



Contribution française à l'instrumentation ESS

Journée de la 2FDN — 16 Mai 2017



Disclaimer



Construction only !
Ends with delivery of instruments
at ESS.



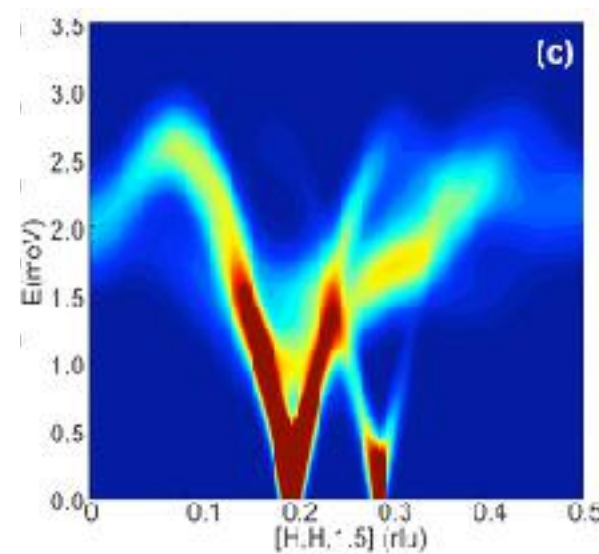
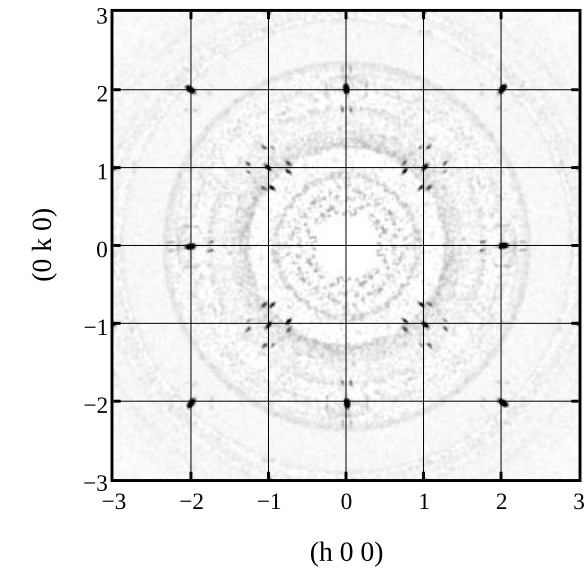
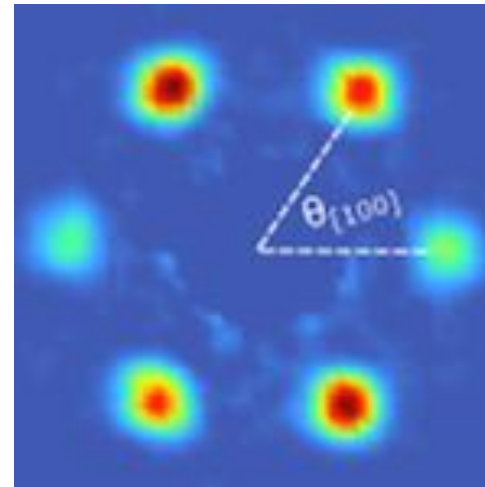
French access to ESS defined later
based on the french contribution to
operational costs.

Scientific topics

- Biology: Bone, teeth and muscle, Carbohydrates, Cell membranes, Drug delivery and action
- Chemistry & Crystallography: Catalysts for the chemical industry, Renewable energy, Materials for batteries, Toxic waste treatment, ...
- Magnetism: Exotic magnetic behavior, Molecular magnet, HTC superconductors, Spintronics, ...
- Material science & Engineering: Alloy, Composite materials, Degradation of structural components, Welding and surface treatments, ...
- Soft Matter: Polymer, Functionalization, Cosmetics, Drug delivery, ...
- Nuclear & Particle Physics

Instrumentation needs

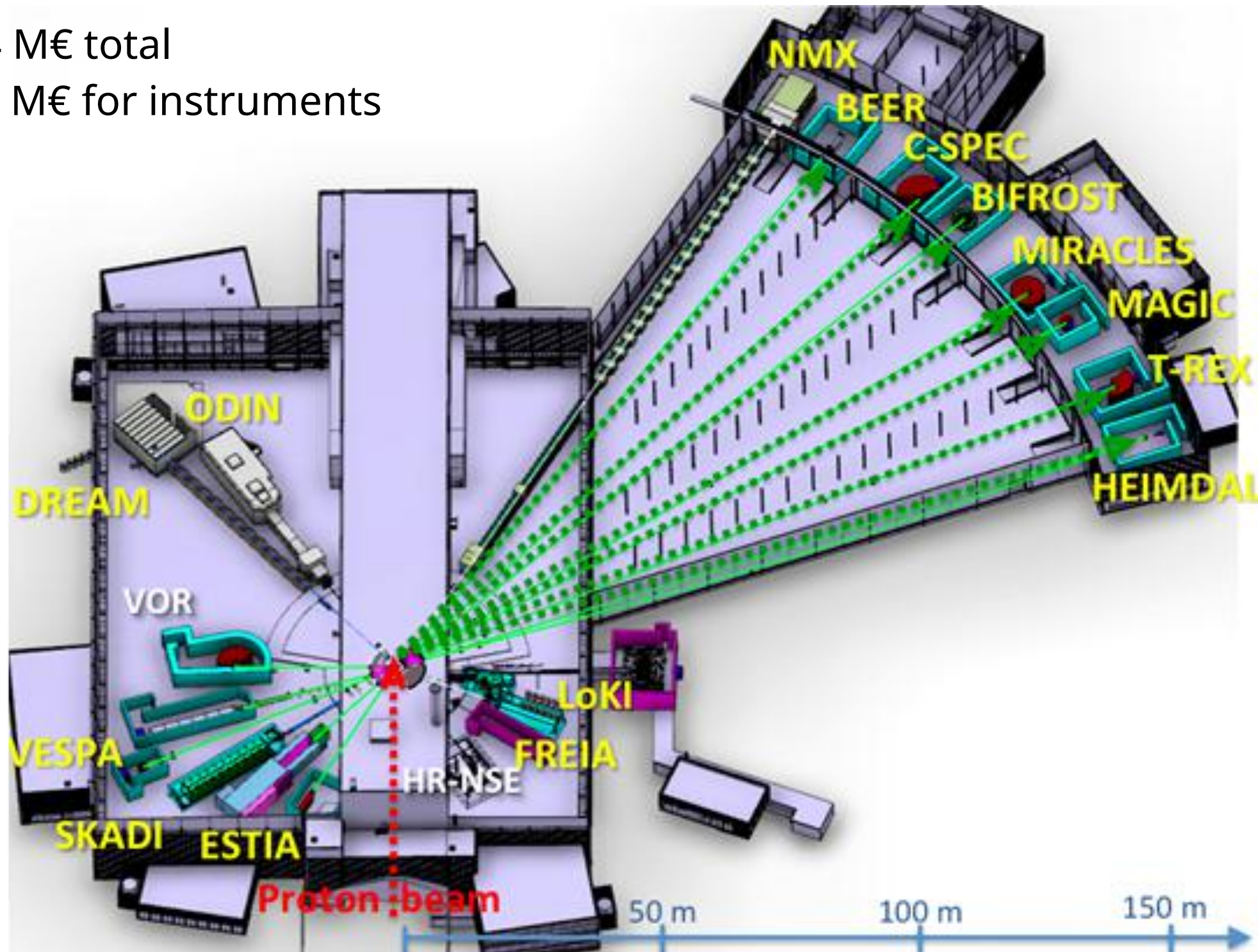
- SANS
- Diffractometers
- Spectrometers
- Reflectometers
- Imaging
- Spin-echo
- Nuclear physics



ESS suite

1834 M€ total

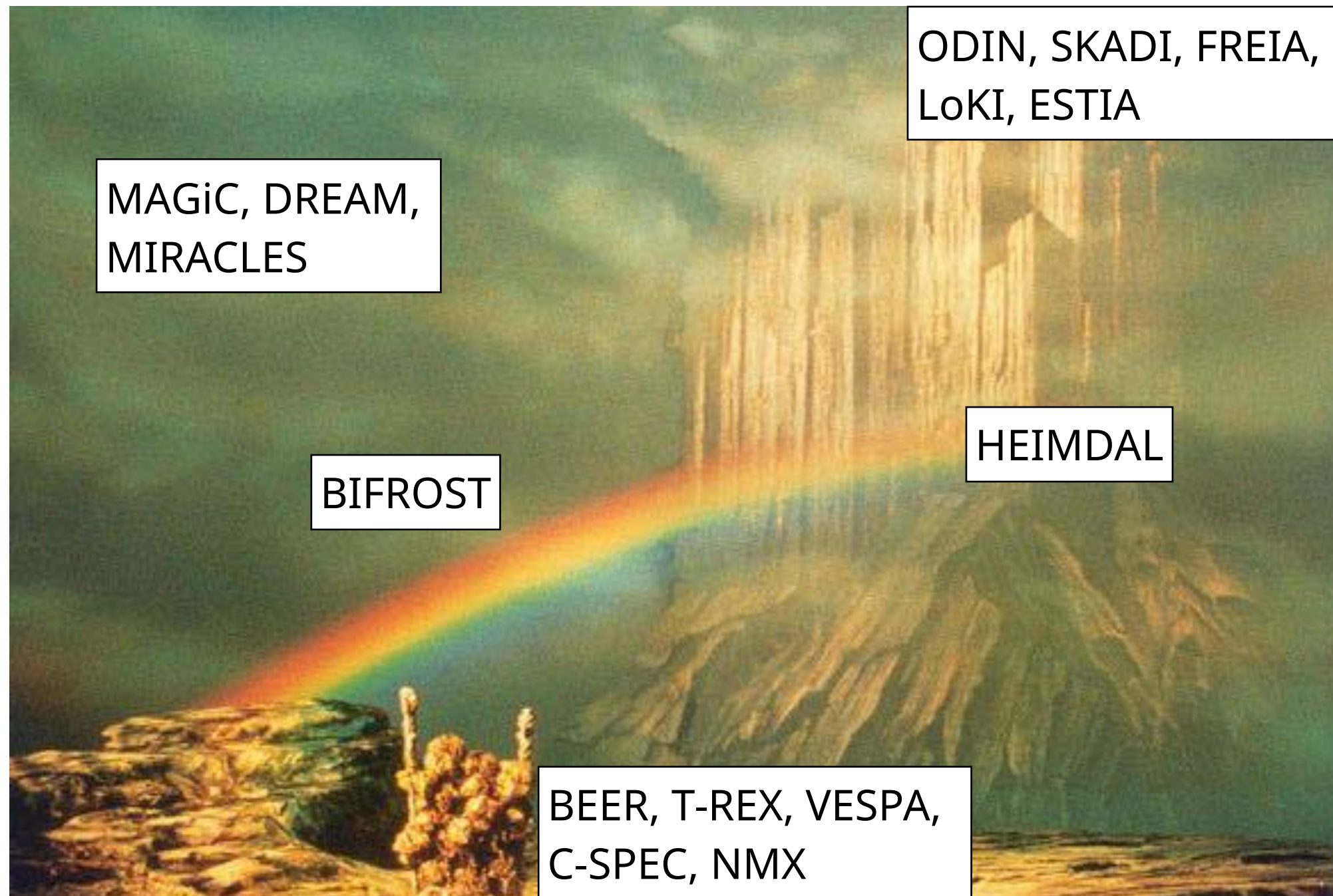
200 M€ for instruments



ESS suite

1834 M€ total

200 M€ for instruments



MAGiC, DREAM,
MIRACLES

BIFROST

ODIN, SKADI, FREIA,
LoKI, ESTIA

HEIMDAL

BEER, T-REX, VESPA,
C-SPEC, NMX

French suite

150 M€ total

35 M€ for instruments

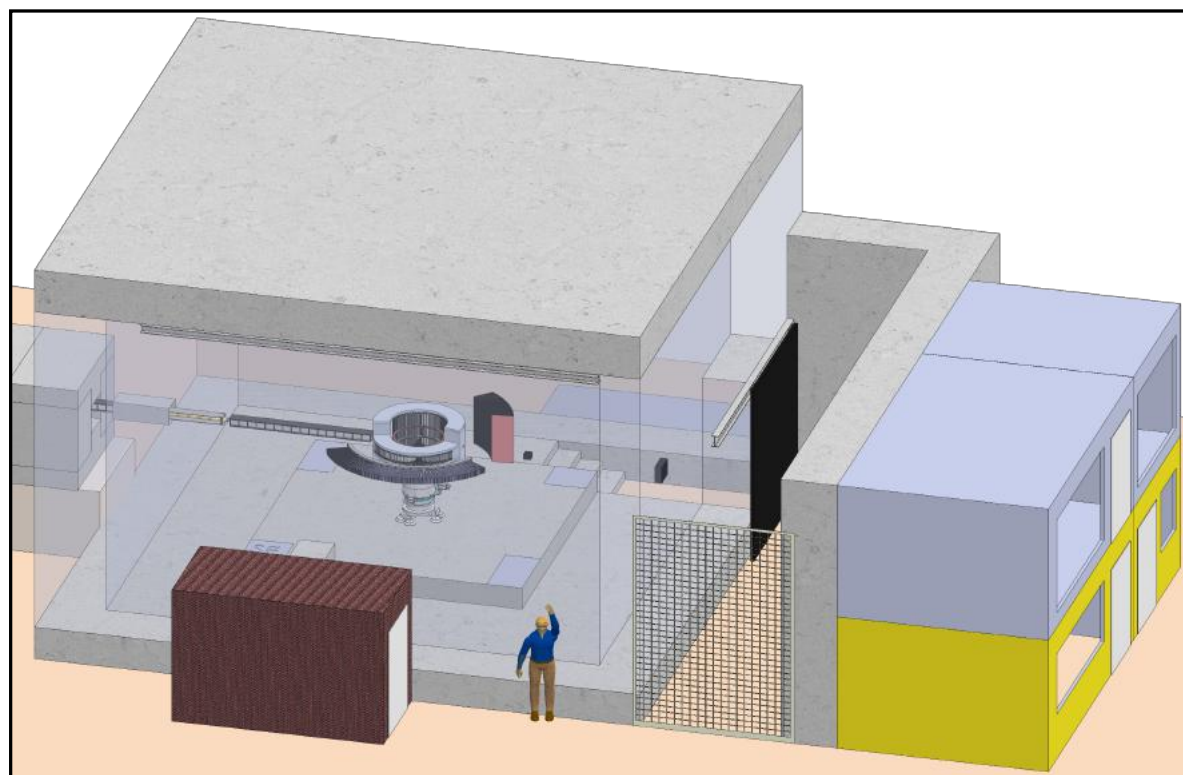


MAGiC



Lead scientist: X. Fabrèges
Lead Engineer: S. Klimko

**Magnetism, superconductivity, chirality,
thin films, novel topological phases**



Polarized single crystal diffractometer
160 m long instrument

Expected gain factors @ 2 MW

Cold beam: > **100**

Thermal beam: > **10**

Scope-setting	19/10/16
TG2 review	31/01/17
installation start	Q2 2019
cold commissioning start	Q3 2020
hot commissioning start	Q1 2022
In first 8	yes

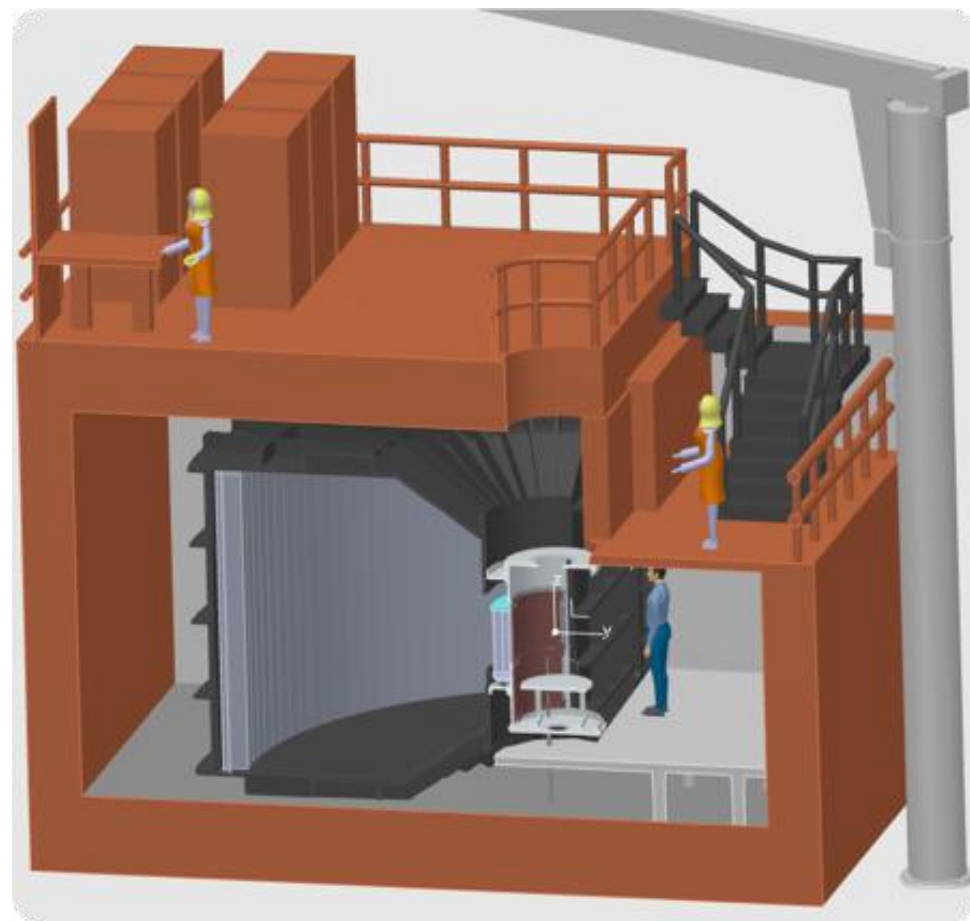
proposal budget	16.22 M€
cost category	12 M€
cost book value	13.10 M€
LLB	59 %
FZJ	24 %
PSI	17 %

C-SPEC



LLB scientist: S. Longeville
Lead Engineer: J. Guyon-le-Bouffy

Solar cells, batteries, thermoelectric, proteins dynamics, spin liquids, topological materials



scope-setting	7/10/16
TG2 review	03/17
installation start	06/2019
cold commissioning start	04/2020
hot commissioning start	06/2021
in first 8	yes

Day 1 Performance (2MW):

- world-leading: x2-6 compared to IN5 (RRM excluded, =x10-15 with RRM)

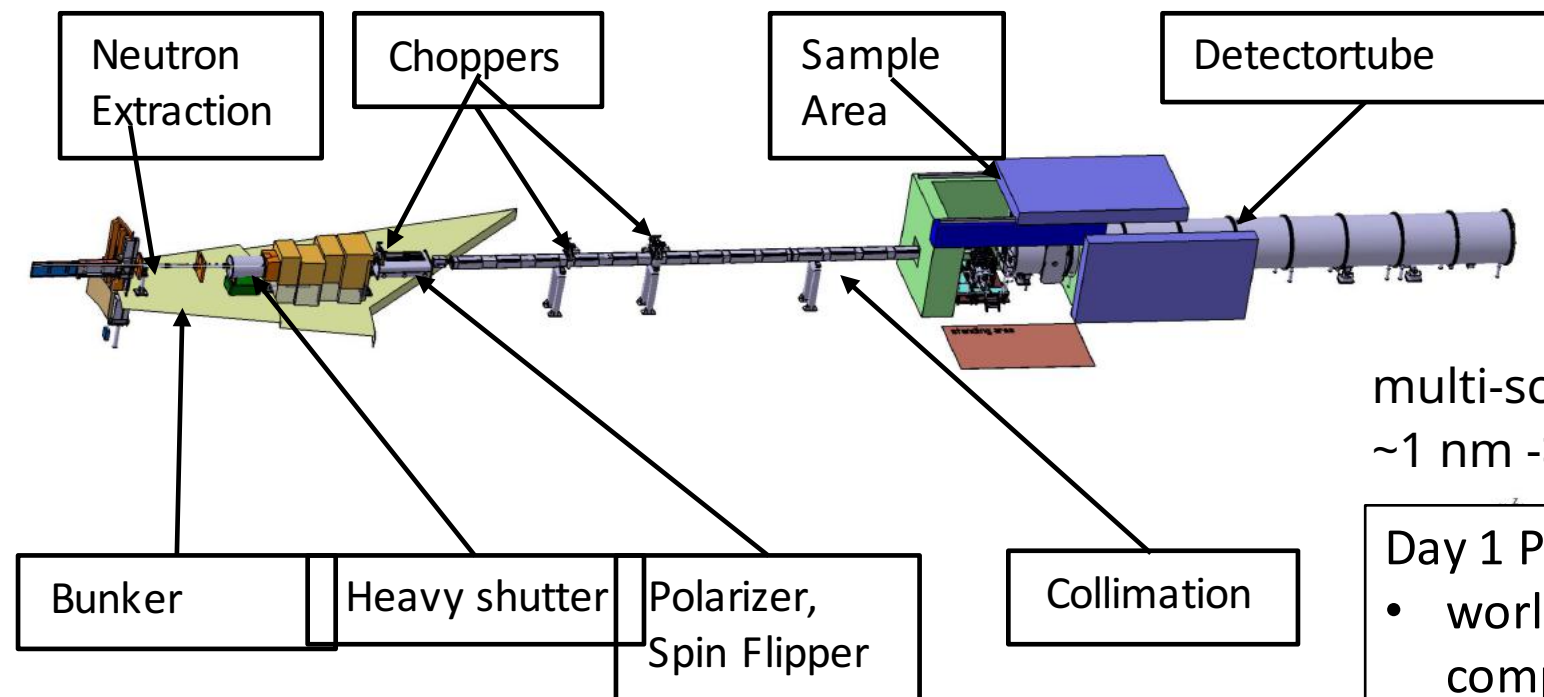
proposal budget	18.79 M€
cost category	15 M€
cost book value	16.5 M€
TUM	50 %
LLB	50 %
phase 1	0.484M€

SKADI



LLB scientist: J. Jestin
 LLB Engineer: S. Desert

Polymers, long period magnetism, food science, proteins, viruses, electronic



multi-scale SANS instrument
 ~1 nm -> ~10 μm

Day 1 Performance (2MW):
 • world-leading: approximately 2x compared to D22

scope-setting	20/6/16
TG2 review	10/03/17
installation start	2019
cold commissioning start	2020
hot commissioning start	2021
in first 8	no

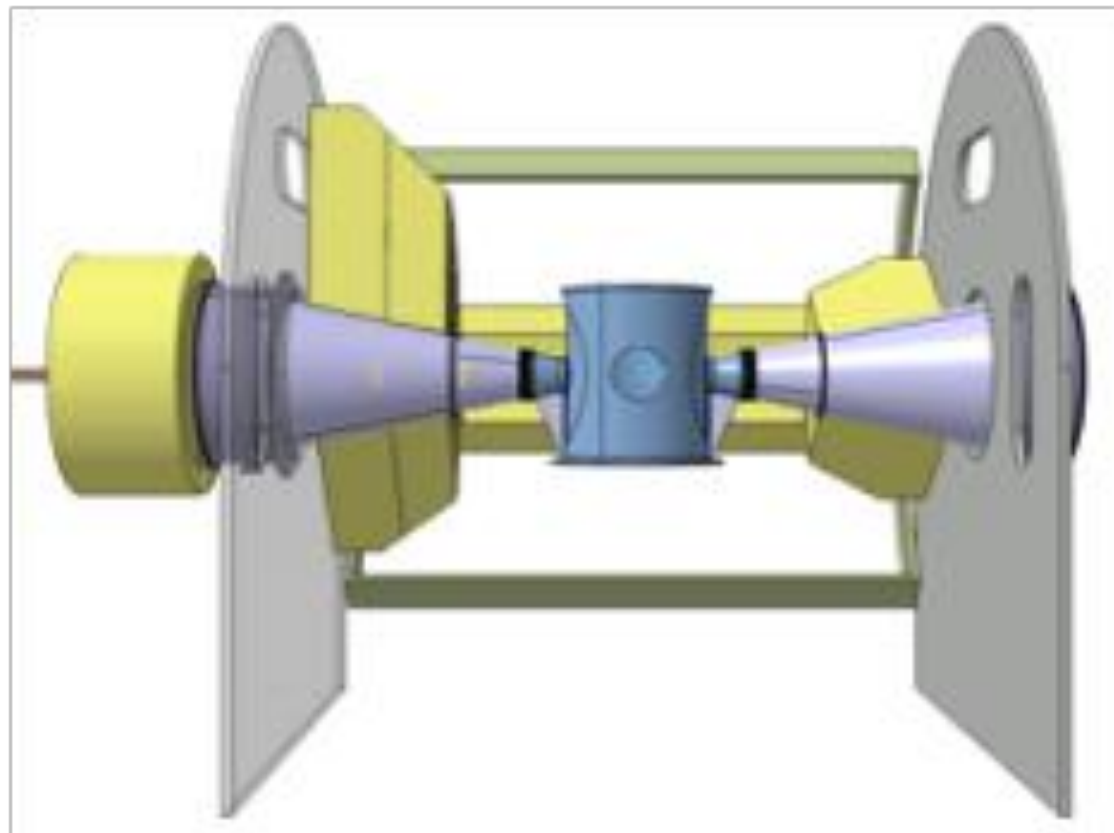
proposal budget	14.25 M€
cost category	12 M€
cost book value	11.50 M€
FZJ	50 %
LLB	50 %

DREAM



LLB scientist: F. Porcher
LLB Engineer: B. Annighöfer

Catalyst, in-operandi batteries, kinetics, magnetism, nano-structures



General -purpose powder diffractometer @ 76m

Day 1 Performance (2MW):

- world-leading: > one order of magnitude higher compared to POWGEN and WISH
- highest resolution for neutron powder diffraction
- PDF and single-crystal measurements are possible

Scope-setting	08/09/16
TG2 review	14/12/16
installation start	2019
cold commissioning start	2020
hot commissioning start	2021
In first 8	yes

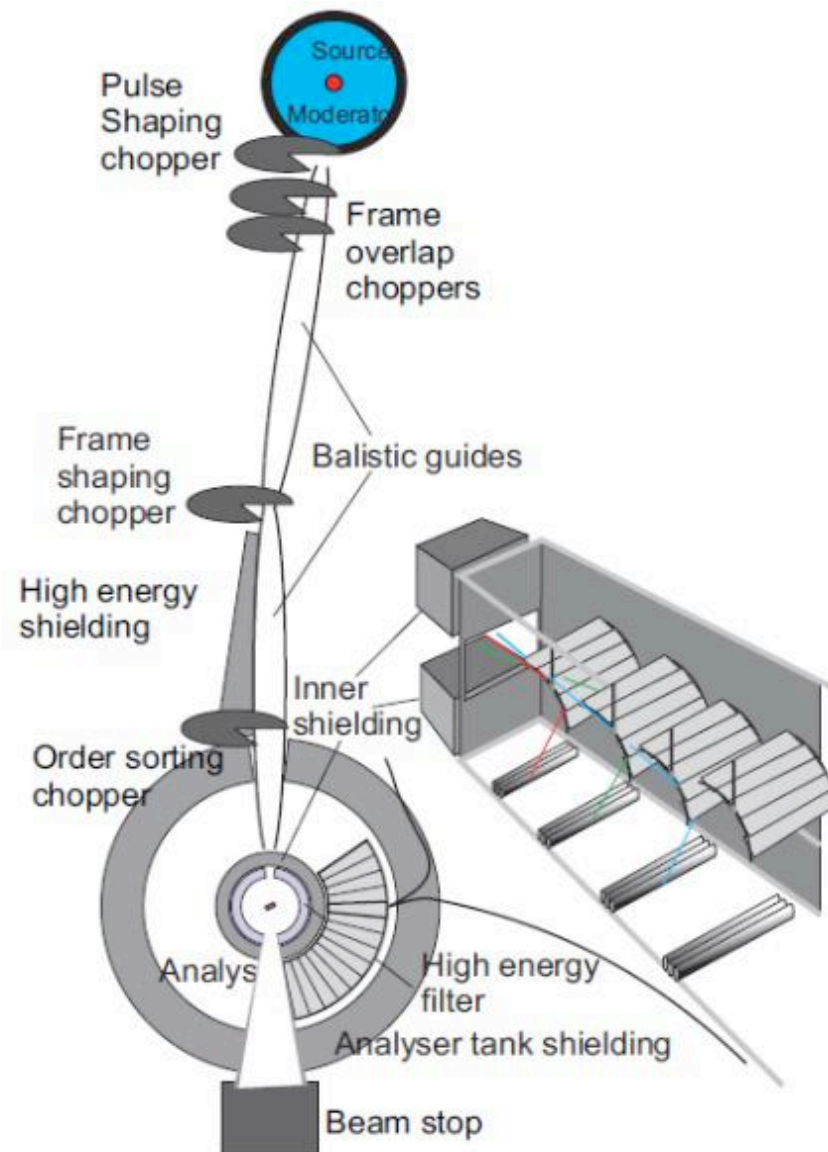
proposal budget	16.27 M€
cost category B	12 M€
cost book value	13.66 M€
FZJ	76 %
LLB	24 %

BIFROST



LLB scientist: P. Bourges
 LLB Engineer: S. Rodrigues

Catalyst, in-operandi batteries, kinetics, magnetism, nano-structures



scope-setting	12/10/16
TG2 review	March 2017
installation start	Q1 2020
cold start	Q1 2021
hot commissioning start	Q4 2022

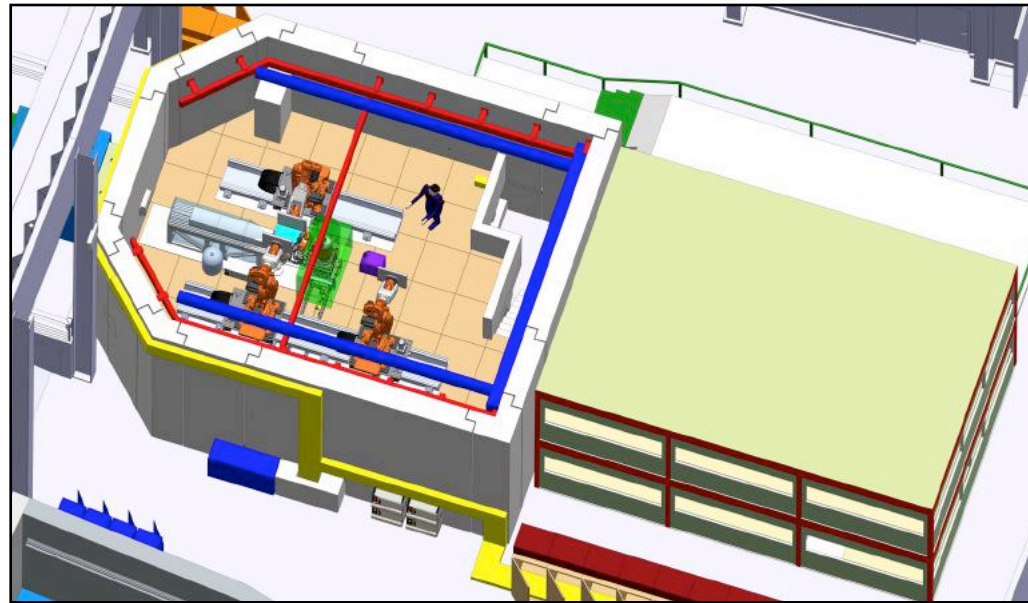
proposal budget	19.92 M€
cost category	B - 12 M€
cost book value	13.448 M€
DK (DTU/KU)	24.2 %
PSI	28.3 %
LLB	21.1 %
IFE	23.7 %

NMX



French scientist: J. L. Ferrer

macromolecular instrument
biology: proteins, nucleic acids



scope-setting	3/12/14
TG2 review	11/12/14
installation start	Q1 2019
cold commissioning start	Q3 2020
hot commissioning start	Q1 2021
in first 8	no

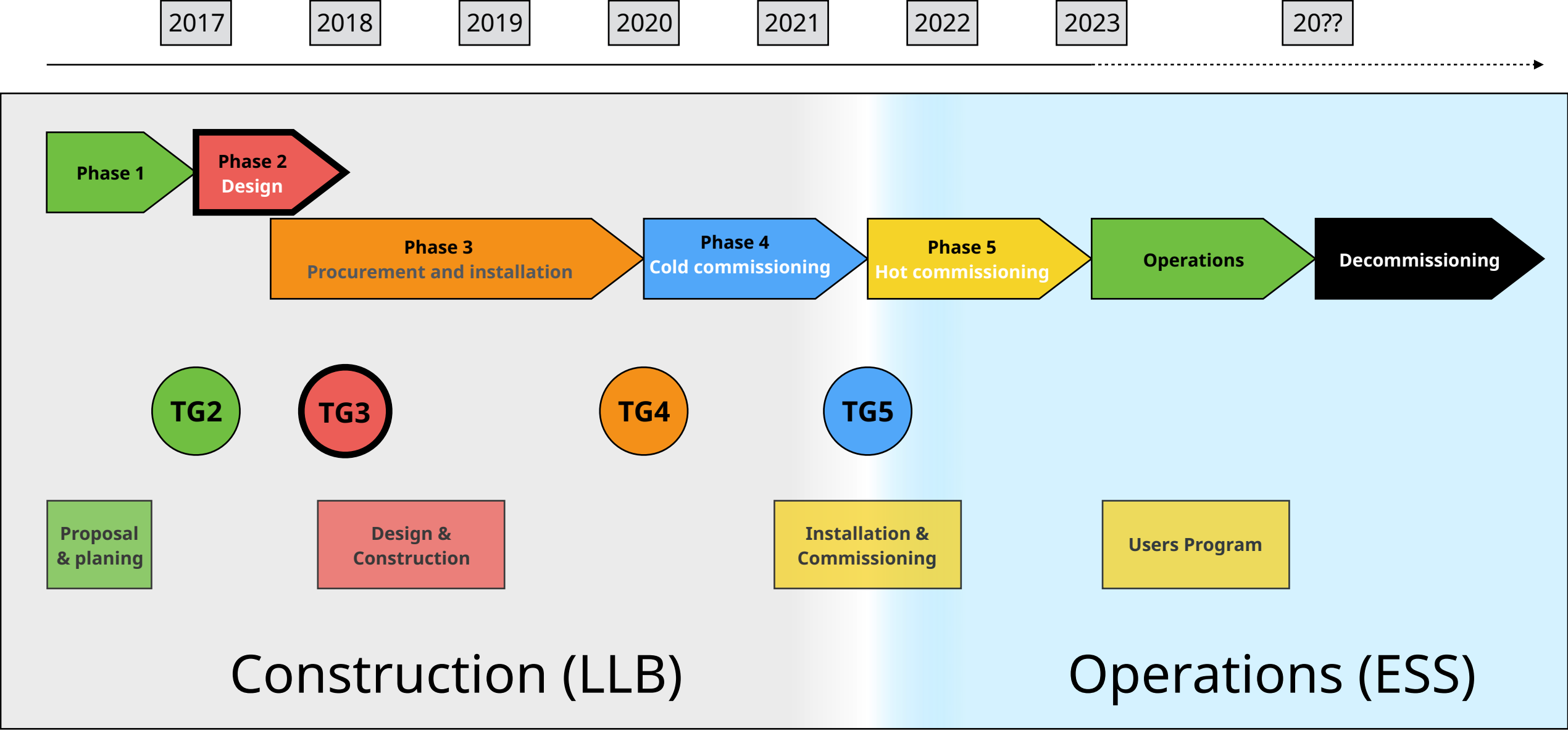


Day 1 Performance (2MW):

- World-leading
- >10x compared LADI & BioDiff

proposal budget	15.56 M€
cost category	12 M€
cost book value	11.67 M€
Wigner/EK/BRC	38 %
LLB/IBS	14 %
UiB	12 %

Timeline



Tack !