

Cryostat commissioning

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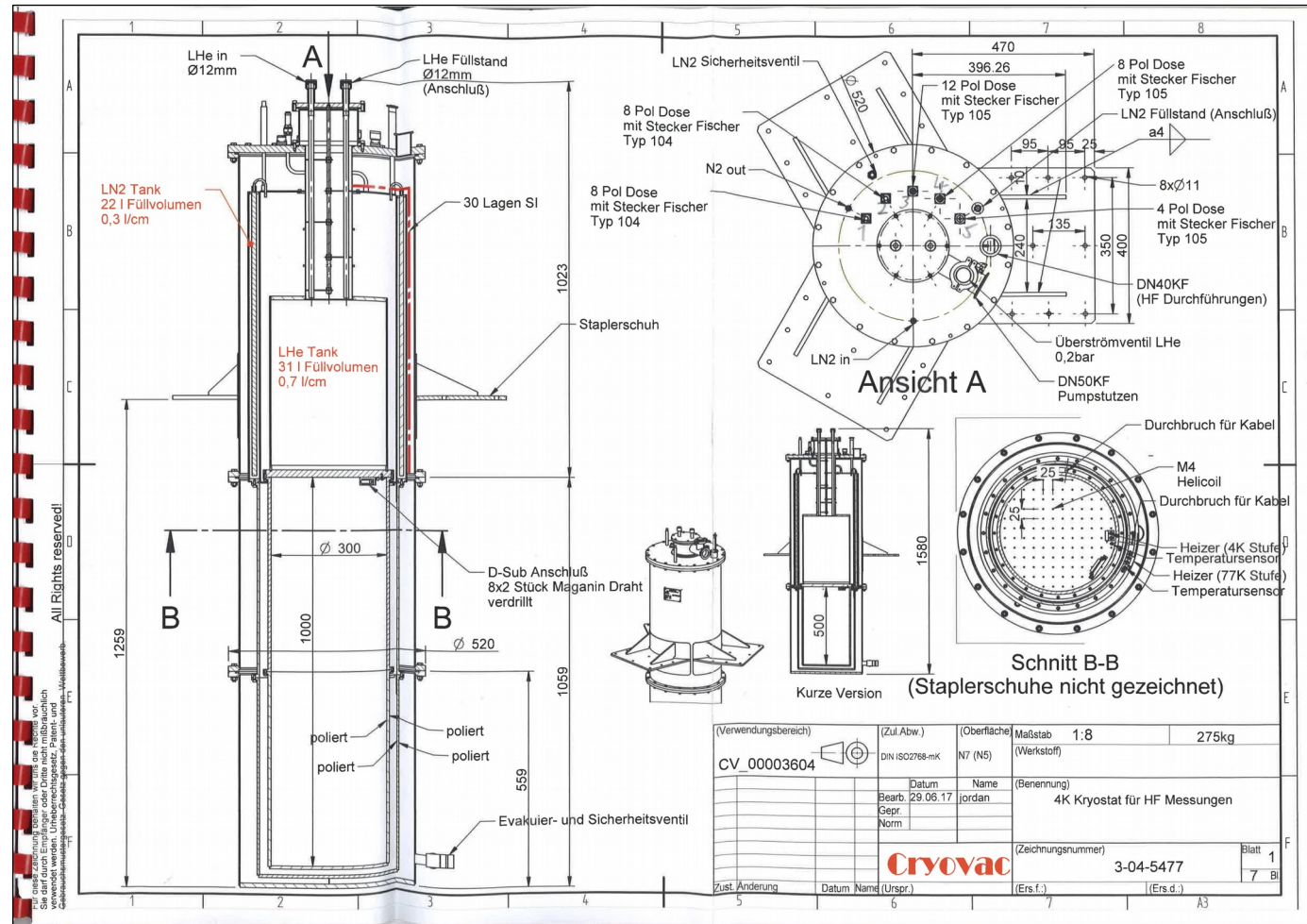
Cryostat

Motivation – See Stefan's talk from Hamburg meeting

- System noise measurements at low temperature
- General cryogenic test stand – mechanics, materials, motors etc.

Result

- Ø300mm mounting plate
- 500mm or 1000mm long sample volume
- KF40 flange for HF cables
- 16 pin electronics feedthrough
- 5 temp. sensors
- 2 heaters



Cryostat



08/05/2018

Cryostat commissioning
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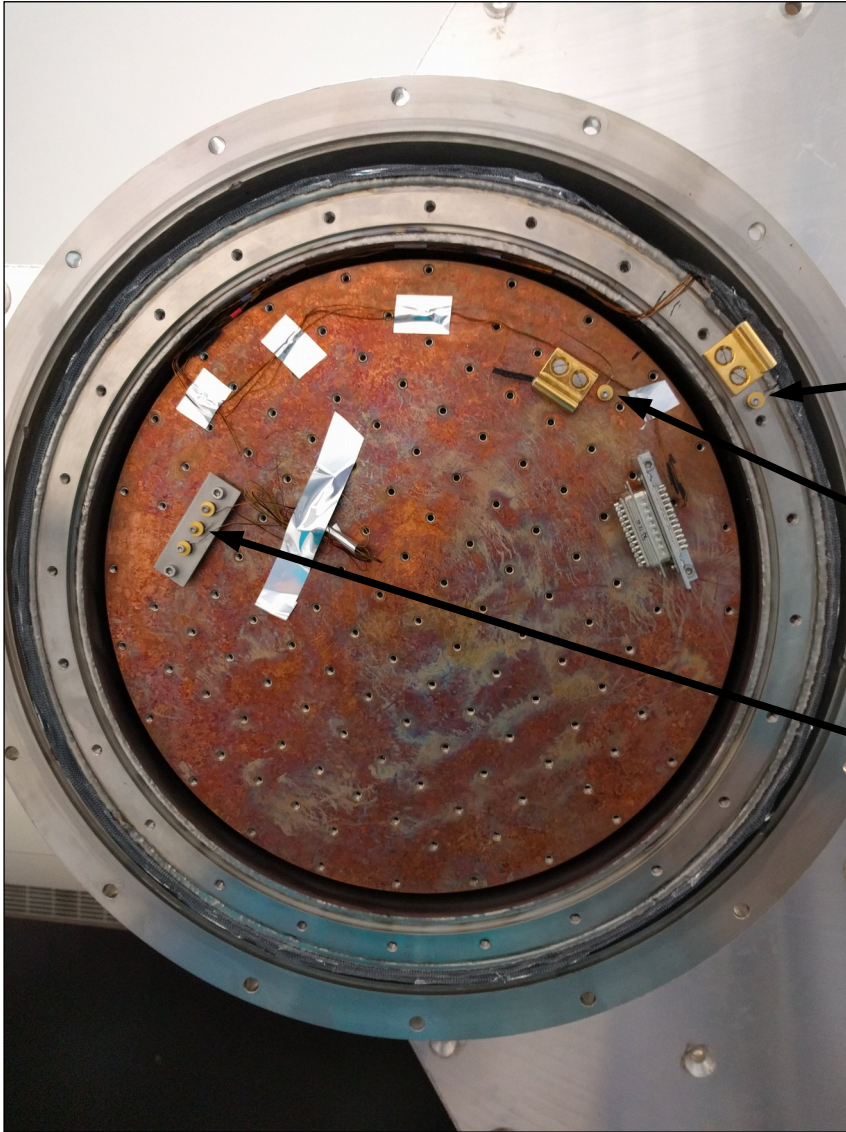
Commissioning

First Cooldown

- **Closing up** (3 vessels) – relatively easy, 2 person job, 1-2 hours. Leak tested.
- **Vacuum pumping** – 2-3 hours.
- **LN2 cooldown** – Fill both LN2 and LHe tanks with LN2, overnight for plate to cool down.
- **LHe tank preparation** – LN2 has to be flushed out (heaters can also be used), 3-4 hours.
- **LHe filling** – 2 hours



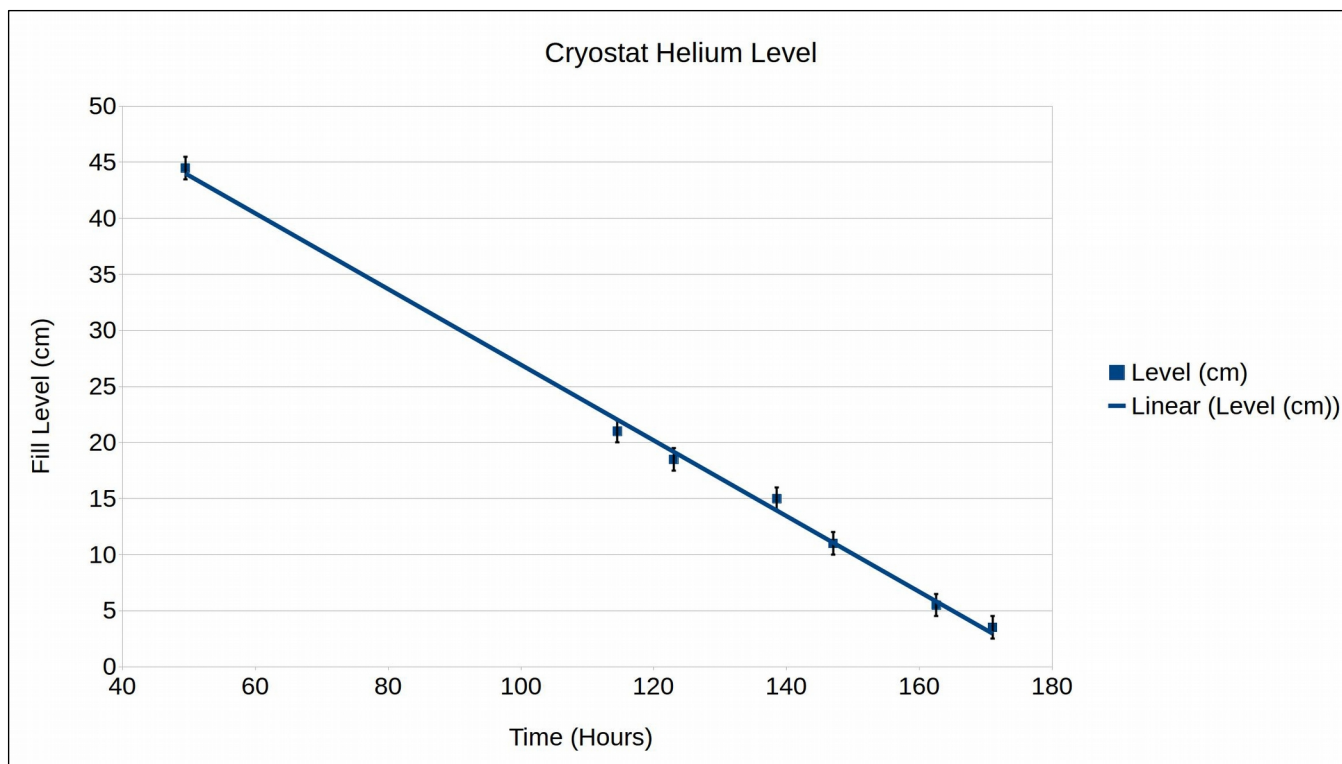
Commissioning



Temperatures

- LN2 Shield – 78K
- LHe Shield (mounting plate) – 4.2K
- Free sensors – 8.6K (needs investigation)

Commissioning



Loss rate
(with empty sample volume)

LHe
0.33 cm/h (0.23 L/h)
=
Refilling every 5 days

LN2
1.2 cm/h
=
Refilling every 3 days

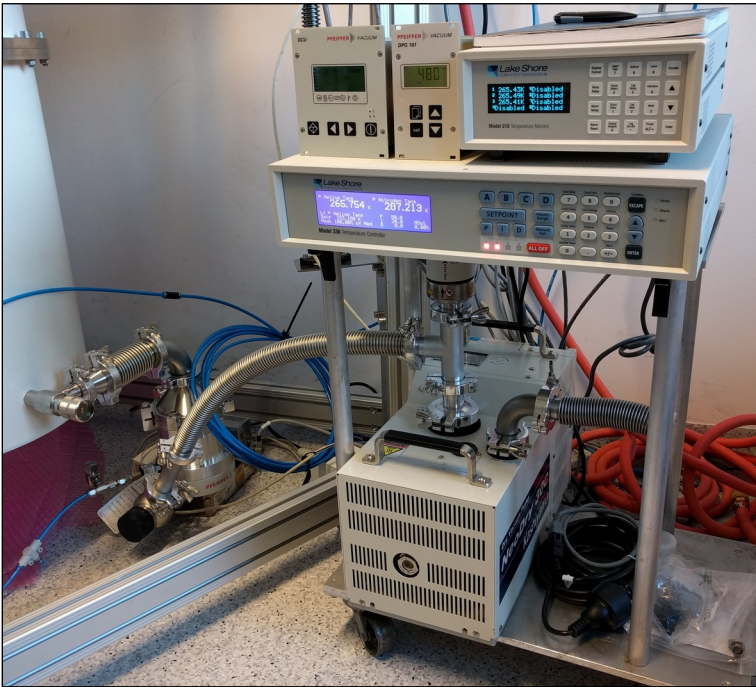
Refill time

LHe
30 mins

LN2
15 mins



Going forward...



Cryostat

- Pumps (and controller) plus temperature readouts and heating controllers are available
- Fill level sensors to come...
- Frame/lifting platform possible upgrade

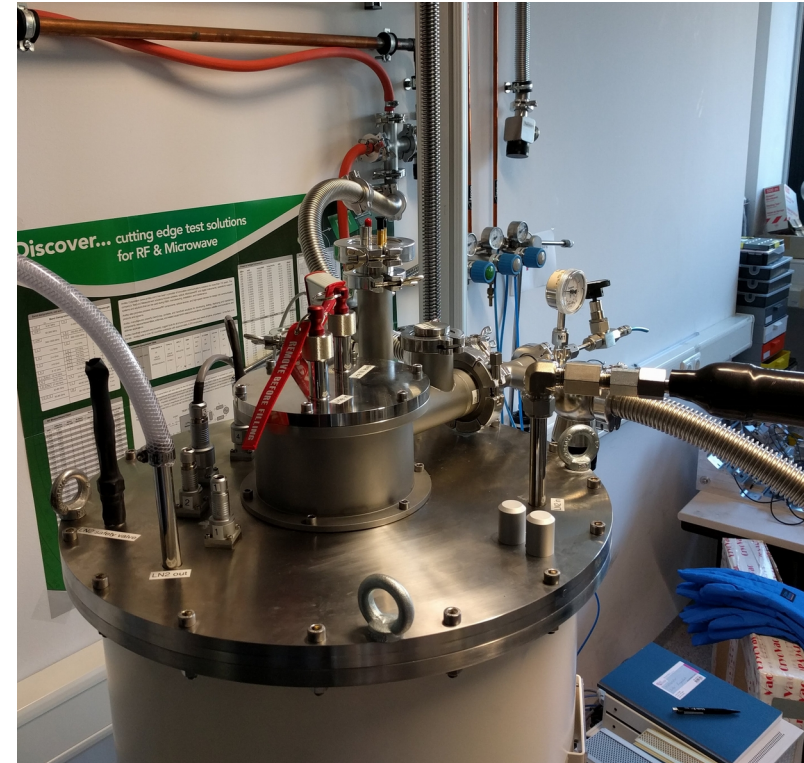
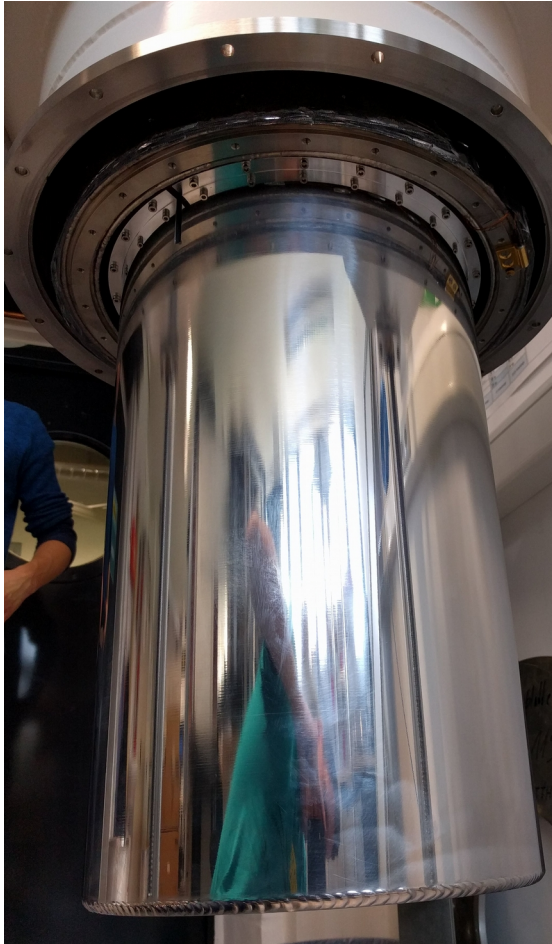


Helium Bath (dewar) – Still in use (See Olaf's talk from Paris meeting)

- Setup still available
- Dewar upgrade with bigger neck in discussion

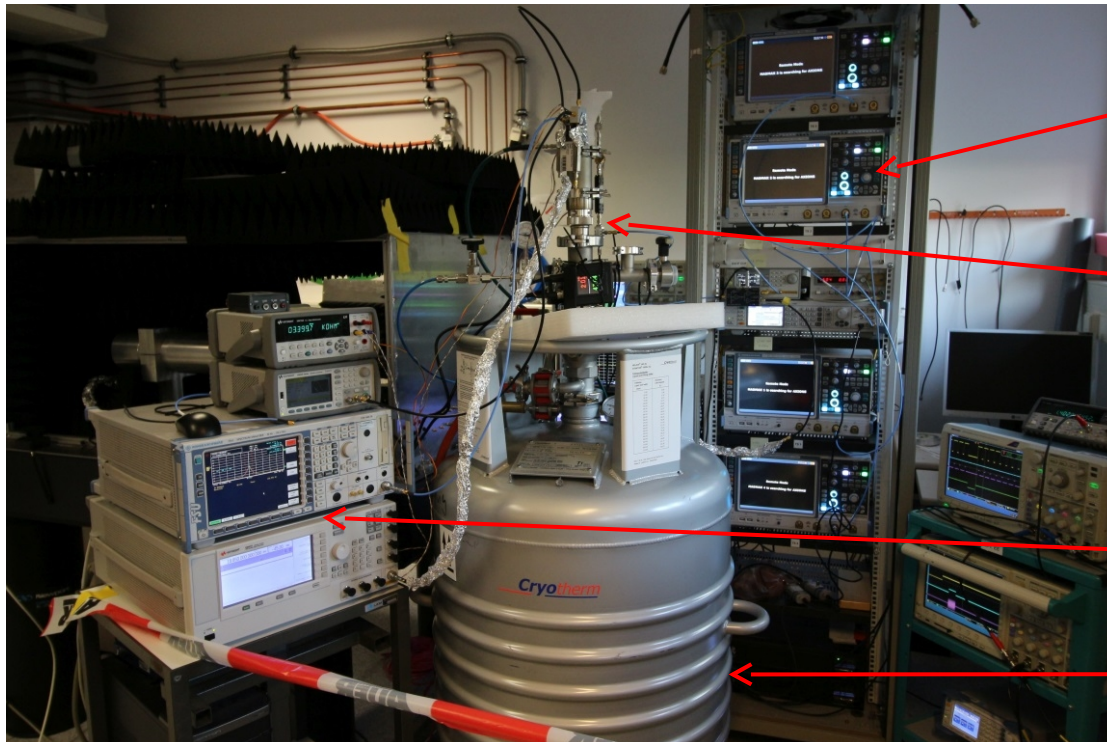
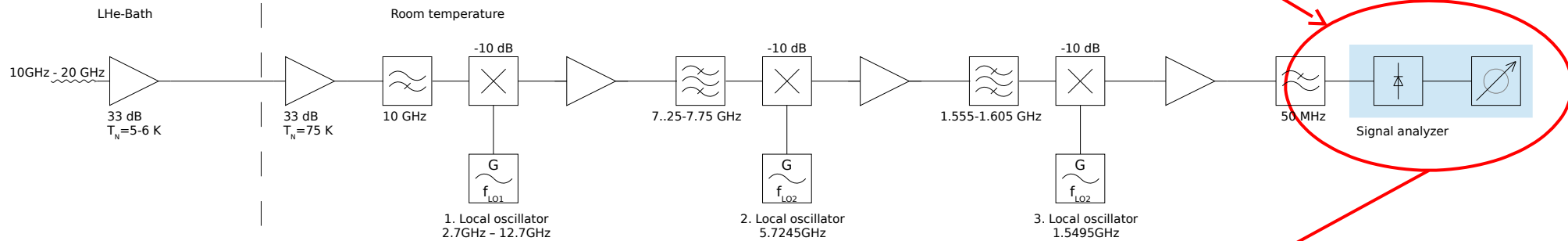


More Pictures



Heterodyne Detection

- Lab system:



Signal analyzer
(4 samplers, 1.4% dead time)

Front end mixers and
amps

Fake axion

LHe bath $\rightarrow 4\text{K } T_{\text{He}} + 5.5\text{K } T_{\text{Amp}} = 9.5\text{K } T_{\text{Sys}}$