PEPR Suprafusion
SF-Cond Project

# Development of a 20-80 K cold source for measuring AC losses in HTS samples in the JOSEFA test station

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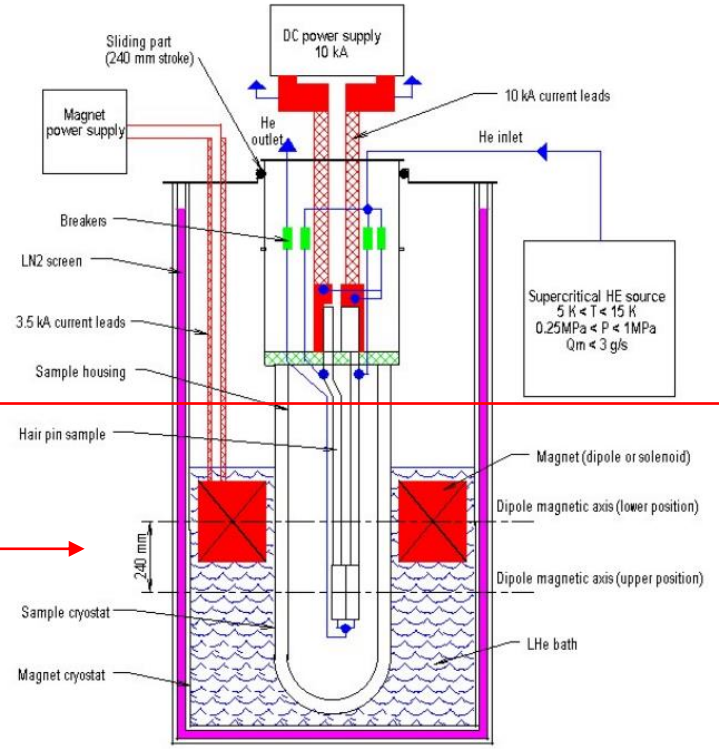
*European – Chinese collaboration on HTS superconducting magnets, Rome, 29/10/2026*

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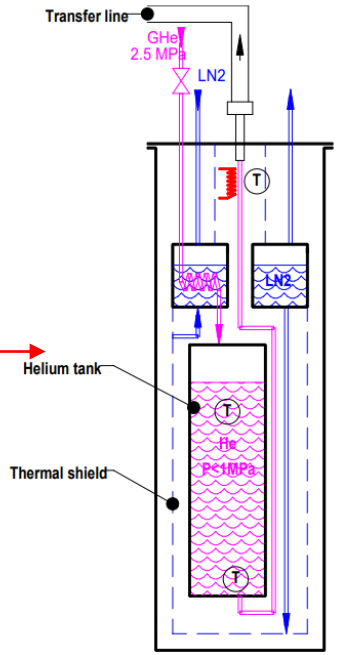
## Present status

- The JOSEFA (JOint Subsize Experiment FAcility) test station of the Group Aimants supraconducteurs (IRFM/GAIM) has been in **service since 1993** and underwent successive **improvements until 2005**.
- It allows tests in **perpendicular field**, as well as in parallel field, of conductor samples or joints in the temperature range **4 K** – 15 K.
- Critical current measurements of cables, joint development, as well as **AC losses**.





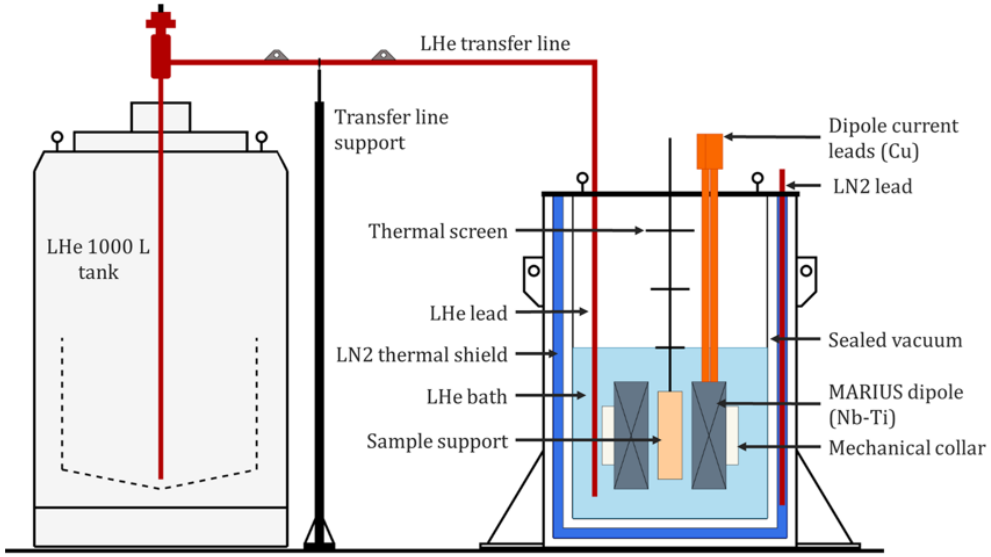

*Simplified schematics of the test station*




*Supercritical He source*

# Development of a 20-80 K cold source for measuring AC losses in HTS samples in the JOSEFA test station

- Since many years, the test station has been used *exclusively* for **AC loss measurements** in perpendicular field **at 4 K** with the sample immersed in a LHe bath.
- The electrical powering of the MARIUS magnet, which generates the background field, is **limited to 2 kA** (~ 1 T/kA, the magnet limit is 3 kA) and the excitation frequency goes down to **0.5 Hz**.

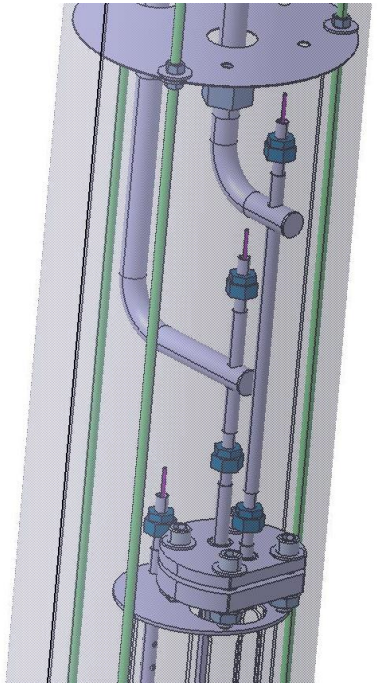


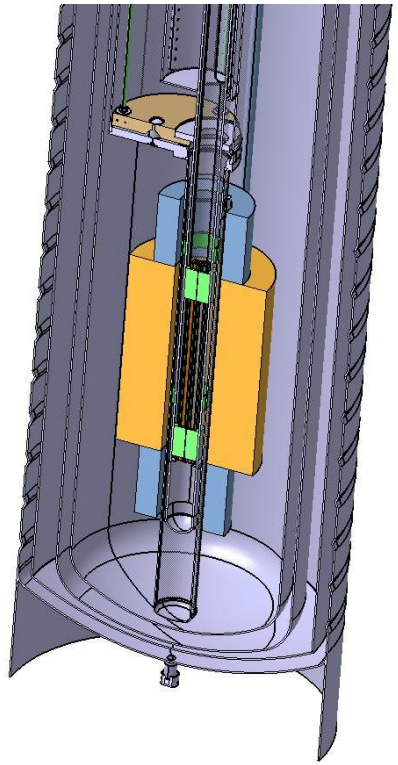

## Perspectives for the PC2 project

- **AC losses are a crucial topic** for superconductors in general, and even more **for HTS**: **hysteresis** ∝ tape width.
- To support the development of HTS conductors, we aim to:
  - Extend the temperature interval of testing, through the installation of a **cryocooler**, from **20 K to 80 K**. We also aim to the **4-20 K** range by **circulation of supercritical He**.
  - The cryocooler will also be used on the other test stations of GAIM.

# Development of a 20-80 K cold source for measuring AC losses in HTS samples in the JOSEFA test station

- **As a preliminary step**, we are modifying the test station with an anti-cryostat to perform **LN2 tests at 77 K**, with the objective to measure the **coupling losses** of HTS conductors.







→ The **first tests in LN2** are foreseen **before the end of this year**