

DREAM First Science April 2025: First samples

ESS Ramp Up Assuming BOT Nov 2025



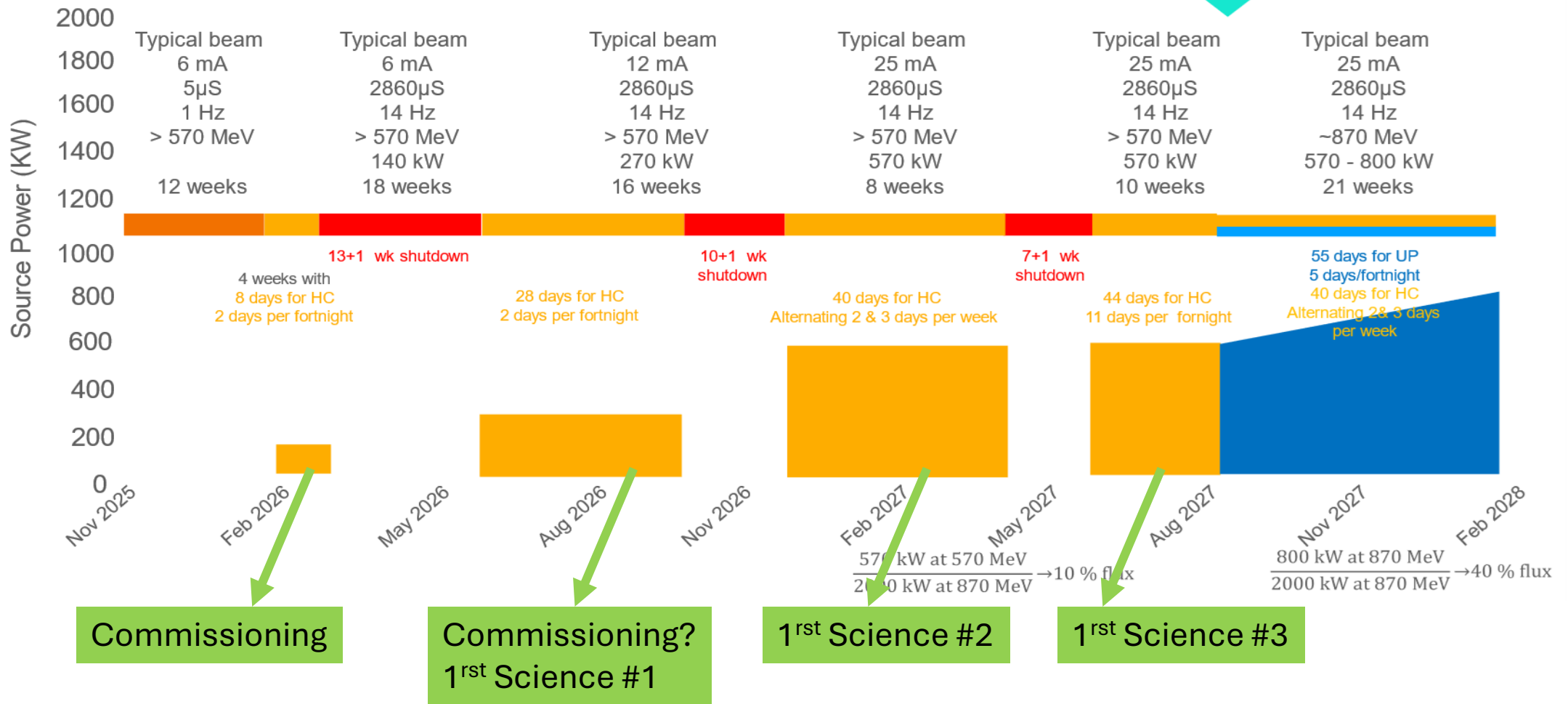
Accelerator commissioning & TBL

Hot commissioning

Shutdown

Users

18 months after
BOT
First users



Available techniques

Data Reduction (C. Durniak, IDS)	Status
Generic reduction tools	
Powder Diffraction	Done (1D)
PDF	In progress (60 % done)
Polarization (with A. Stellhorn)	In progress (just started)
SANS	Not started (adaptation from LoKi)
Single Crystal Diffraction	Not started – New IDS

Sample	Availability	Test
V-rods various diameters	ESS	Detector homogeneity
NAC	ESS+order	Powder
Y ₂ O ₃	ESS	Powder
Diamond	ESS	Powder
Silver behenate (AgC ₂₂ D ₄₃ O ₂)	ESS	Powder
Silica spheres	ESS	SANS
Al oxide spheres	ESS	SANS
LaB ₆	June2025	Powder
Al ₂ O ₃ (Merck)	ESS	Powder
YIG single crystals	Ordered	SXD
<i>NIST Si</i>	<i>unclear</i>	<i>Powder</i>
<i>NIST Al₂O₃</i>	<i>unclear</i>	<i>Powder / SXD</i>

Availability of sample environments

Dry cryofurnace (pool)	2025	6.5T magnet	2025
He-cryofurnace (pool)	End 2025	8T magnet	End 2026
Dilution fridge(pool)	2026		
Heat gun/cryojet + changer	End 2025	Cold Polarizer (Dream, RAC)	Mid 2026
Vanadium furnace	End 2026	SANS Analyzer	2026
		Wide angle analyzer	End 2026
HP cryostat	2025		
PE press	2024	Gas manifold (3 gas, 0-30b)	2025
Gas pressure cells	2024	I-sorb cell for gas injection	Design
Clamp cells	2025		
Liquid pressure cells	2024	Potentiostat (electrochem.)	2024
DAC	2027	Cells (electrochem.)	Design

Experiment	Sample / Availability	Technique (s)	Sample environment	Feasibility Instrument/Sample/ SE	Beam Phase	Comments / Evaluation
					1	
4.1 Transition metal monoxides	NiO / Paul end 2025	NPD	RT (Cryofurnace) (Furnace)	9 / end 2025 / Y Ranking oxide: Ni> Mn > Co >Fe	1	High resolution should work Small basic cells
	MnO /end 2025	„	Cryofurnace	end 2025	„	
	FeO /end 2025	„	Cryofurnace	end 2025	„	
	CoO /end 2025	„	Cryofurnace	end 2025	„	
4.2 Zeolites and MOFs	MFI / ESS ➔ MOR? / ESS	NPD	Cryofurnace Gas manifold (IP sorb)	6 / Y / Y (MFI) 8 / Y / Y (MOR)	3	Low Q coverage is poor
	MIL-53 / ESS	„	Cryofurnace	8 / Y / Y (MIL-53	3	
	MOF-74-1 / synthesis at ESS	„	Cryofurnace	8 / Y? / Y	3	
	MOF-74-2 / synthesis at ESS ?	„	Cryofurnace	5 / ? / Y	3+	
4.3 Electrode materials in pristine state	Li2M2W2O9 M= ?	NPD	RT only?	7 / ? / Y	2	Medium resolution, Sample size?

Experiment	Sample / Availability	Technique(s)	Sample environment	Feasibility Instrument/Sample/ SE	Beamtime Phase	Comments
					1	
5.1 Perovskites & complex oxides	Fe ₂ O ₃ / commercial or Paul (early 2026)..	NPD	Cryofurnace	9 / ? / Y Rank #3	2-3	High resolution, small cells Clean sample may need heating if commercial → Paul
	CaTiO ₃ /commercial or Paul (early 2026)	„	Cryofurnace	Rank #2	„	Distortion, HR
	LaCrO ₃	„	Cryofunace	„	„	See M. Salberg
	LaMnO ₃					Benchmarking only...
	Co ₃ O ₄	„	Cryofurnace	„	„	Check if distorsion or not – Interesting?
	Fe ₃ O ₄ / Paul Available (early 2026)	NPD + PDF + polSANS	Cryofurnace + Furnace + Polarisation	9 / ? / Y (Temperature only) Rank #1!		Verve splitting , cryo
5.2 Small samples with cation disorder	AA'BB'O ₆ double-double perovskite Paul, ad hoc composition,	NPD PDF?	Cryofurnace	4 / ? / Y	3	Sample size 20 mg/synthesis Ideally 1 synthesis → measurement / Neutron flux is critical. Low Q coverage for complex magnetic structure

Experiment	Sample / Availability	Technique(s)	Sample environment	Feasibility Instrument/Sample/ SE	Beamtime Phase	Comment
5.3 Hydrogen-containing samples	[CH₃NH₃][Co(CO OH)₃] / Romain End 2025 Deuterated?	NPD	Cryostat	9 / End 2025/ Y	1 2	Peak splitting, magnetic peaks, large quantity available, SX???
	Mn_x(OH)₂(C₆H₂O₄ S)_y Part. Deut.? Romain	NPD	150 C, Hydrothermal V-can holding the pressure, to be discussed	4 / ? / ?	3+	Background level critical. Multiple phases? rather complex cell
	FeB	NPD + PDF	?			
	Zn₄Si₂O₇Cl₂	NPD+PDF	?			

Experiment	Sample / Availability	Technique(s)	Sample environment	Feasibility Instrument/Sample/ SE	Beamtime Phase	Comment
					1	
5.4 Energy materials	X-NMC after cycling Compo.? Gwen?	NPD PDF? nanoSANS?	-	8 / ? / Y NMC	2-3	Ex situ on NMC: should work
	HKUST-1	NPD	-	3 / ? / Y HKUST-1	2-3	Low Q coverage needed for HKUST-1 + 1H background
	Rb/Cs H2PO4	NPD PDF?	RT, furnace?, cryofurnace?	6 / ? / Y	3	Small cells 1H background, sample crystallinity/size?
	Li-argyrodites	NPD PDF?	RT, furnace?, cryofurnace?	8 / ? / ?	3	Small cells Sample crystallinity/size?

Experiment	Sample / Availability	Technique(s)	Sample environment	Feasibility Instrument/Sample/ SE	Beamtime Phase	Comment
5.5 Incommensurate magnets	(Tb,Y)Mn 6Sn Romain end 2025	NPD	Cryofurnace	6 / ? / Y	1 2-3	Low Q coverage needed (MnGe :Q~3nm) Magnetic structure in lower crystal class → Distortion?? → HR measurements
	CoZnMn Romain end 2025	NPD	Cryofurnace	„	„	
	CeAlGe Romain end 2025	NPD	Cryofurnace	„	„	
	MnGe Romain end 2025	NPD	Cryofurnace	„	„	