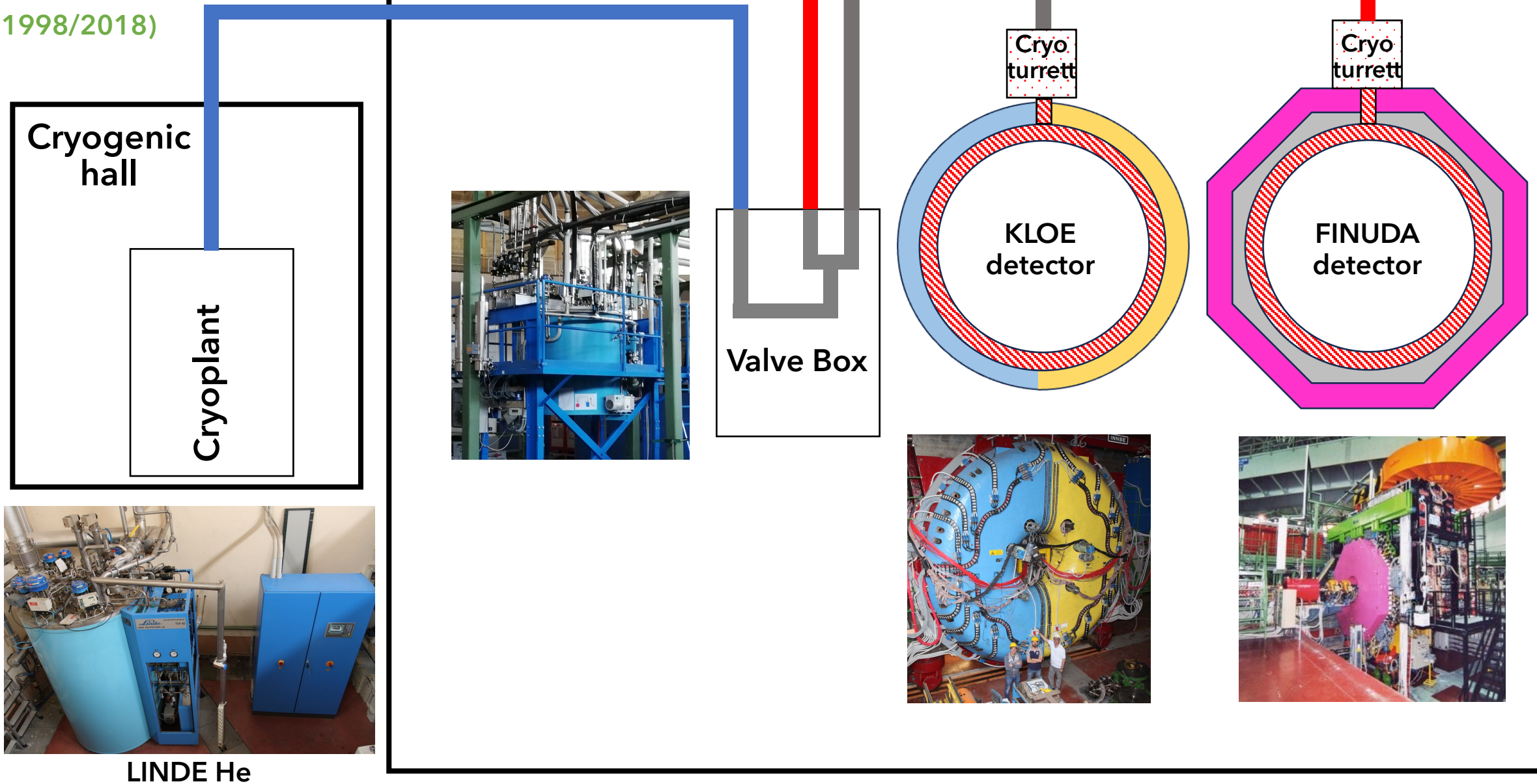
DAΦNE CryoPlant Operating Layout

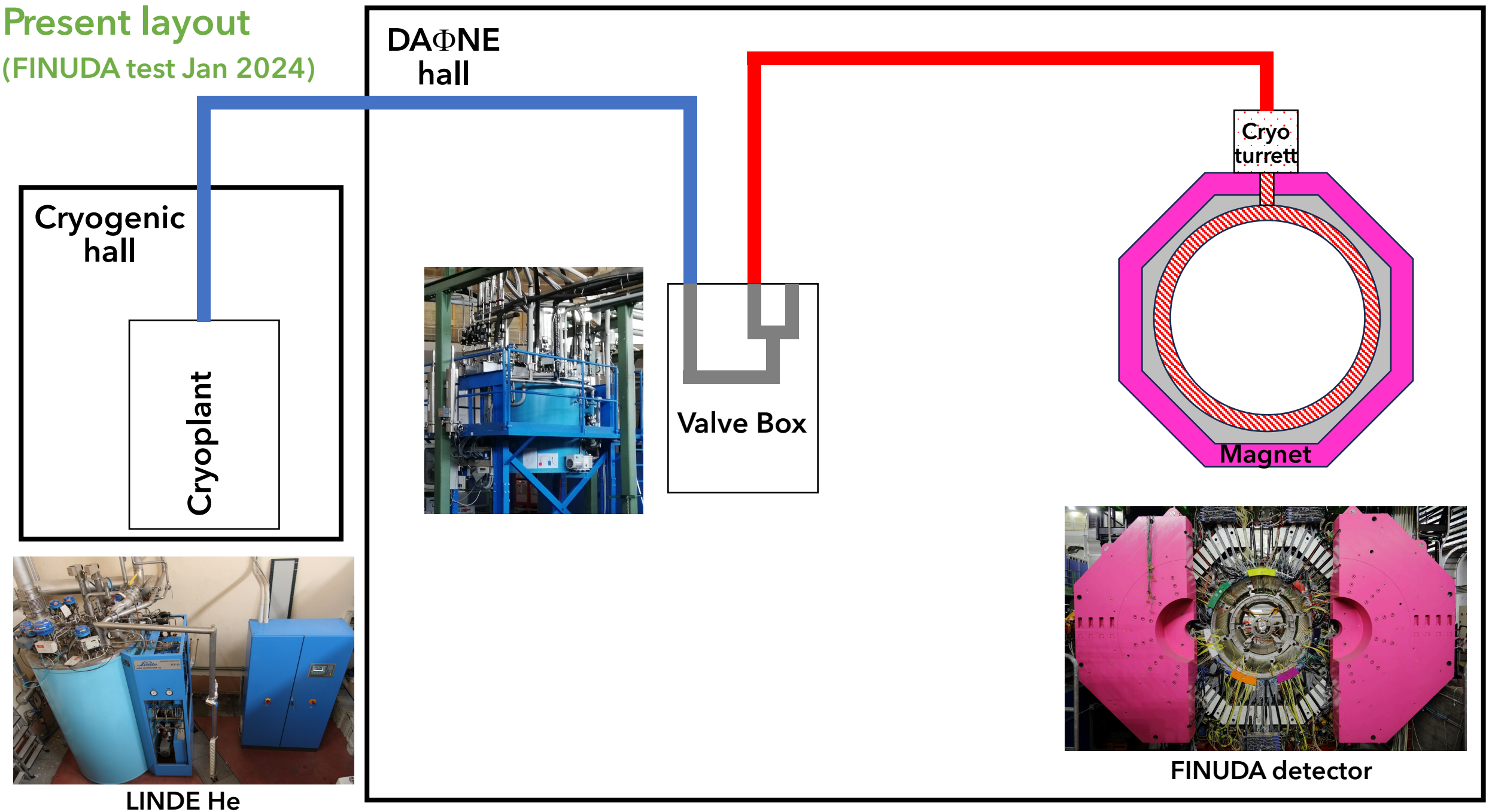
(1998/2018)



LINDE He refrigerator/liquefier

Present layout

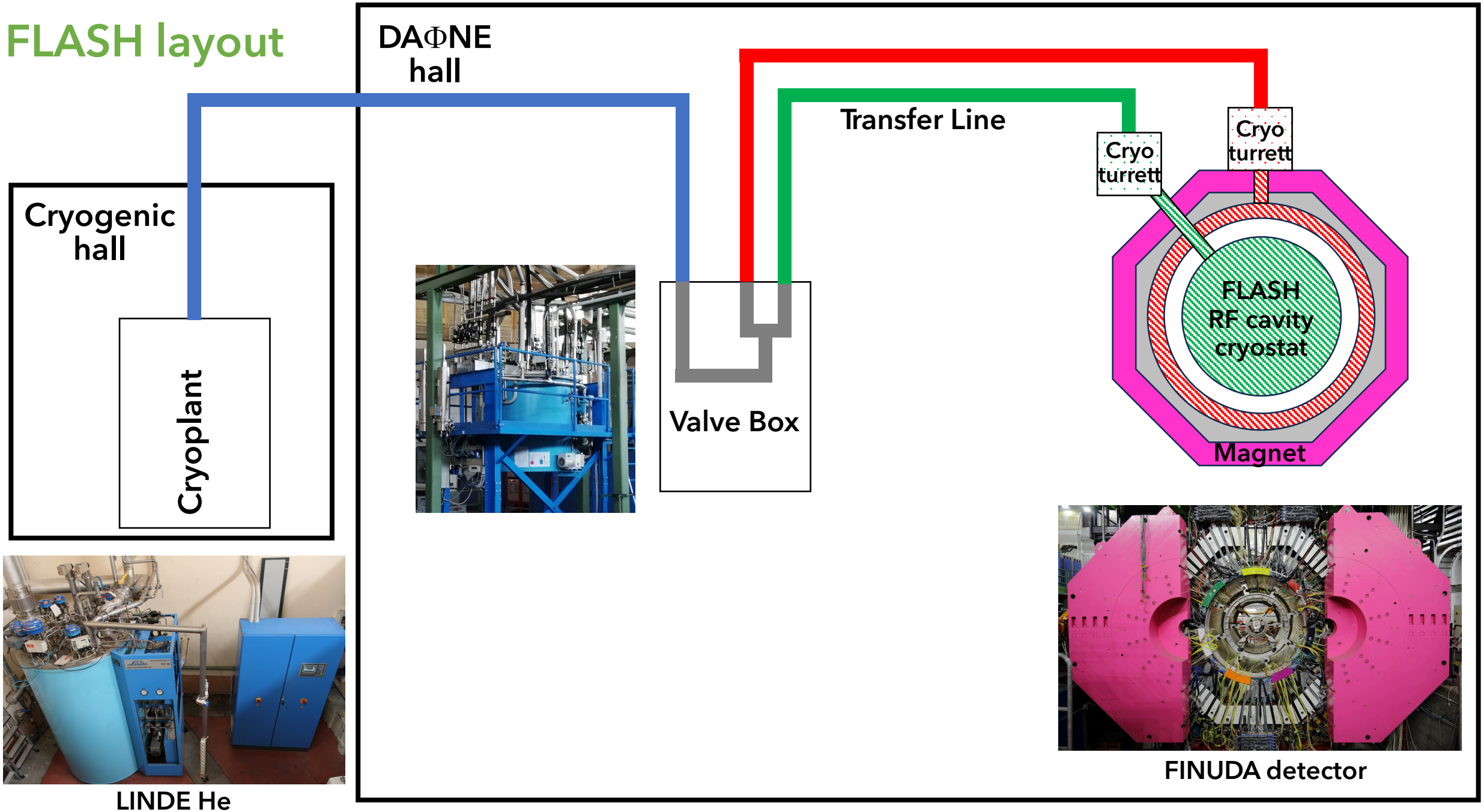
(FINUDA test Jan 2024)



LINDE He refrigerator/liquefier

FINUDA detector

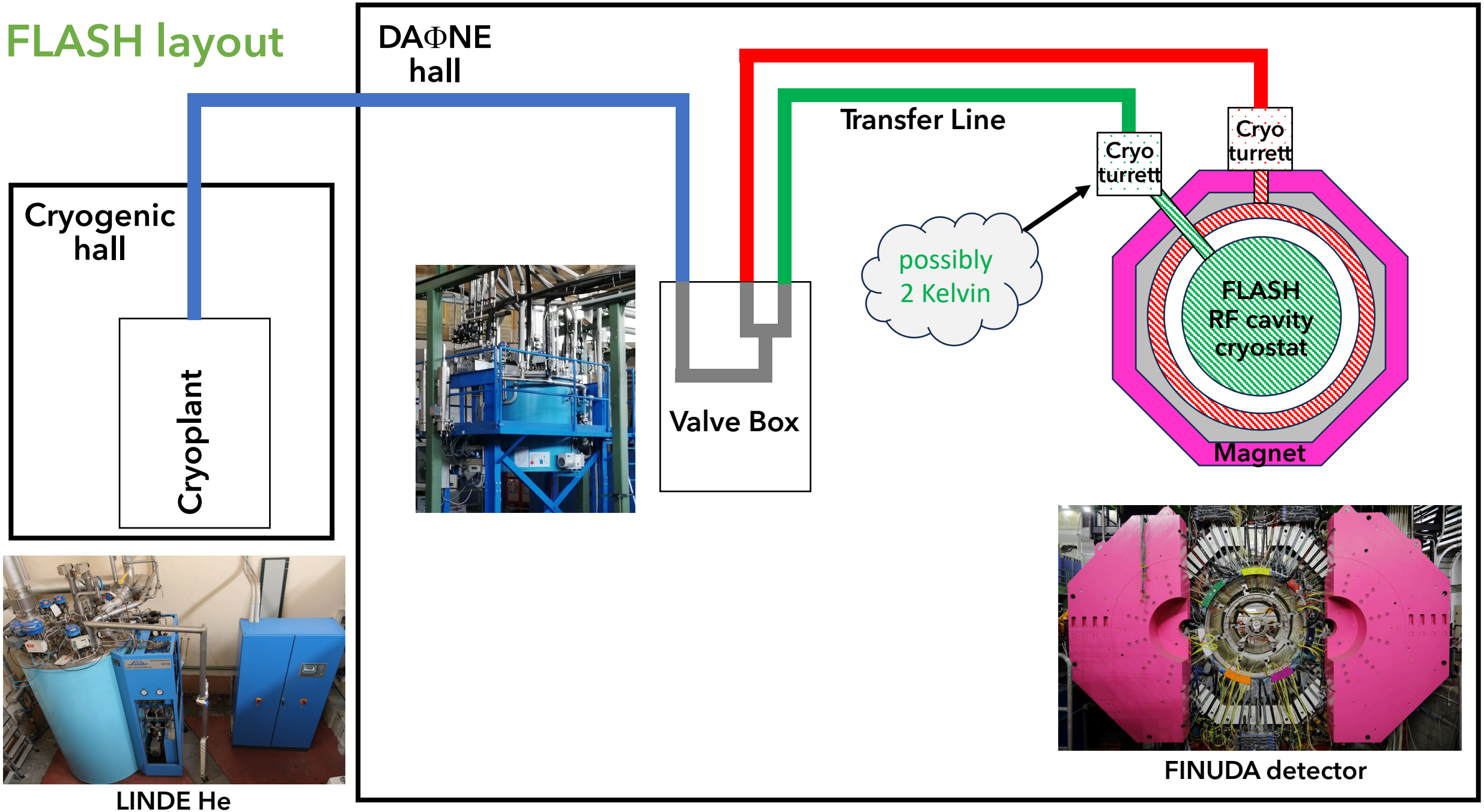
FLASH layout



LINDE He refrigerator/liquefier

FINUDA detector

FLASH layout



LINDE He refrigerator/liquefier

FINUDA detector

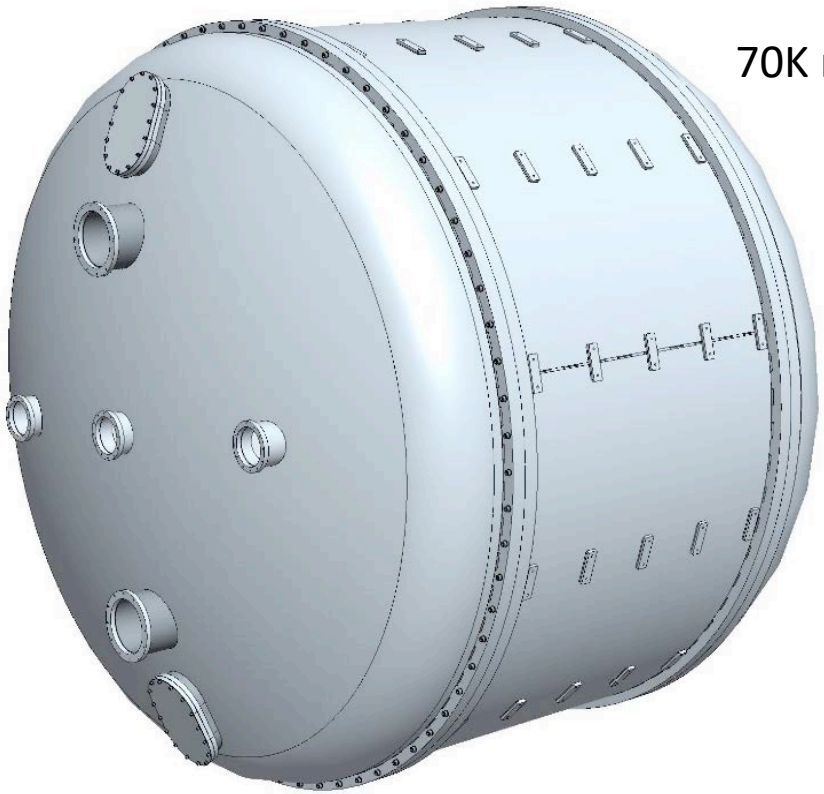
Work to do

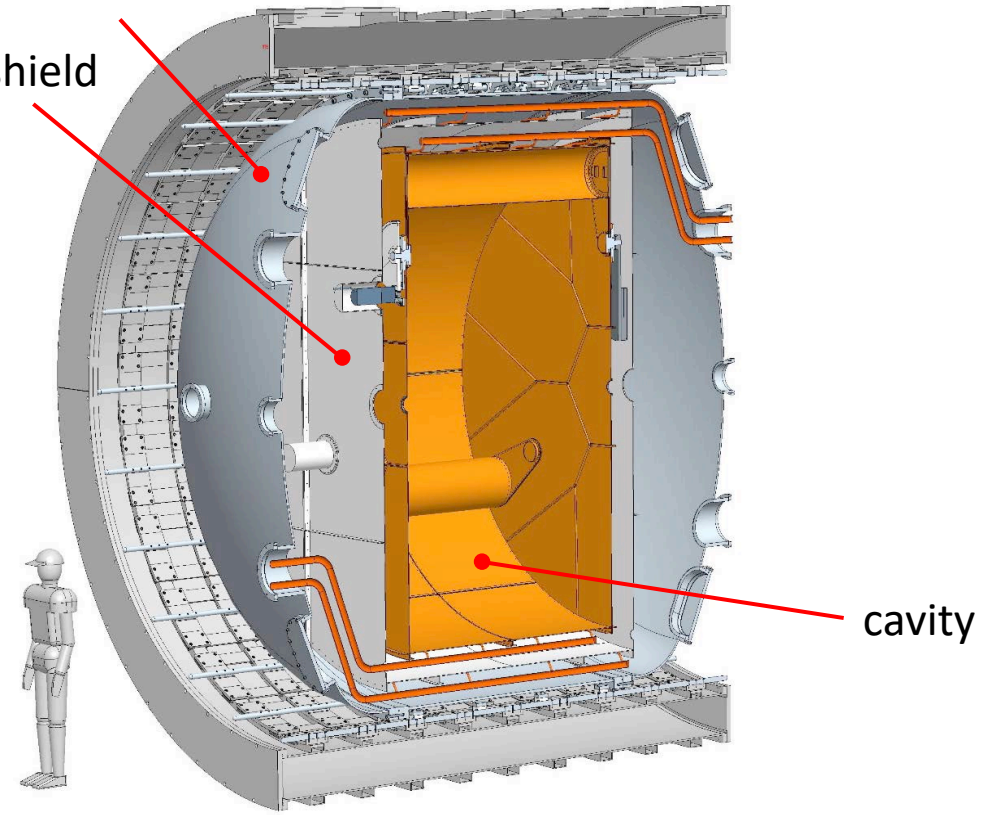
- Definition of the RF cavity cryostat general layout details
- Cryostat cryo/mechanical design (vacuum shield + 70 K radiation shield)
- Cryogenic turret cryo/mechanical design
- Cryogenic transfer lines design (*similar to the KLOE old TLs*)
- RF cavity mechanical design with tuning system

Timescale

- 2024 TDR Preparation
- 2025 – Cryostat and RF cavity design
- Project approval by INFN (2025?)
- 2026/28 – Tender and construction

Cryostat cryo/mechanical design



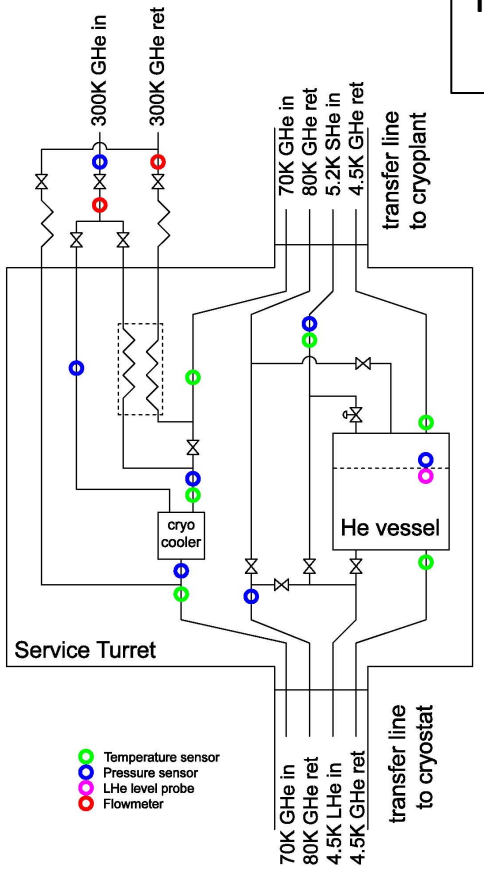


We can partly take advantage of the work done by Fantini Sud s.p.a. for the KLASH cryostat (see pictures above)

- The design must be adapted to the new constraints (FINUDA in place of KLOE)
- it should be re-scaled down by a factor > 2 to fit the FINUDA magnet
- we need to re-think the support system (FINUDA support structure is different from the KLOE's one)

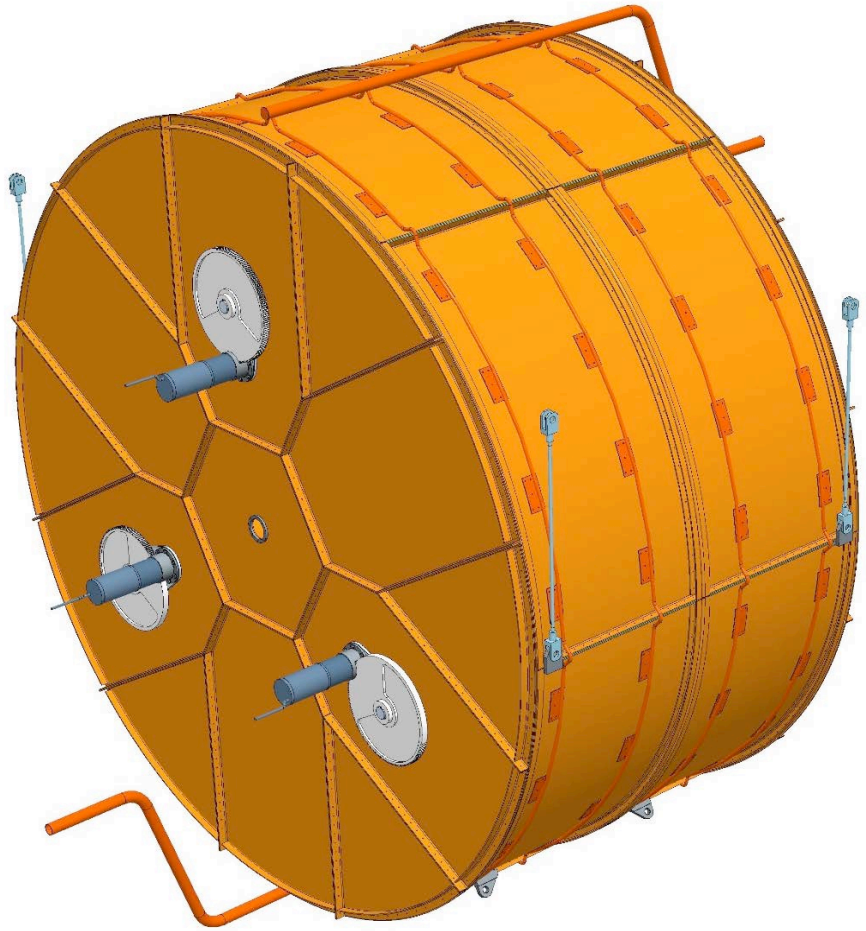
Cryogenic turret cryo/mechanical design

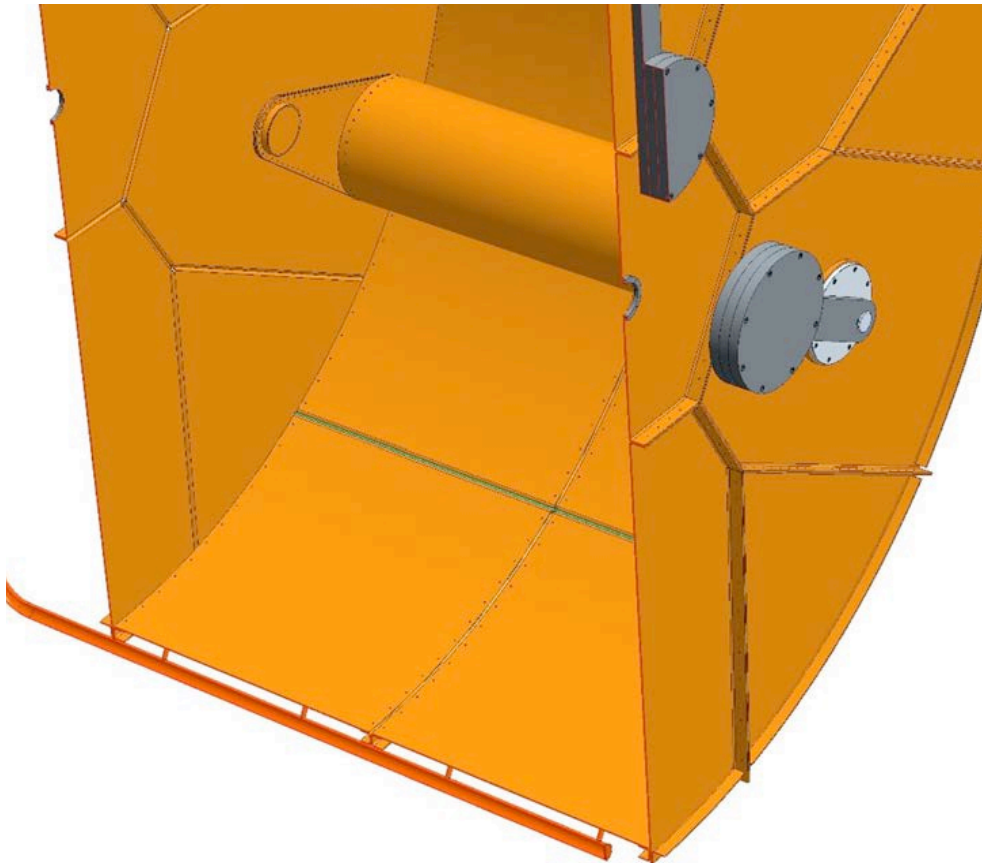
FLASH turret P&ID
(proposal)



Cryogenic Transfer Lines carry only supercritical He (5.2K/3bar), so the He liquefaction (4.4K/1.2bar) must be done just before the user, inside a dedicated *service turret,* which must be designed

RF Cavity mechanical design with tuning system





The RF cavity (made by copper) must be mechanically designed together with its tuning system

Microwave simulation done at LNF

How CERN can help us

- Definition of the general layout in terms of both cryogenic and mechanic layout about all the components.
- Consultancy about the cryogenic design:
  - ✓ choice of the working T (4.5 or 2.2 K) and related components (pump)
  - ✓ cryo turret design
  - ✓ dimensioning of pipes
  - ✓ dimensioning of valves
  - ✓ choice of the right materials
- Help in fluidodynamic and thermo-mechanical simulations, if needed.
- Consultancy about the RF cavity mechanical and tuning design.