BIFROST

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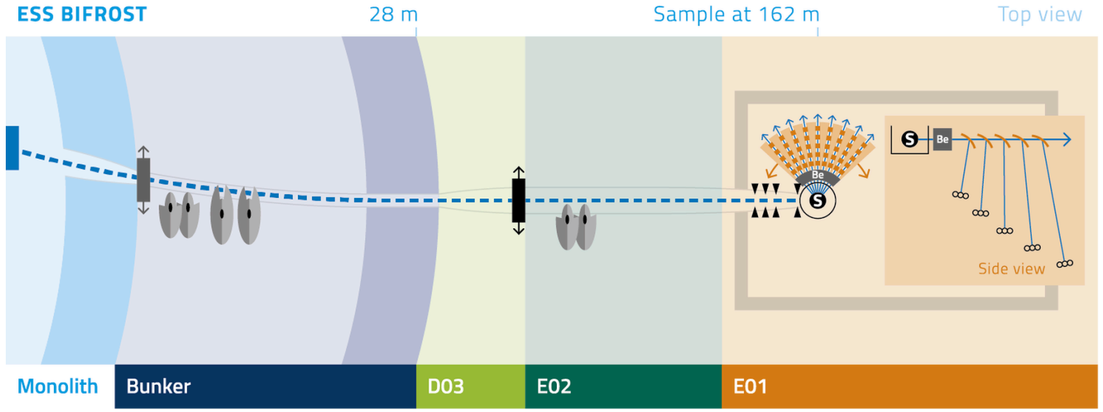
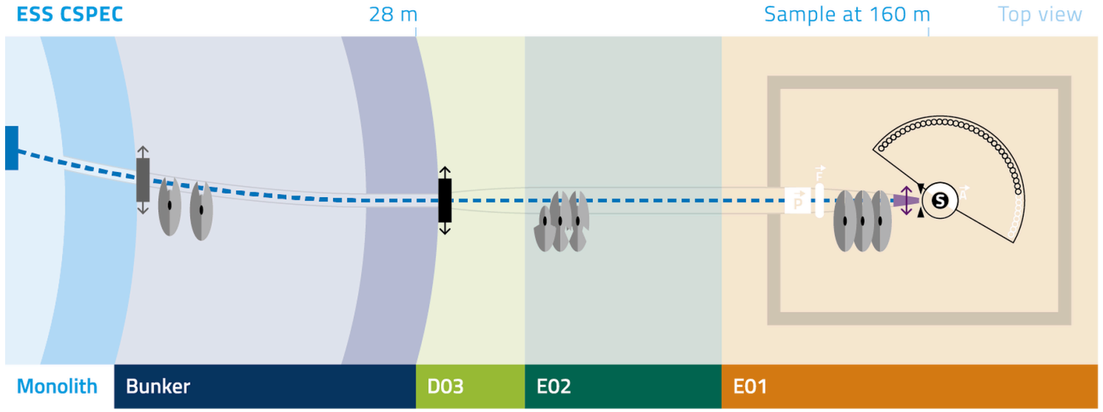
Overview

- BIFROST & CSPEC
- Njord & Remora
- Outlook

BIFROST & CSPEC

Spectrometers





- Indirect geometry multiplexing spectrometer
- $2.7 \leq E_f \leq 5.0$ meV

- Direct geometry spectrometer
- $N \leq$ ~10 monochromatic E_i RMM sub-frame pulses

Readiness

DMSCSPEC issue overview

109 non-epic issues, grouped by milestone. Pill fill encodes status, border encodes instrument, and tooltips carry JIRA metadata.

Done | In Progress | To Do | BIFROST | CSPEC | Shared

Cold Commissioning
19 issues

11 | 5 | 3

2 | 3 | 4 | 5
6 | 22 DR | 23 DR | 28 DR
29 DR | 65 EC | 68 AQ+1 | 26 DR
27 DR | 45 DR | 64 AQ | 67 AQ+1
21 DR | 48 DR | 70 AQ+1

Hot Commissioning
60 issues

22 | 8 | 30

25 DR | 31 DR | 32 DR | 34 DR
49 DR | 50 DR | 82 DR | 83 DA+1
92 | 93 | 94 | 95
96 EC | 101 DST | 102 | 103
104 AQ+1 | 105 DST+1 | 107 EC | 108 DA
116 | 117 DST+1 | 30 DR | 38 DR
51 DR | 58 DM | 86 DR | 87 DR
114 AQ | 121 | 35 DR | 36 DR
37 DR | 39 DR | 40 DR | 41 DR
46 DR | 52 DR | 66 EC | 69 AQ+1
84 DA+2 | 85 DR | 88 DC+2 | 89
90 | 91 | 97 AQ+1 | 98 AQ+2
99 DC | 100 DST | 106 | 109 DC
110 DR | 111 DA+1 | 112 AQ+1 | 113 DA+1
115 | 119 | 120 | 122

First Science
11 issues

2 | 1 | 8

72 SIMS+1 | 80 SIMS | 53 DA | 42 DR
44 DR | 54 DA | 59 DM | 60 DM
71 AQ+1 | 73 SIMS+1 | 79 SIMS

User Operations
17 issues

1 | 0 | 16

62 DM | 24 DR | 33 DR | 43 DR
47 DR | 55 DA | 56 DA | 57 DA
61 DM | 63 DM | 74 SIMS+1 | 75 SIMS+1
76 SIMS+1 | 77 SIMS+1 | 78 SIMS+1 | 81 SIMS
118 ECDC

Unscheduled
2 issues

0 | 0 | 2

124 | 125

Task highlights

Ongoing

- Better simulations
- Raw data format
- Normalization
- Team training

Queued

- Simulated HC
  - calibration
  - spurions

Waiting

- Metadata definition
- Catalog integration

njordremora.org

Njord & Remora

Two proposed spectrometers for the European Spallation Source

Proposal: Njord & Remora

Posted **Mar 19, 2026**

By **Njord & Remora**

2 min read

Executive Summary

Njord and Remora are presented as a paired instrument concept for the European Spallation Source: one instrument tuned for ambitious small-sample science, and a second, symbiotic spectrometer designed to increase user capacity. Together they aim to unlock measurements that are currently out of reach for cold neutron spectroscopy, especially for materials with very small crystals, weak signals, or demanding sample environments.

The proposal focuses on two linked problems: important science cases are being limited by neutron flux and sample geometry, and the community also needs more beamtime. Njord addresses the first by pushing the available brightness into a tightly focused beam, while Remora uses the remaining spectral window to add a complementary direct-geometry spectrometer on the same beamport.

Background

Many of the most interesting neutron-scattering subjects are also the hardest to study. Metal-organic frameworks, organic superconductors, quantum magnets, pressure-tuned materials, are systems where the relevant signals are weak, the samples are tiny, or the experiments need extreme sample environments such as pressure cells and large-field cryomagnets.

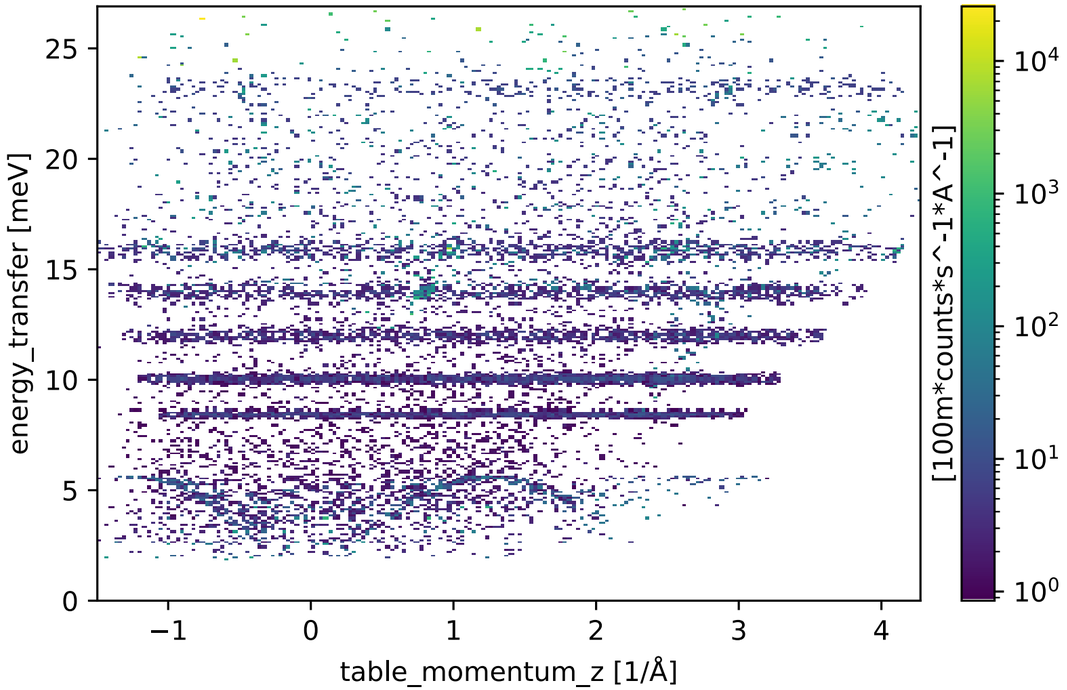
Existing instruments often run into practical limits before the science is exhausted. For some questions the samples are simply too small; for others, the signal is buried in background or the required measurement time becomes prohibitive. This as both a scientific opportunity and a capacity challenge for the European neutron community.

Outlook

Calibration routines

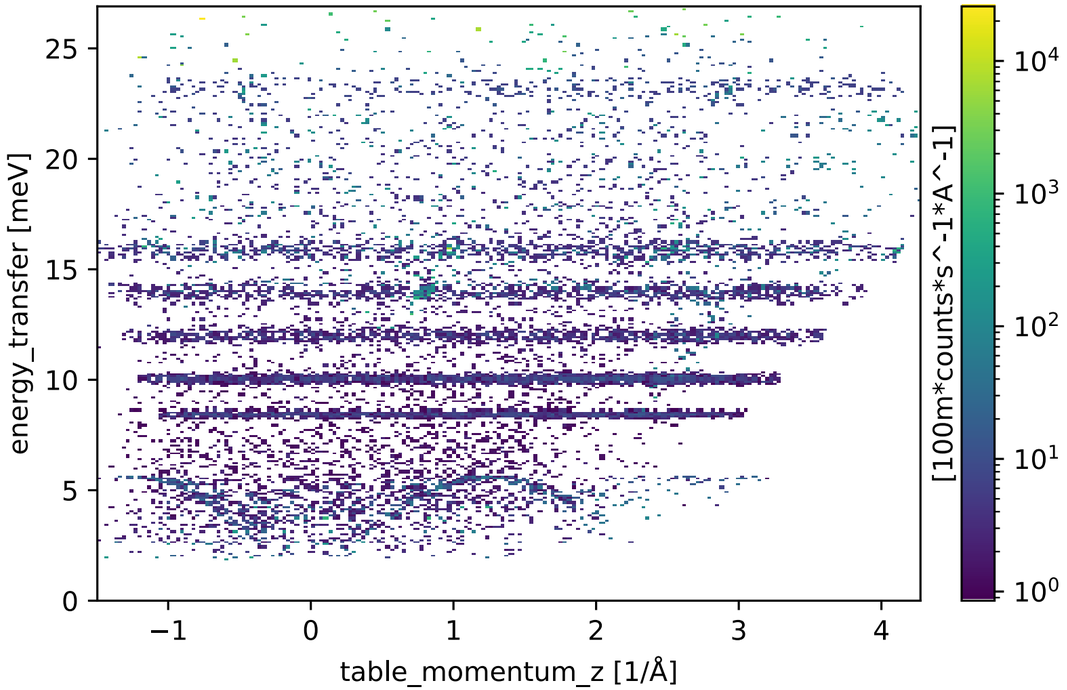
- Needed for detector charge division
- Define and test methods

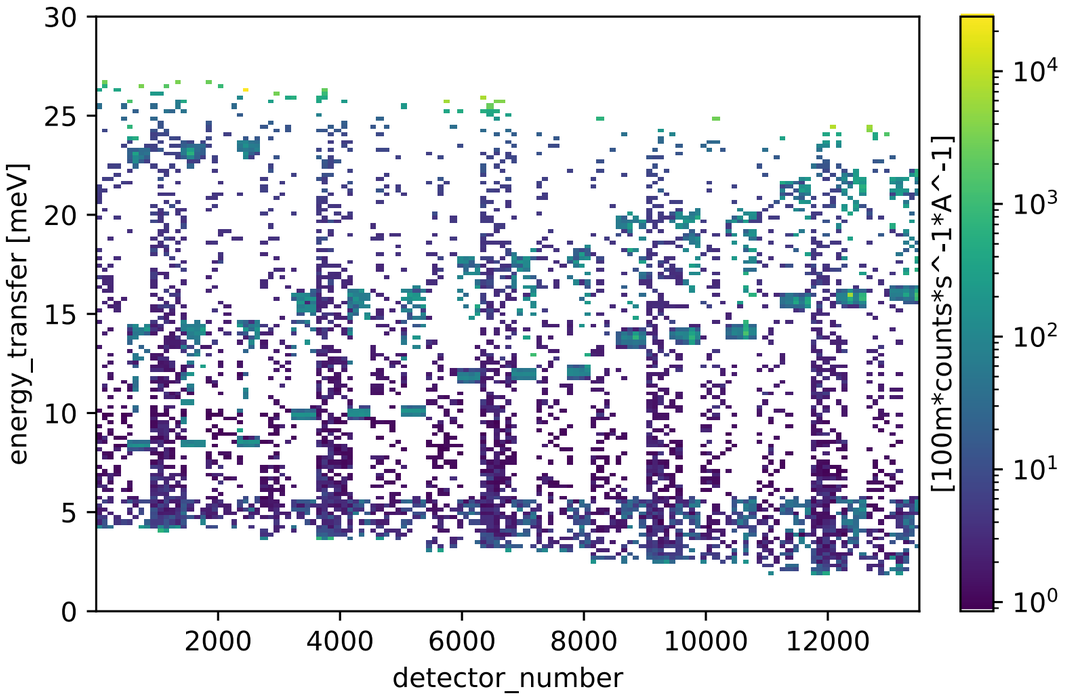
Spurions



- Phonon & incoherent elastic scatterer
- 6.8 < E_i < 26.15 meV
- Be filter for E_f > ~5 meV suppression

Spurions

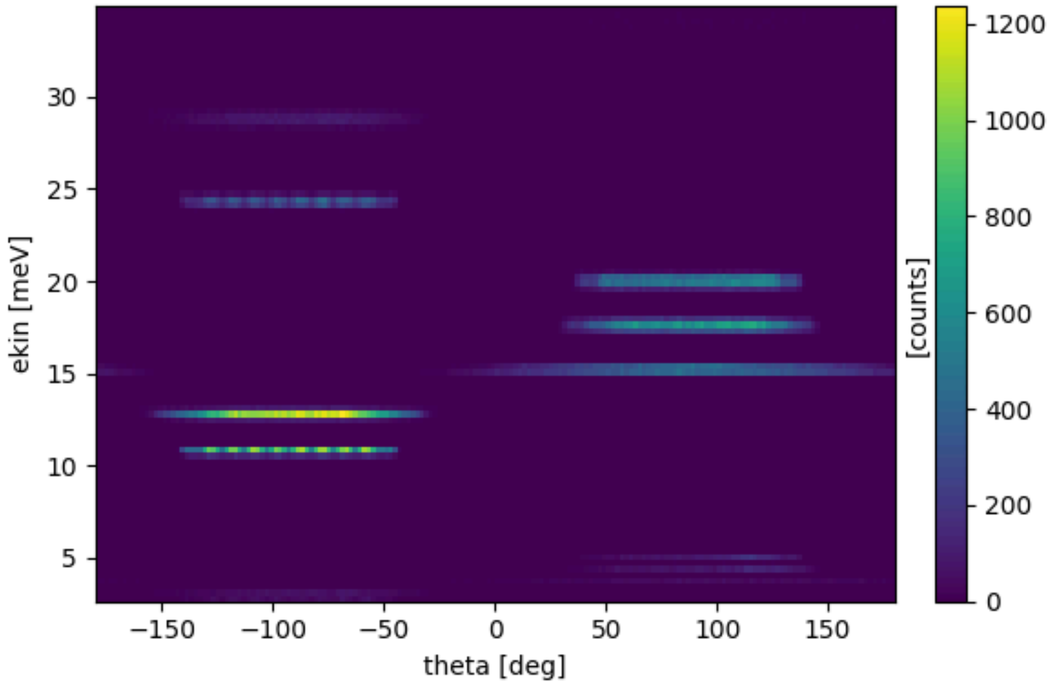




- Phonon & incoherent elastic scatterer
- 6.8 < E_i < 26.15 meV
- Be filter for E_f > ~5 meV suppression

- Over representation of low-probability events
- $\boldsymbol{\lambda/2}$ (*and* $\boldsymbol{\lambda/3}$ for E_f = 2.7 meV)

Spurions (cheating)



- Final state of McStas rays that hit any detector
- θ is in-plane direction angle:
  - $\theta < 0$ is towards sample
  - $\theta > 0$ is away from sample

Digital Instrument

- ~~Twin~~: Engineering/Maintenance tool
- *Shadow*: Scientific stand-in

A digital shadow can enable better understanding of an instrument

1. User training
2. Experimental method development
3. Resolution effects

Coded Aperture guide diagnostics

- Characterize the guide (position, divergence) phase space in one* shot
- Fingerprint the guide to detect and diagnose problems
- Digital shadow needed
  - for aperture design
  - for experimental proceedure design
  - for data analysis design

Tutorial

1. Log in at visa.ess.eu
2. Create a new instance for proposal **741872** *Testing the system for ESS*
3. Connect via `JupyterLab` and launch a `Terminal`
4. Execute `bash /ess/data/bifrost/741827/derived/setup.sh`

```
#!/bin/bash
src="/ess/data/bifrost/741872/derived/tutorial/"
dst="${HOME}/tutorial"
rsync -a --chmod="+w" "${src}" "${dst}"
echo "BIFROST tutorial files in ${dst}"
ls -lh "${dst}"
```

5. Open `exercise.ipynb` in the created `tutorial/` folder.