Super- FRS magnets testing: follow-up activities 2021

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GSI/CERN Collaboration Progress meeting
CERN, 22nd June 2021
Outline

- Status
- Update magnets activities
- Update facility activities
Status at CERN

- FoS Short Multiplet on **Preparation Area**
  - Preparation for electrical tests at room temperature

- FoS Long Multiplet on **Test Bench 1**
  - Hardware and Software commissioning

- FoS Dipole on **Test Bench 2**
  - Preparation for safety valve installation and magnet connection to the bench
Update magnets activities: FoS LM (1)

1. Cooldown: 0.7 K/h and ΔT~28K over the cold mass ~ 16 days duration

- Limited mass flow (22 g/s) during pre-cool down  ➔ discussion scheduled
- CWU1 mass flow meter FT200 has malfunction  ➔ to be replaced
- Increased pressure drop on TS circuit (up to 12 bar) during cool down, as for FoS-SM  ➔ reason unknown
- Automatic top filling mode did not work due to a limitation of electronic read-out of CERNOX sensors the (some CERNOX don’t measure below 6.2 K) ➔ increase threshold temperature?
- Long and short level gauges wrongly wired by magnet manufacturer  ➔ QA measures implemented
Update magnets activities: FoS LM (2)

2. **HV tests** passed for all magnets (up to 1.5 kV for Quad)
3. **Cryo tests**: heat load tests ~ 3 days duration

- **8 boil-off/refill cycles** performed in 3 testing days to determine the multiplet heat load with and without current lead cooling
- Due to wrong wiring of **LHe vessel heaters** (feedthroughs swapped by manufacturer) some tests have to be repeated
- **Additional heat load measurements** while powering a magnet are planned
4. **Condensation** on top flanges and current leads: continuous monitoring before powering tests

5. **No leakage** problems into the vacuum vessel: multiplet operating more than 4 weeks without vacuum pump, at stable pressure

6. **Facility hardware re-commissioning at cold**
   - **Interlock**: 9 individual FPA loop opening by the PLC under defined logic. Every functionality is conform to expected.
   - **UQDS**: cabling and communication issues ~ 6 days intervention
   - **Power Converters**: functionalities confirmed for 2 circuits, no need of full commissioning. Power application OK
   - **Data logging**: data recording systems correctly checked and working fine. Data extractor correctly working.
7. **Powering:**
   - Long quadrupole and Sextupole powered individually up to ultimate current levels (330 A and 320 A)

8. **Magnetic measurements**
   - Long quadrupole and Sextupole measured individually and in cross talk configuration with SW (P.Kosek)
Update facility activities (1)

- **Test bench platforms:**
  - new support cables structure installed

- **GSI/CERN interfaces:**
  - *Control software:* commissioned at cold completed. Few more adjustments may be still required
Update facility activities (2)

• Preparation Area extension:
  - Relocation of TE/MPE facility planned by end of July 2021 from bld. 180 to bld. 272.

• Access to B180:
  - The access will be partially limited for the duration of the construction works, but it will be granted for exceptional transport of multiplet and dipoles by notifying the arrival and the space needed 1 week in advance.
Thank you for your attention