Summary and Close-Out

Valentina Santoro

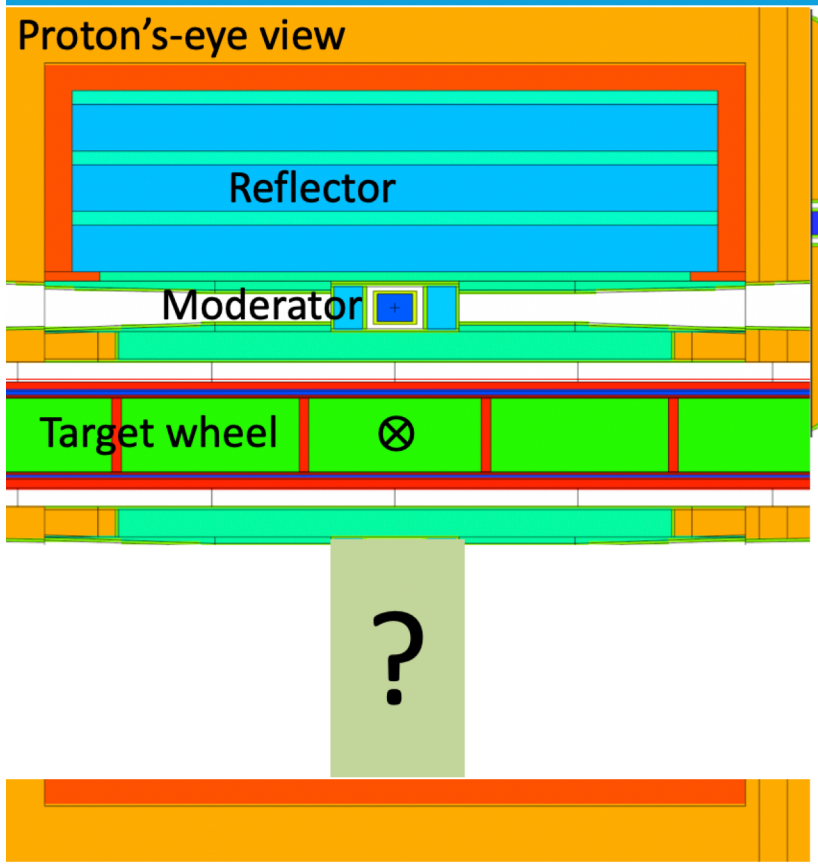
HighNESS kick-off Meeting, 26 October 2020

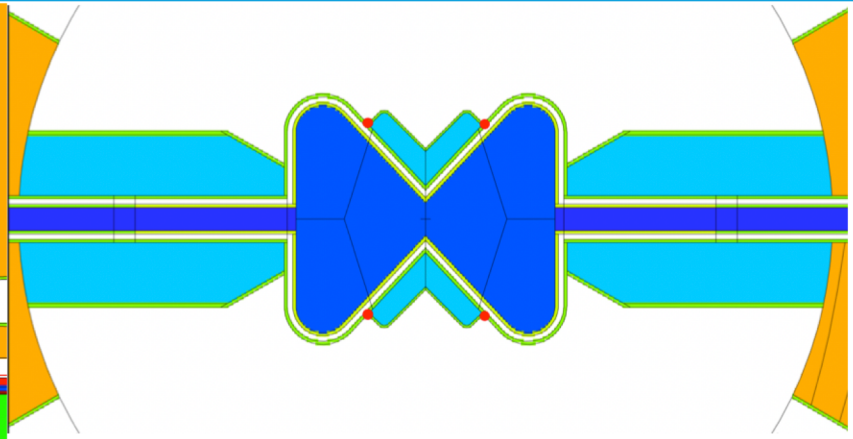

Andreas Schreyer
73%
complete

Moderator flexibility

Bottom moderator

Andreas Schreyer





All beamport inserts (3.5 m long) can view top and bottom moderator

- Dedicated moderator for single beamline
  - directional
  - particle physics
- General-purpose moderator available to all
- High-intensity moderator
  - up to 240 mm viewable height
- VCN source
- UCN source

Workflow

WP2: Douglas Di Julio,
José Ignacio Marquez Damian

Task 2.2

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Task 2.1

ess

NCrystal

Molecular Dynamics (liquids)

DFT (solids)

Atomic Structure

Frequency Spectra

Magnetic Scattering

Incoherent Scattering

Bragg Scattering

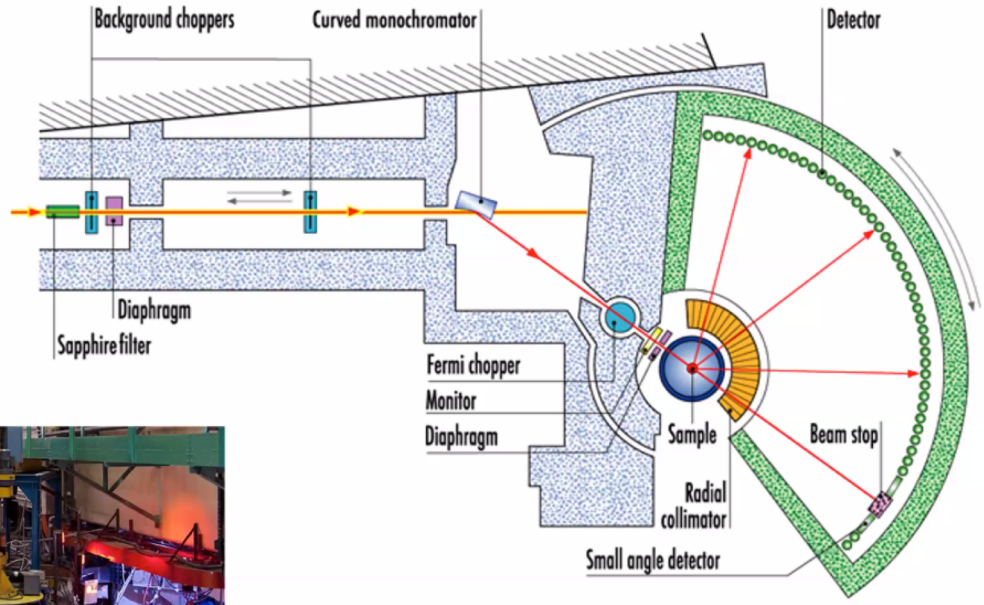
Small Angle Neutron Scattering

Dynamic Structure Factor

Neutronic Monte Carlo Simulation (OpenMC, MCNP, PHITS, Geant4, McStas)

Experimental program for HighNESS uses ILL's instrument suite, notably:

WP3: Oliver Zimmer



Time-of-Flight spectrometers IN5 and Panther

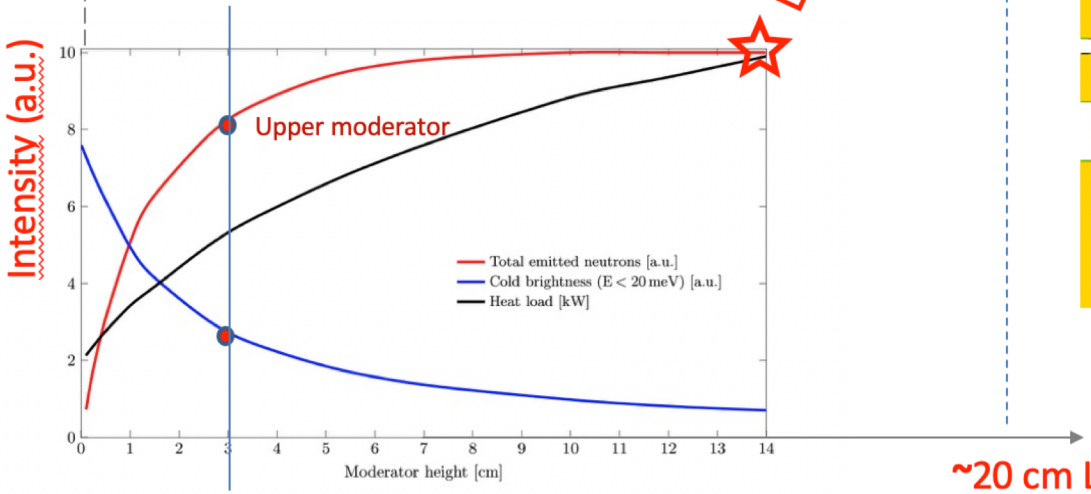
Diffractometer D20

Cold moderator: why liquid deuterium?

WP4: Luca Zanini, Alan Takibayev

EUROPEAN SPALLATION SOURCE

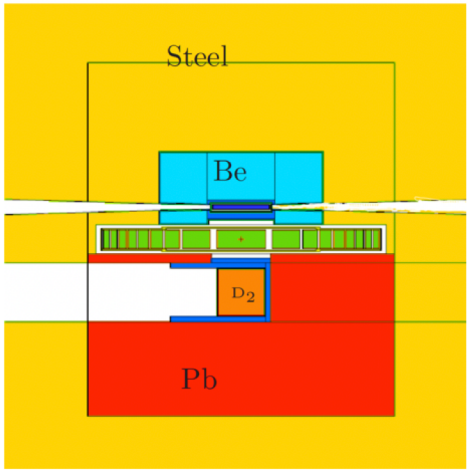
~25



~20 cm LD_2

A much better way is to use voluminous D2 moderator (factor 3-4 more intense)

E. Klinkby et al.,https://arxiv.org/pdf/1401.6003.pdf



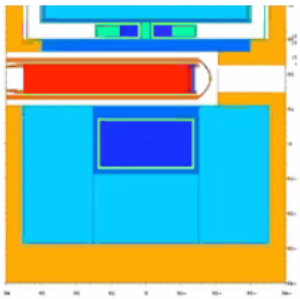
WP5: Yannick Beßler , FZJ

ESS HIGHNESS – WP5 ENGINEERING

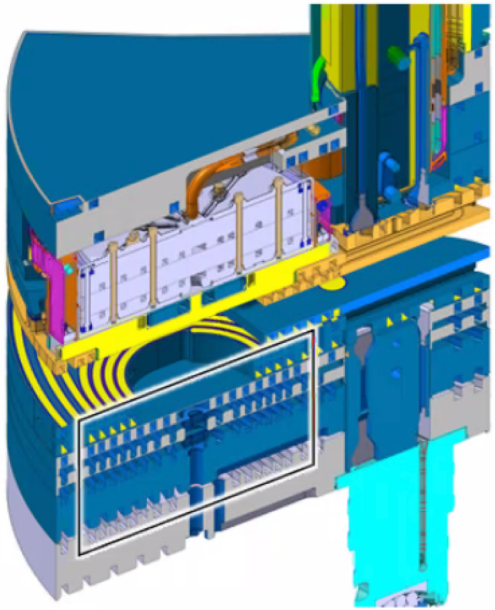
Summary & outlook

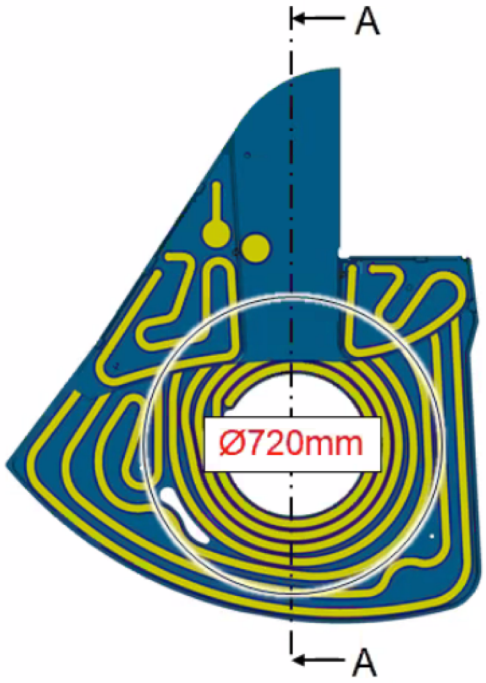
Limited space available in the lower mounting socket below the target:

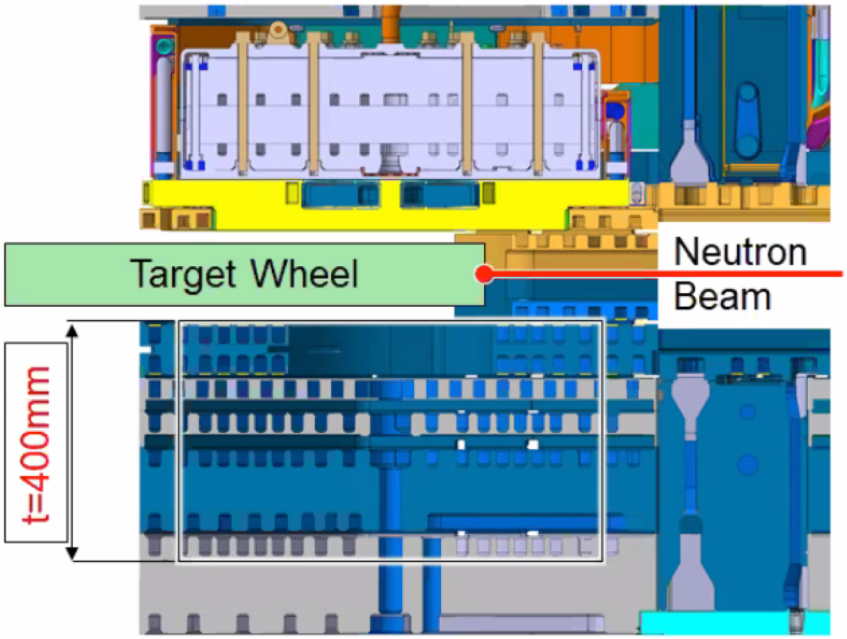
- The frame layers need to be actively cooled – critical in areas with small wall thickness
- The frame needs to have a certain minimum radial wall thickness
- Supply pipework needs to be guided in aluminum jackets that occupy a not negligible space



A-A

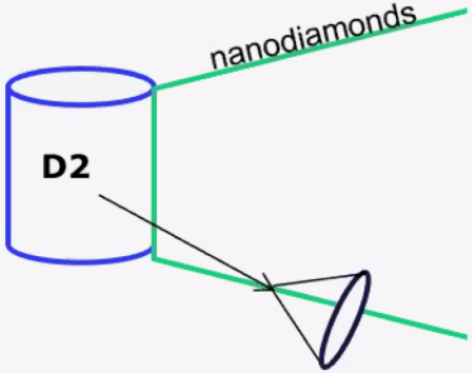






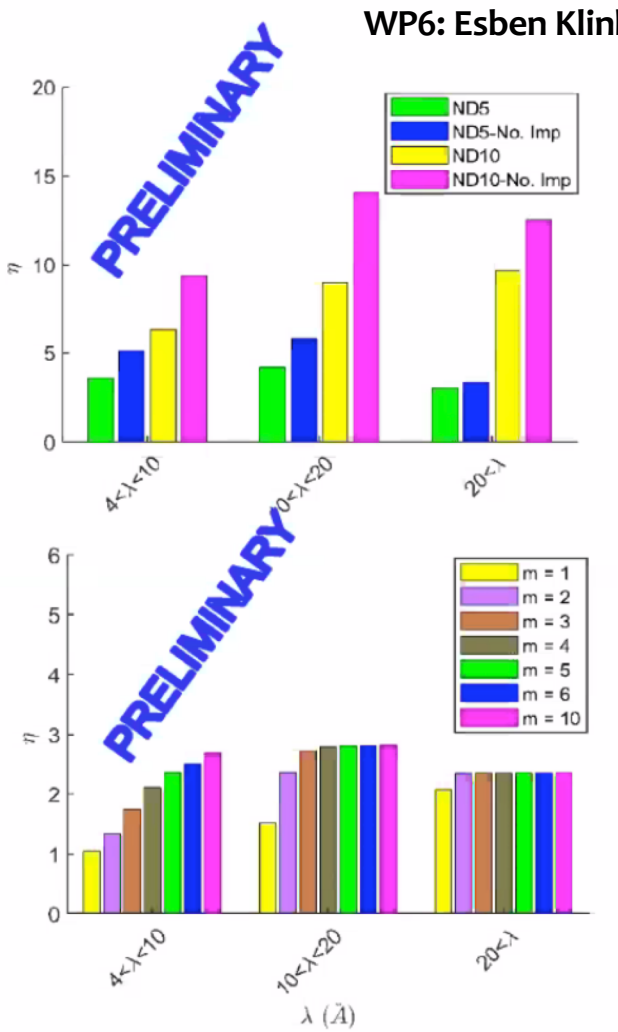
JÜLICH Forschungszentrum

Code development status



- <4Å : supermirrors are superior to nanodiamonds, but >4Å roles may change
- Technical realization not even in concept phase. HighNESS should mature tech

WP6: Esben Klinkby, DTU



WP7 – Condensed matter science

WP7: Markus Strobl PSI

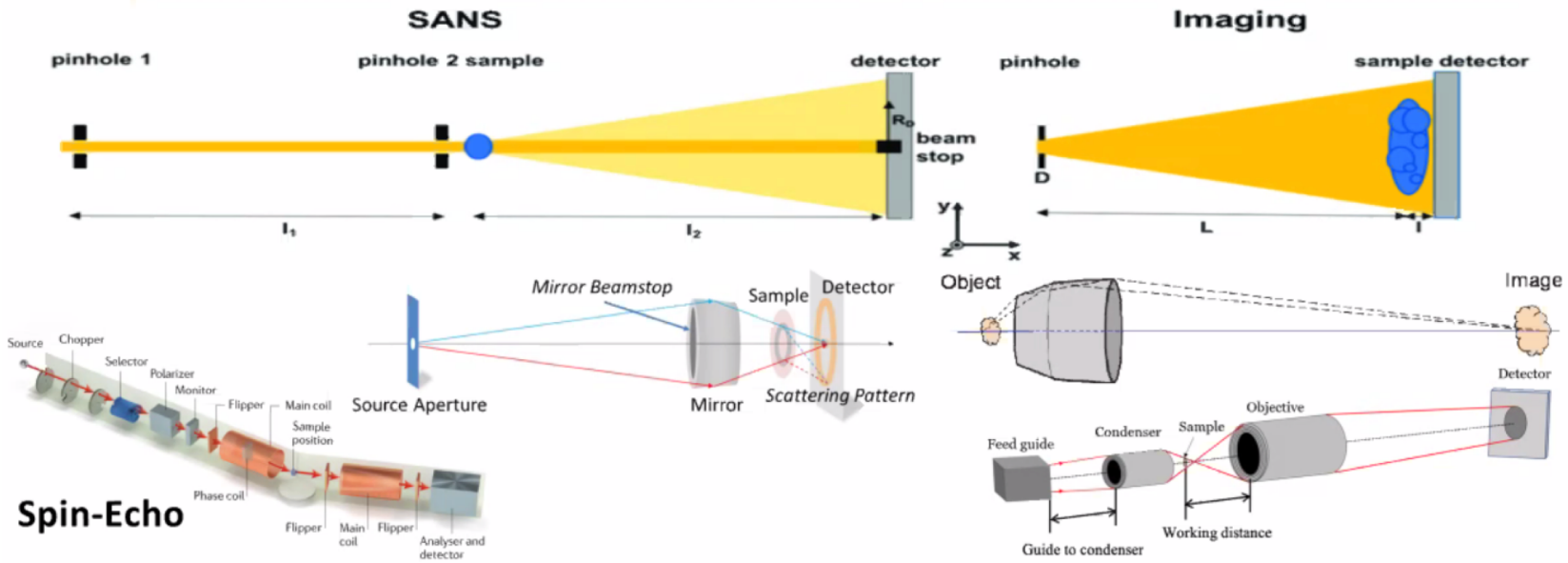
Deliverables

D7.1 Definition of instrument concepts (M6)

This report is the main output of Task 7.1 and will be delivered in month 6. It will list the instrument concepts selected for optimization, together with a brief justification for their selection and a preliminary definition of the FoM for each instrument concept.

D7.2 Optimization study of instruments, moderator and reflector (M34)

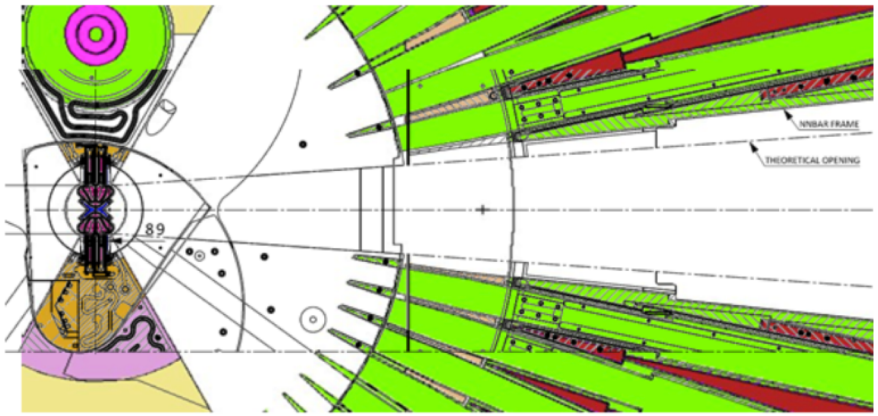
This report covers the work of Tasks 7.2, 7.3 and 7.4 and will be delivered in month 34, marking the end of the WP. For each instrument concept, it will describe the FoM used for the optimization and the iterative optimization process involving moderators, reflector and instrument design. It will then assemble the optimization of all the instrument concepts into a single global optimum and evaluate and present the resultant instrument concepts and their performance. For an example of a similar optimization effort, see Ref.[64]



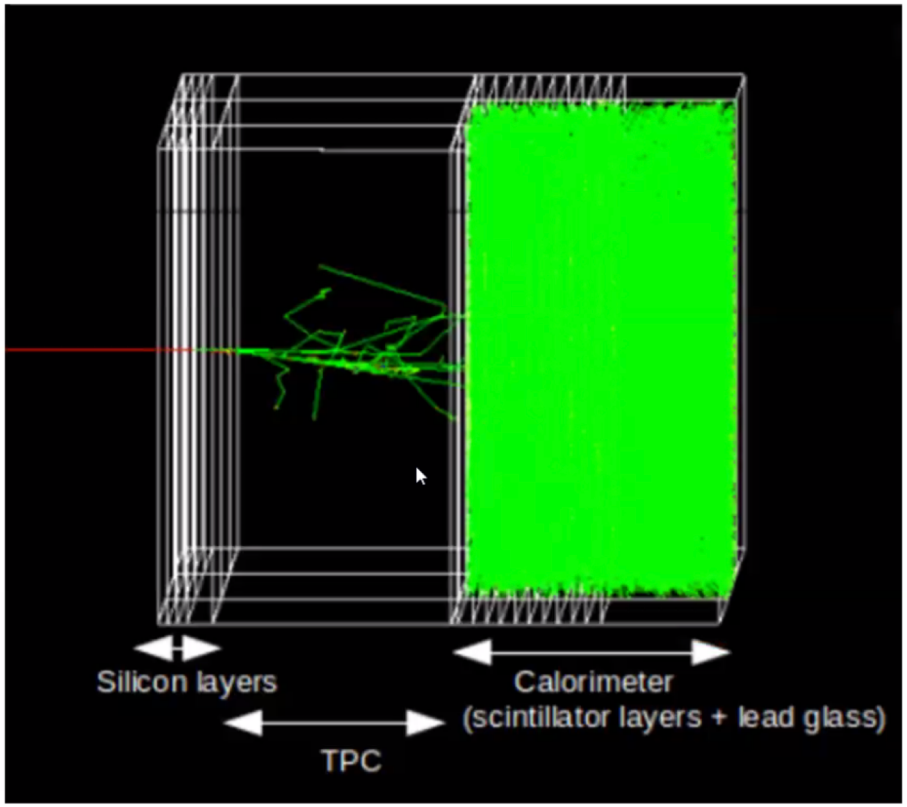
WP8: David Milstead SU

Current detector status

Horizontal cut through the NNBAR opening in the monolith (overlap Monte Carlo model and drawing)



Geant-4 simulation implementing silicon layers, TPC volume and calorimeter.



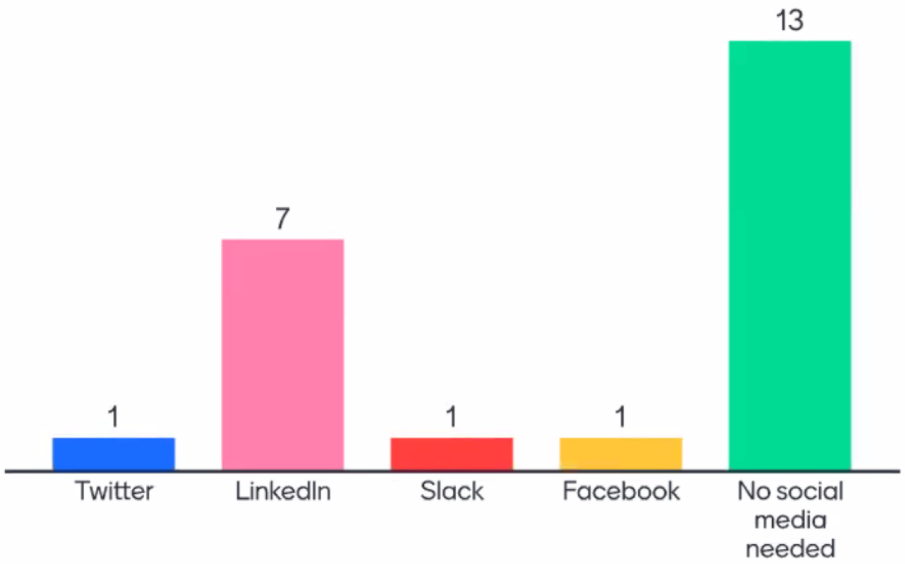
Current capacities

Storage

- **Lustre file system:** 66TB parallel filesystem exposed on QDR Infniband (verylong, short and newlong queues). Purchased in 2011. To be sunset H1 2021.
- **ZFS (r0n12):** 80TB used for home directories and things requiring backup. This system is backed up to an offsite location (I2). Purchased in 2014.
- **ZFS (groupdata):** 320TB used for reproducible data (results of simulations etc.) Not backed up. Purchased in 2017.
- **IBM SpectrumScale system:** 0.5PB available EOY 2020.

WP10: Ute, ESS

Which social media platform would be most useful for HighNESS?



Thanks to Ute we learn that HighNESS people are not really social

No such thing as a Free Lunch

1. **Adhere** to reporting requirements
2. **Eligible** Costs related to the Action (Annex 1 GA)
3. Identifiable in Organisations **Accounts**
4. Supporting **Documentation Archived**
5. Keep **HighNESS Coordination Team** "in the loop"

It always seems impossible until it's done.

Nelson Mandela

HighNESS is funded by the European Union Framework Programme for Research and Innovation, Horizon 2020, under grant agreement 951782

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Nelson Mandela

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Thanks again to all the participants in the HighNESS Consortium

Participant No.	Participant organisation name	Short name	Country
1 (coord.)	European Spallation Source ERIC	ESS	SE
2	Institut Max von Laue – Paul Langevin	ILL	FR
3	Forschungszentrum Julich Gmbh	FZJ	DE
4	Universita' Degli Studi Di Milano-Bicocca	UNIMIB	IT
5	Danmarks Tekniske Universitet	DTU	DK
6	Paul Scherrer Institut	PSI	CH
7	Mirrotron Multilayer Laboratory Ltd	Mirrotron Ltd	HU
8	Stockholms Universitet	SU	SE