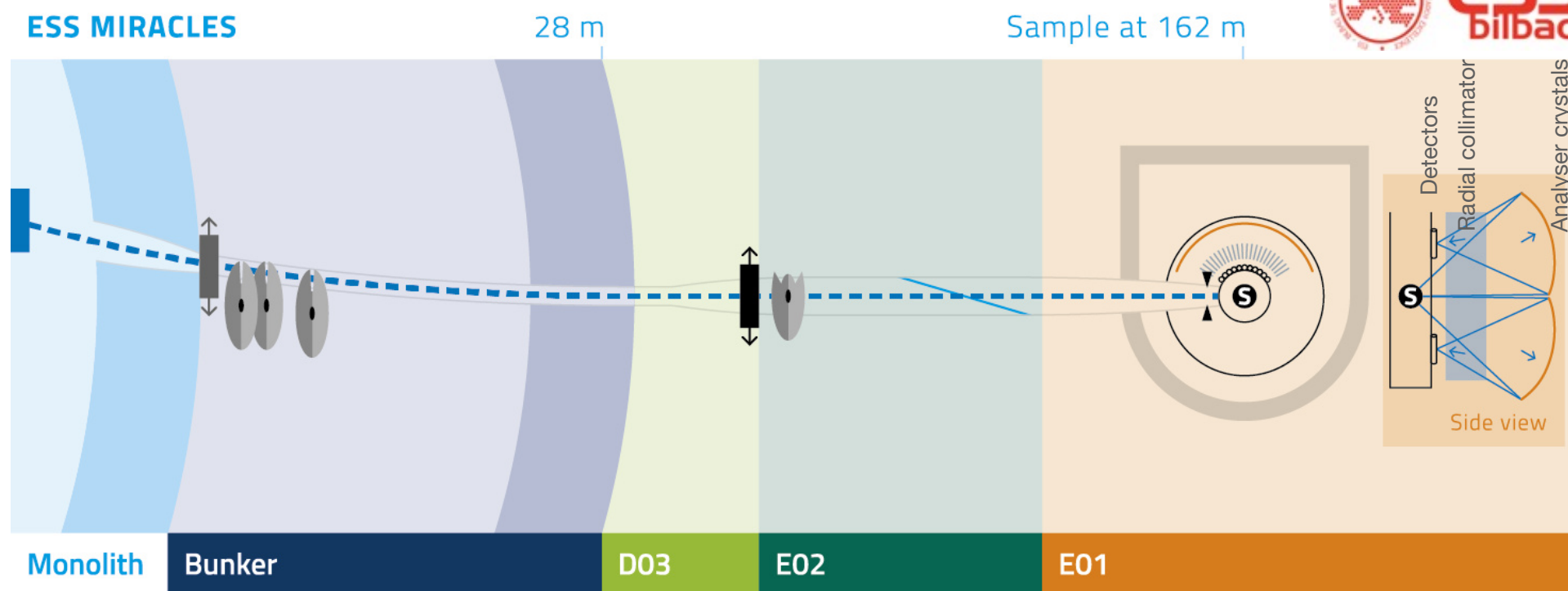
T-REX CHOPPER CONTINGENCY PLANS

STAP discussions

MIRACLES: High resolution backscattering spectrometer

TG5: June 2027

Lead scientist: Felix Villacorta (Bilbao), Jose Pereira (Bilbao), Benedetta Rosi (ESS), Data Scientist: Christian Beck
Lead instrument engineer: Alex Conde Estebanez (Bilbao)



Financiado por
la Unión Europea
NextGenerationEU

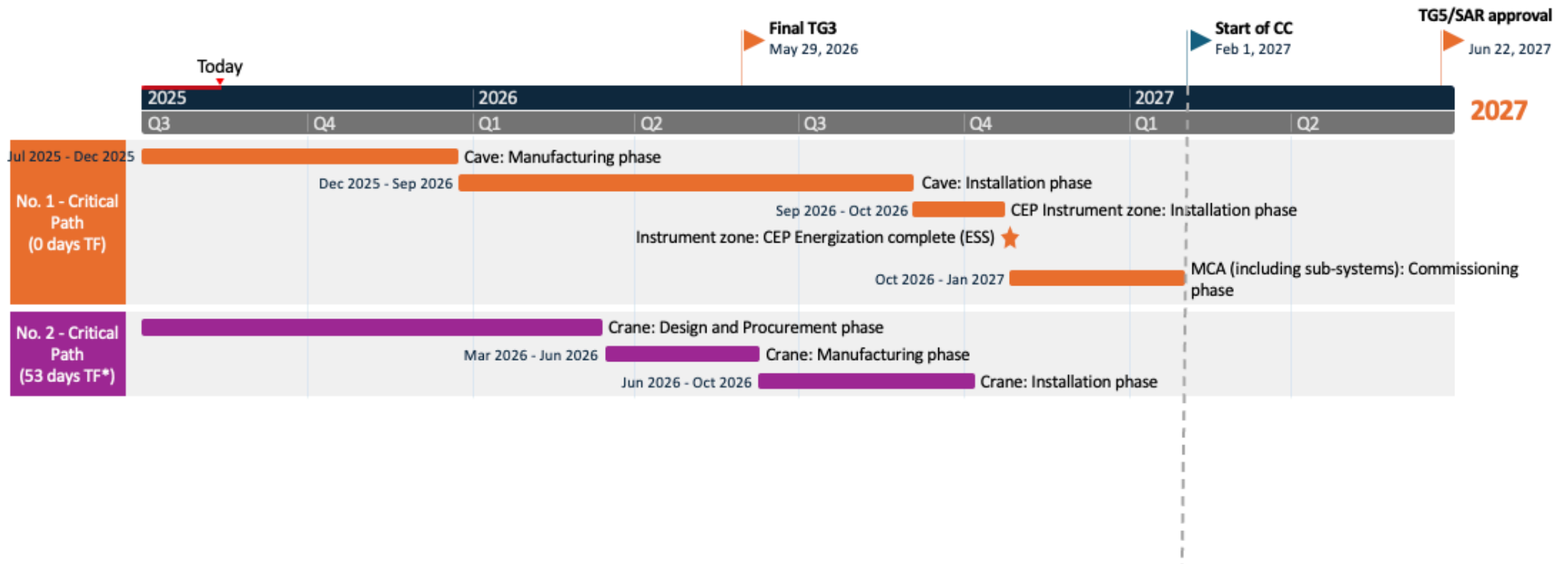


EUSKO JAURLARITZA
GOBIERNO VASCO

MIRACLES: High resolution backscattering spectrometer

TG5: June 2027

Critical paths



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TF: number days of **total float** to Instrument's TG5

MIRACLES

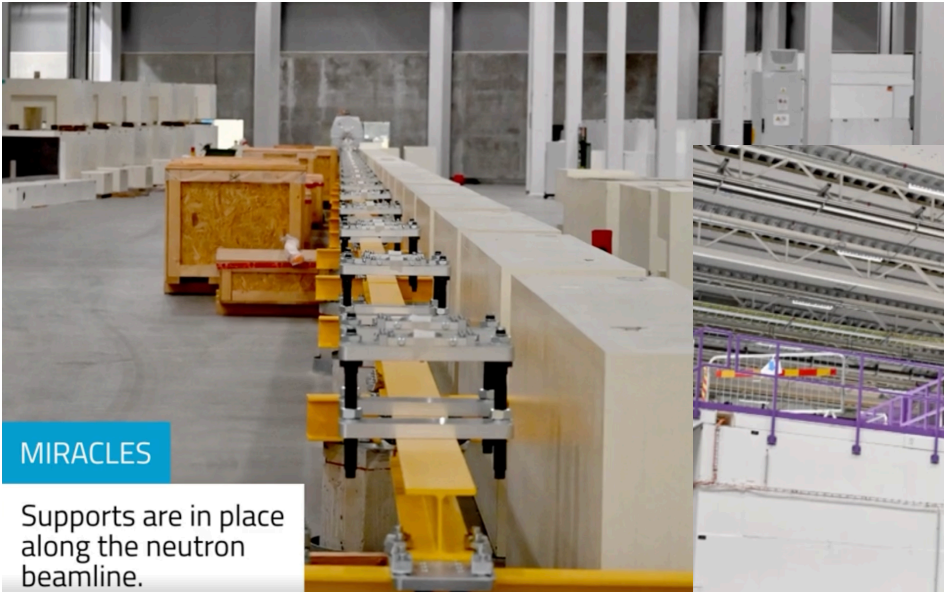


MIRACLES

Supports are in place along the neutron beamline.



MIRACLES



MIRACLES

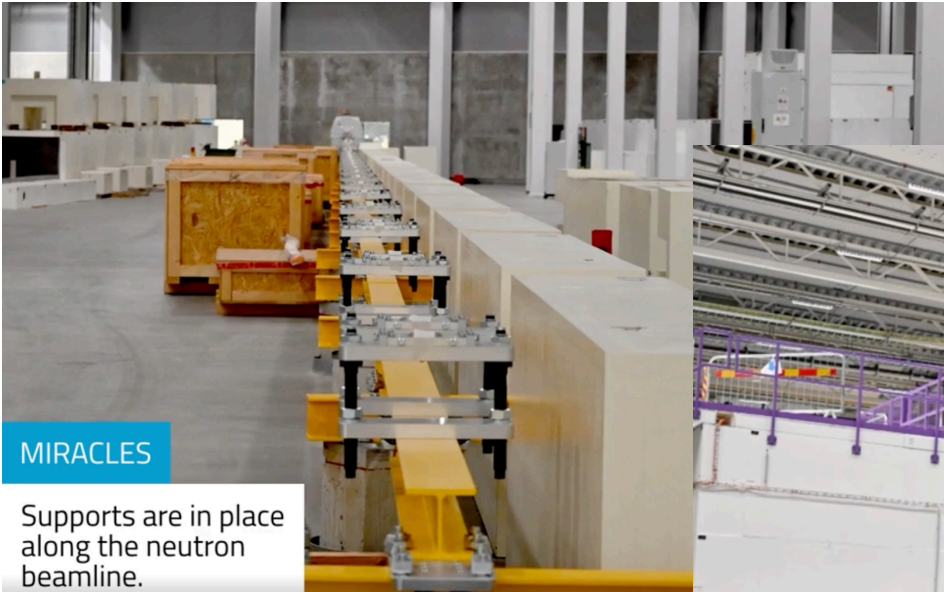
Supports are in place along the neutron beamline.



MIRACLES

The vacuum vessel is awaiting cave construction in the long instrument hall.

MIRACLES



MIRACLES

Supports are in place along the neutron beamline.



MIRACLES

The vacuum vessel is awaiting cave construction in the long instrument hall.



MIRACLES

Additional shielding blocks have been placed outside the bunker.

MIRACLES: High resolution backscattering spectrometer

Actions:

Choppers: Delayed delivery and technical challenges of fast speed choppers.

Technical solutions found. Choppers accepted.

Common projects not prioritised for Tranche 2/3 instruments: electrical and conventional utilities, monitors, detector scope.

Focus remains on T1 but solutions are being found (e.g. CEP/CUP contracts, detector solutions)

Lack of onsite staff

Position offered for instrument scientist based at ESS (October 2024), will need local engineering resources: position open for on-site engineer.

Benedetta P. Rosi, MIRACLES Scientist (ESS).

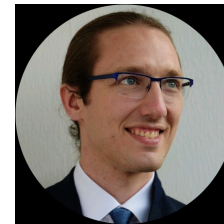
Antoni Simelio, Integration Engineer (ESS Bilbao, in Lund).

Erlantz Céspedes, Neutronics Engineer (ESS Bilbao, in Madrid), for the Radiation & Activation Analysis.



Data chain & workflow: Data scientist recruitment

Christian Beck has arrived.



Further concerns

Timeline for alignment & installation of Si analyser crystals

Detector testing (& infrastructure) at ESS : Solution Found.

Lack of Polyethylene around cave: To be discussed

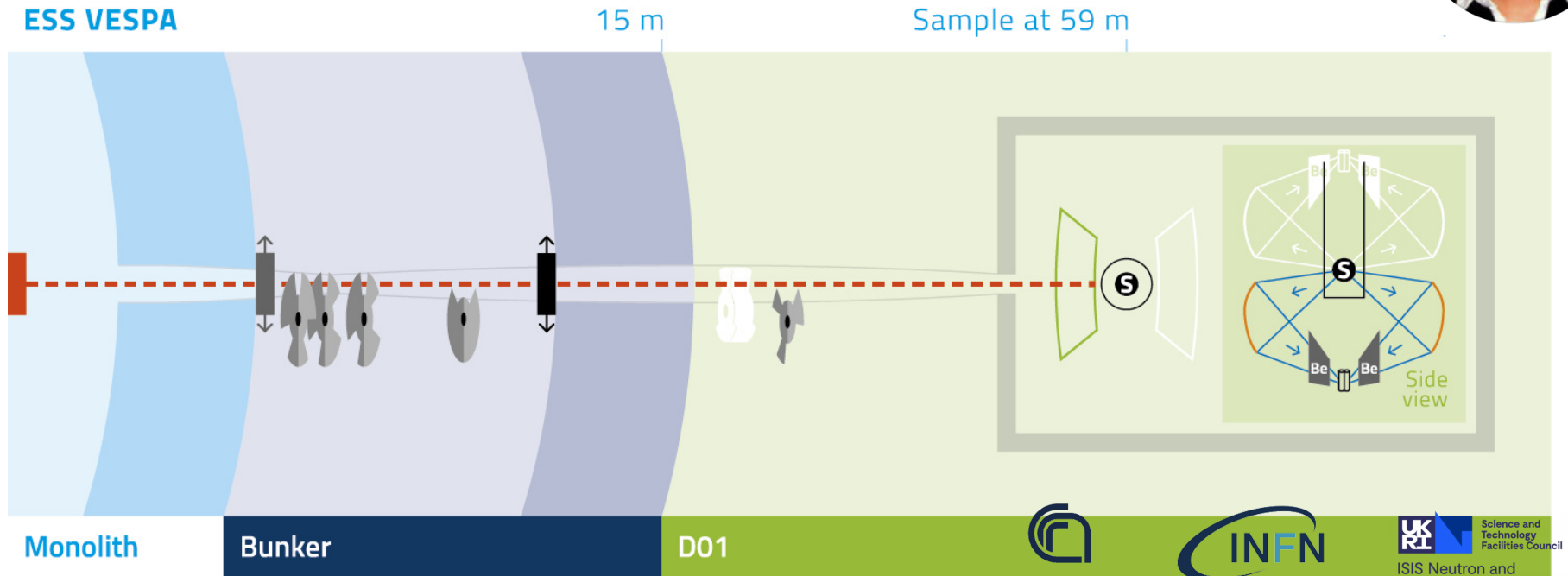


VESPA: The vibrational spectrometer of the ESS

TG5: November 2029 - Q2 2029.

Lead scientist: Adrien Perrichon (ESS): Scientist: [Monica Hartl](#)

Lead instrument engineer: Liam Whitelegg (ESS), Rosa Camilleri Lledó (ESS):



Direct view of the thermal moderator ($E_i = 3 - 1200$ meV)

Complex chopper cascade to achieve 3 subframes and variable resolution

Indirect-geometry crystal-analyser

Complex and compact secondary spectrometer:

500 ^3He tubes, 12000 HOPG crystals, 250 kg of cryo-cooled Be, in < 2 m³ volume.

VESPA: The vibrational spectrometer of the ESS

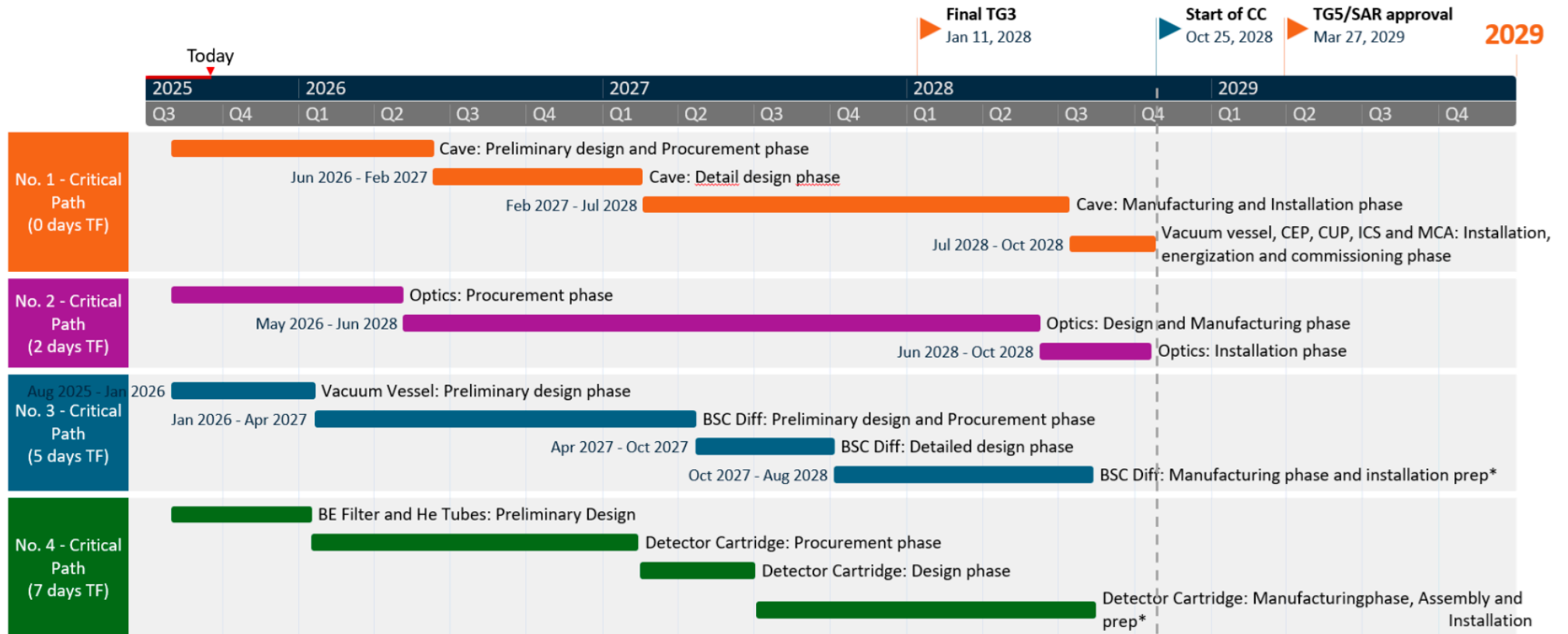
TG5: November 2029 - Q2 2029.



<i>Team members</i>	<i>Affiliation, %FTE</i>	<i>Role</i>
Adrien Perrichon	ESS, 100%	Lead Scientist
Monika Hartl	ESS, 100%	Instrument Scientist
Rosa Camilleri Lledó	ESS, 100%	Lead Engineer
Liam Whitelegg	ESS, 50%	Lead Engineer
Helen Popland	ESS, 100%	Mechanical Engineer
Alexander Johansson	ESS, 100%	Mechanical Engineer
Lorenzo Di Fresco	CNR, 50%	Project Engineer
Roberto Senesi	CNR, 20%	Project Sponsor

VESPA: The vibrational spectrometer of the ESS

TG5: November 2029 - Q2 2029.



Detailed design phase of secondary spectrometer

T0 chopper added to scope of instrument

Rescoping of complete Analyser Modules under discussion.

Supermirror guide tender completed (gained a few months)

Testing HOPG crystals at ISIS

Analyser prototyping

Preliminary design of VESPA secondary spectrometer : tender Q1 2026

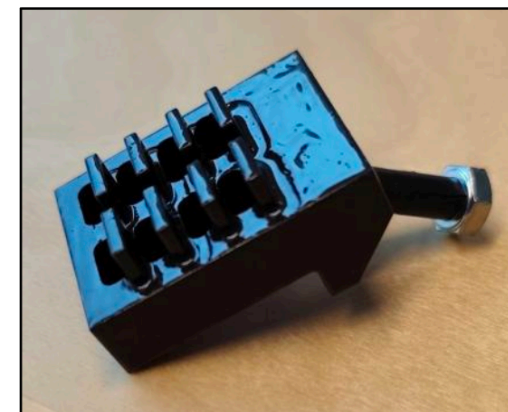
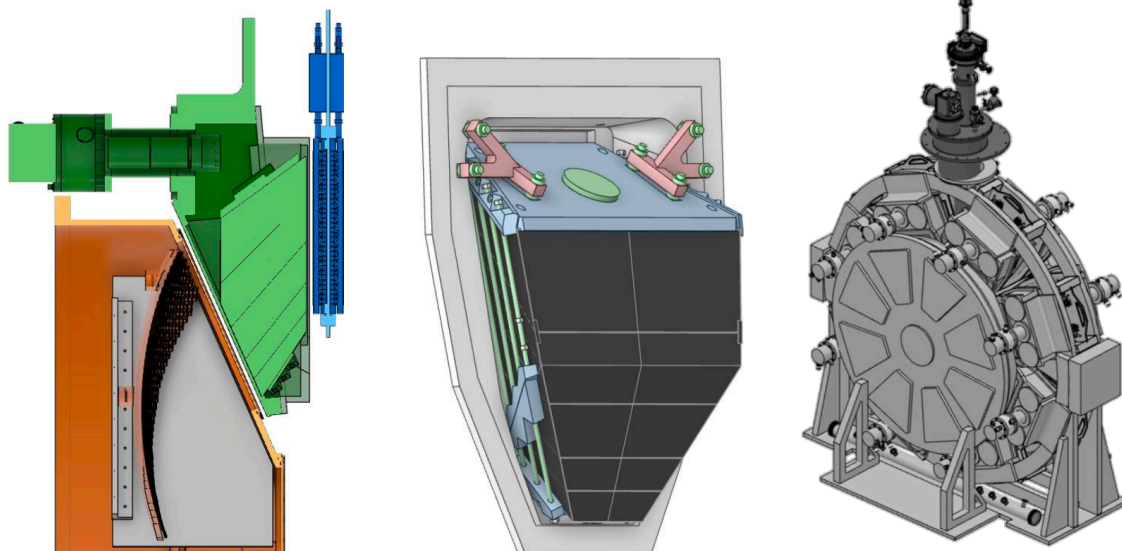


Figure 3 - Analyser prototype to evaluate the coating performance on MARI.



STAP Spectroscopy overview

PASCALE DEEN



Early science activities

Spectroscopy division

Deliver highly functioning instruments through detail oriented construction & commissioning.
Demonstrate the full scope of the spectroscopy instruments.

PASCALE DEEN

Instrument scientist at ESS

Duties and opportunities



Responsibilities:

Instrument duties:

- The instrument scientist team holds the responsibility of the scientific performance and configuration of the instrument and is responsible for the technical implementation of the instrument design and any upgrades.
- Ensure the successful completion of the neutron scattering instrument project in close collaboration with the instrument lead engineer.
- Focus on the installation of sample environment, detector capabilities and data curation and analysis.
- Follow and help if needed the installation of the neutron scattering instrument.
- Perform the commissioning of the neutron scattering instrument.
- Perform the planning, design, and evaluation of instrumentation concepts through calculations, simulations and test-experiments.
- Contribute to the development of relevant ESS support facilities and infrastructure



Scientific duties:

- Conduct scientific or technical research and author scientific or technical publications
- Establish and maintain constructive contacts with universities, laboratories and other relevant actors
- Take part in peer review of scientific publications, grant proposals, research, and facilities
- Represent ESS at appropriate conferences and workshops
- Present scientific and technical research at the relevant conferences and workshops, and in seminars and lectures.
- Engage with the scientific community through involvement in standards groups, conference organization and professional bodies as appropriate
- Supervise post docs and students and participate in teaching activities, as appropriate.

Developing the scientific culture



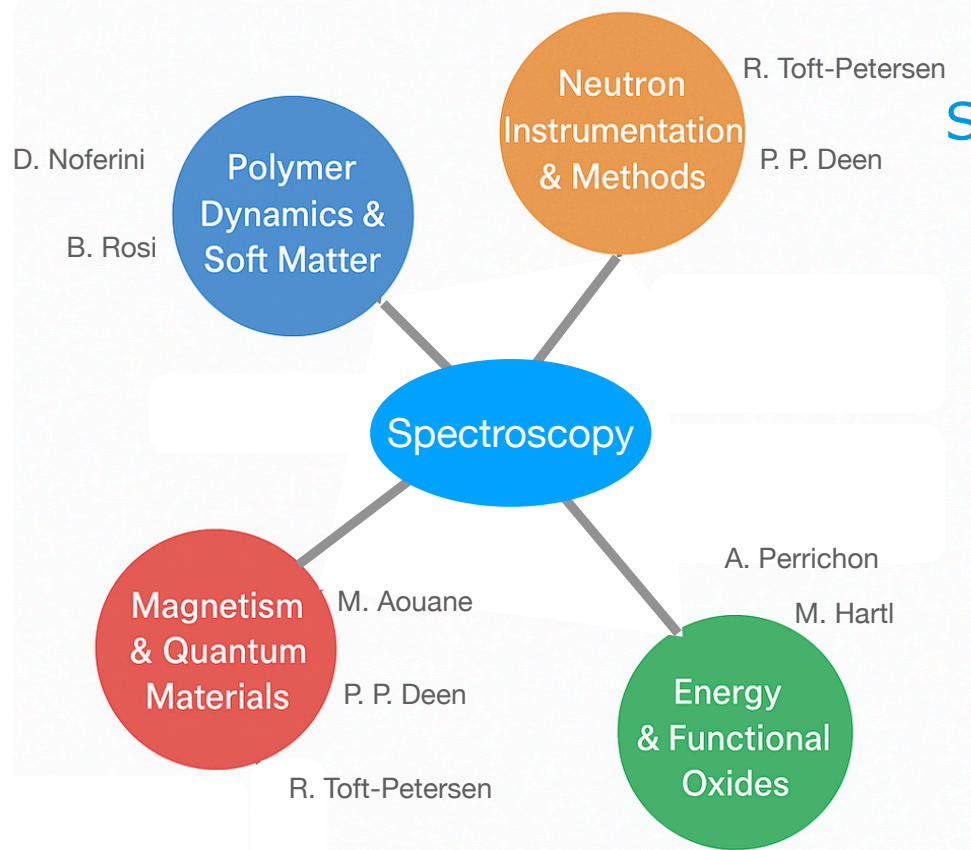
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(1) Conduct scientific research



- **Polymer dynamics and soft matter** (Entangled polymers, rubber)
- **Neutron instrumentation and techniques** (BIFROST, KVASIR, ortho–para H₂ studies)
- **Magnetism and quantum materials** (Nd₃BWO₉, TbPt₆Al₃, Bi₂Fe₄O₉)
- **Energy materials and functional oxides** (Ba₂In₁₈₅M₀₁₅O₅, Prussian Blue analogs, proton diffusion)



Scientific affiliations (guest or affiliation)



CHALMERS



LUNDS UNIVERSITET



UNIVERSITY OF
COPENHAGEN

(2) Grant proposals & further initiatives



ESS Lighthouse: Magnetism and Quantum Materials (Q-MAT)

As a part of the Lighthouse activities, we will expand the use of neutron scattering in the Danish community of materials research. Universities and Institutes.

New research lighthouse to focus on developing better food ...

21 jan. 2025 — A new research center focusing on the potential of **neutron-based methods** to revolutionize pharmaceutical and food sciences.

- Development of sample environment for simultaneous neutron spectroscopy and electrochemical impedance spectroscopy at the ESS.
- In-situ investigations of local dynamics and structures of light harvesting complexes of plants.
- TIMENESS - Time-resolved Neutron Spectroscopy and Scattering for structure–dynamics relations during molecular assembly.
- Theoretical technologies to support MAX IV and ESS.
- Development of sample environment for inelastic neutron scattering under an electric field.
- Development of next-generation in-situ light illumination kit for neutron spectroscopy on powders, single crystals and thin films.
- MILD Combustion with Nitrogen and Carbon Dioxide Reforming.

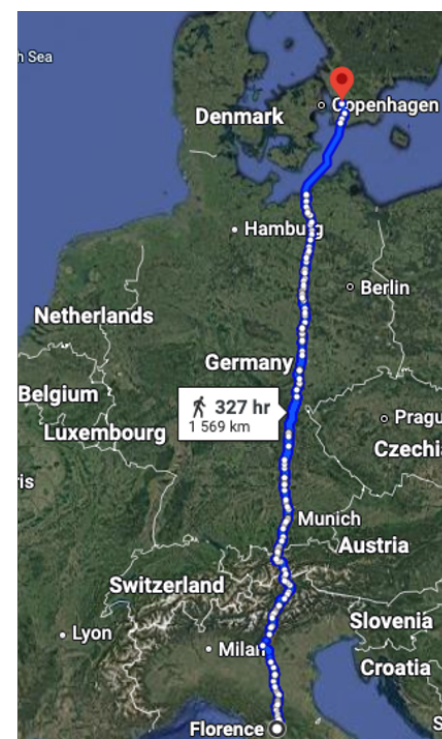
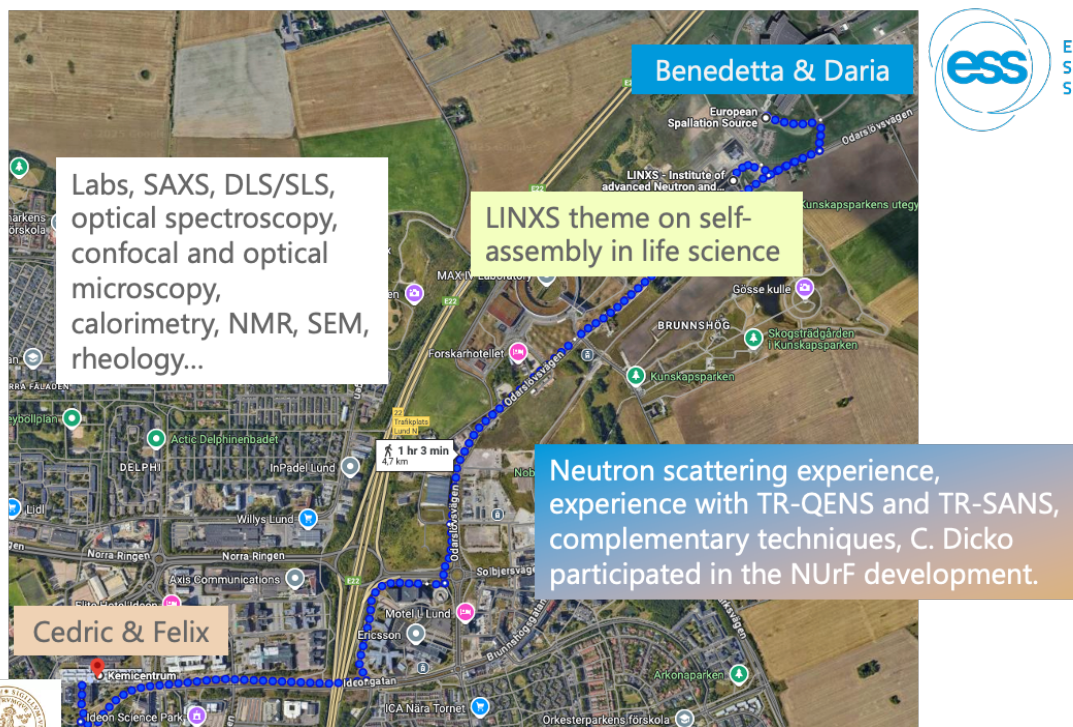
(3) Early science ESS Post-Doctoral fellow (ESS-Spectroscopy, Soft Matter)

Daria Noferini & Benedetta Rosi (Cedrik Dicko & Felix Roosen-Runge)



Evolution of structure and dynamics during assembly pathways of silk-based materials

Time-Resolved Neutron Scattering on Silk-Based Materials, working at the intersection of biomaterials science, soft matter physics, and neutron scattering methodology.



Innovative silk-based systems for cultural heritage conservation



UNIVERSITÀ DEGLI STUDI FIRENZE

(3) Early science Post-Doctoral fellow (ESS-Spectroscopy, Magnetism)

Pascale Deen, Rasmus Toft Petersen.

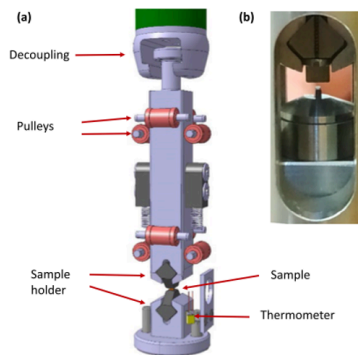


Uniaxial pressure to perturb exchange interactions in quantum materials.

PSI cell
Knowledge transfer
Operating capabilities

Stepper motor generates in-situ force
Force up to 200 (compressive and tensile)
Feedback allows operating system in a continuous pressure mode

Sample environment group
Control software (ECDC)
DMSC (Spurion determination)



ESS cell
Knowledge transfer
Operating capabilities

2 GPa compressive pressures
In-situ force determination
Cryogenic temperatures
Non-magnetic (PA)

Sample environment group
Control software (ECDC)
DMSC (McStas, Spurion)
Consider neutron activation

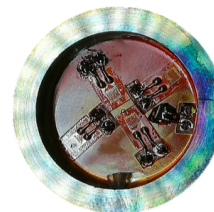


Figure 1. Photo of the 4 strain gauges and the PT100 thermometer which have been glued onto the CuBe cage. Photo taken before wires have been soldered.

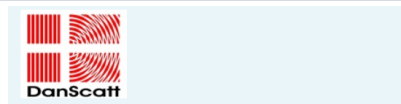


In-kind post doctoral position with DTU.

(4) Workshop and conference participants

Workshop on tools for analysis of coherent excitations | Jul 11 | Copenhagen, Denmark

This workshop will focus on actionable steps to overcome challenges in data analysis and modelling for neutron spectroscopy. Brief technical talks will also highlight cutting-edge theoretical methods alongside insights into data analysis strategies at leading facilities. Ample time will be allocated for group discussions, fostering collaboration and allowing for the development of a shared path forward and a coherent vision for the community. Registrations are currently open. [View this event](#)



PAQMAN | Jul 2 - 4, 2025 | Sola, Norway

PAQMAN is a workshop that explores how advances in neutron scattering instrumentation (particularly polarization analysis), data analysis, and simulations can be harnessed to understand diffusion and other slow dynamics in a broad range of systems. The workshop will take place between the 2nd and 4th of July 2025 and will gather up to 60 scientists for 2.5 days of presentations and discussions. [View this event](#)

Neutron Scattering Group



Società Italiana di Scienze Neutroniche
Associazione di Promozione Sociale

- Daria Noferini: Local responsible for Sweden for the Italian neutron scattering society (SISN)
- Pascale Deen: Board of UK neutron scattering society



In conclusion: Early science activities for spectroscopy



First science workshop (Bifrost) will hold similar ones for other instruments.
Not the right time yet.

Focussing on ensuring functionality for day 1 (BOT):

- Testing endlessly the data acquisition chain, resolving grounding issues.
- Sample environment for Bifrost (orange cryostat, high magnetic field).

Ensuring all instruments are optimised: shielding, full scope.

Scientists must remain scientifically active to deliver excellent instruments.

Strong community engagement and communication (manage expectations).



Early science activities

Spectroscopy division

Deliver highly functioning instruments through detail oriented construction & commissioning.
Demonstrate the full scope of the spectroscopy instruments.

PASCALE DEEN

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Neutron Scattering
Gordon Research Conference

Neutrons as a Probe to Drive Our High-Technology Society

April 26 - May 1, 2026

[Apply Now](#)

GRC Education Requirements: Undergraduates or those who have not obtained a bachelor's degree in science/engineering (or acceptable equivalent) are not eligible to apply to attend Gordon Research Conferences or Seminars.

Chairs

Pascale Deen and Yun Liu

Vice Chairs

Vanessa Peterson and Efrain E. Rodriguez

Rey Don Jaime Grand Hotel

Avinguda de l'Hotel
Castelldefels, Barcelona, Spain

[Venue and Travel Information](#)

