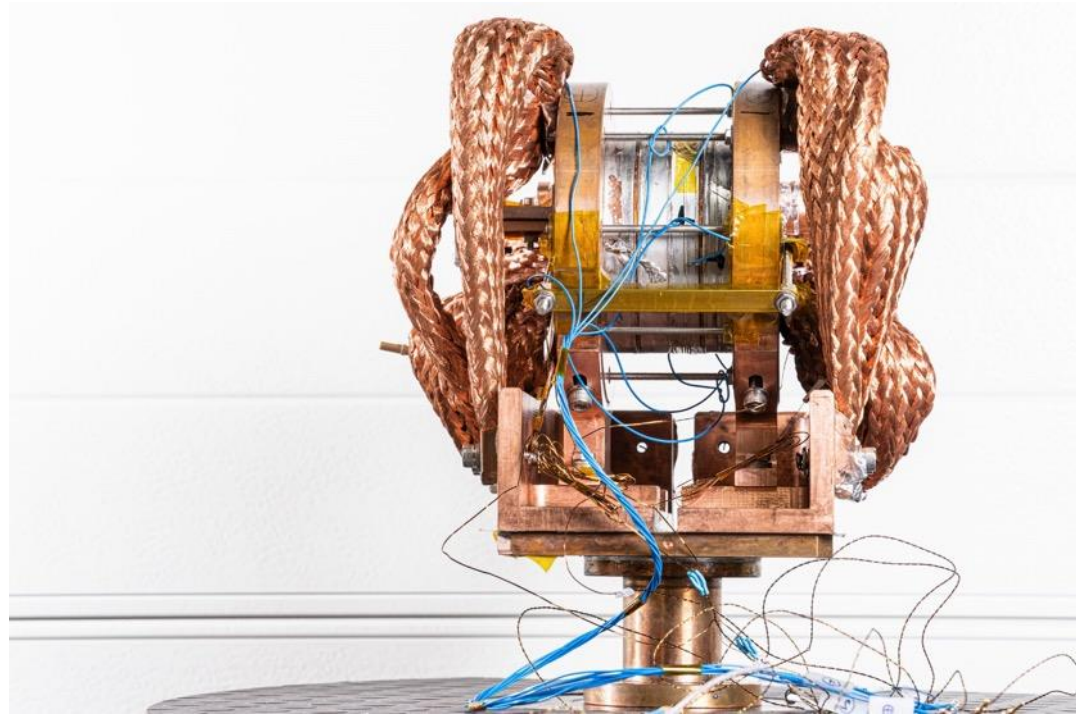


PAUL SCHERRER INSTITUT



02.11.23 – HFM Annual Mtg

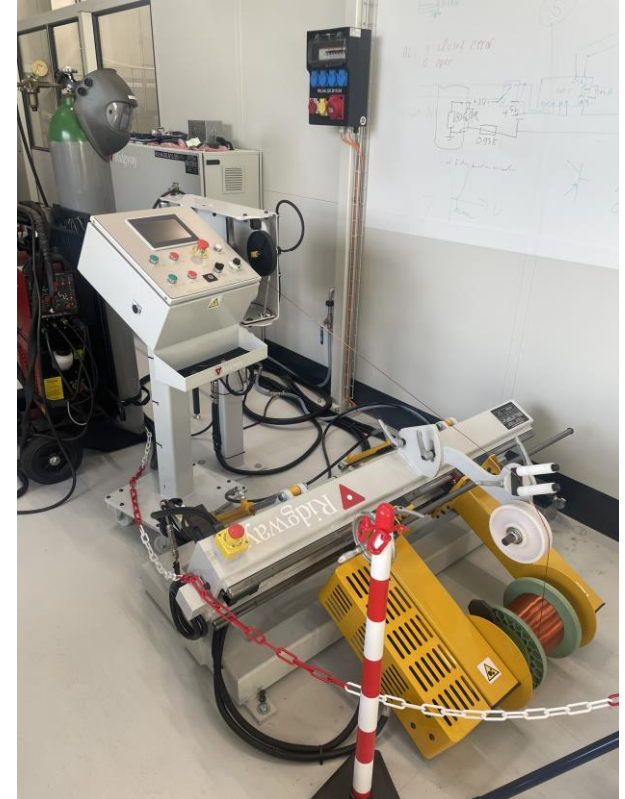
PSI Infrastructure Needs

D. M. Araujo, B. Auchmann, A. Brem, M. Daly, M. Duda, O. Kirby, M. Koratzinos, J. Kosse, T. Michlmayr, C. Müller, H. G. Rodrigues, S. Sanfilippo, D. Sotnikov (PSI), A. Milanese (CERN)

This work was performed under the auspices of and with support from the Swiss Accelerator Research and Technology (CHART) program (www.chart.ch).

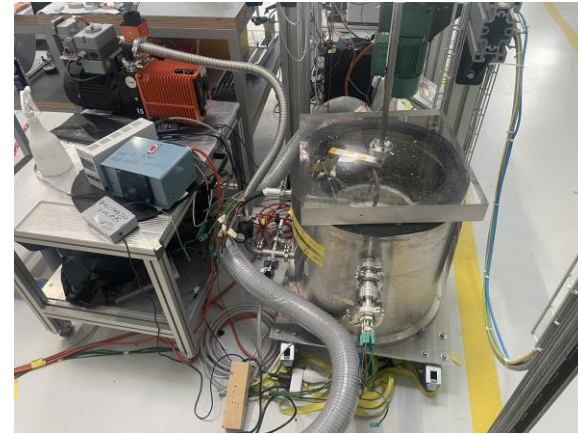
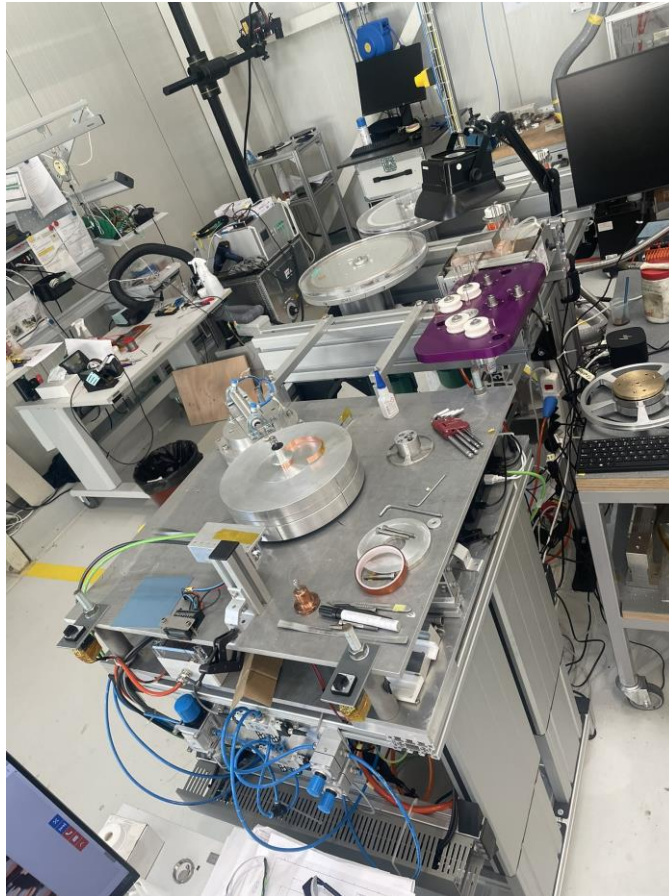
MagDev Laboratory





Development cooperation with Ridgway Machines Ltd.
Winder unit (2m40) with pneumatic and electrical connections.
3 DoF positioner + tensioner unit.
Manual and programmable semi-automatic control via OPCUA interface.
(Oversized) re-reeler.

HTS Pancake Coil Manufacturing



Tensioning table for two reels, based on CERN design. Flux-foamer.
Automatic winder unit with pneumatic pushers, heater controls etc.
Vacuum-solder vessel.
Argon glove-box for solder operations.



- Argon-furnace for 2-m-long coils.
No second gas circuit for controlled mold/retort atmosphere.
Requires re-design of hinged door and proper loading.
- Research tubular furnace, 1-m-long, 14 cm diam.
Quartz tube, vacuum or gas atmosphere up to 1100°C.
Loading inspired by CERN.

HFM Coil Impregnation



- Vacuum-impregnation vessel for 1-m-long coils, vertical impregnation.
- Autoclave for 2-m-long coils, horizontal impregnation.
250°C, 10 bar.

Direct heating, atmospheric heating, cooling water circuit.
 Multiple vacuum circuits for pre-preg part manufacturing.

Sample and Small-Coil Impregnation



- Mixing, de-gassing, impregnation setup for fast-turnaround. Disposal tubing, clip-on pinch valves, peristaltic pump, mixer- and vessel-vacuum control, glued sample heaters.
- Mixing pot for increased quantities.
- Box oven for wax crystallization / epoxy curing.



- Chemistry storage and ventilated workplace.
- Spin-coating equipment.
- Spray-coating equipment.
- Ultrasonic cleaning.
- Etc.

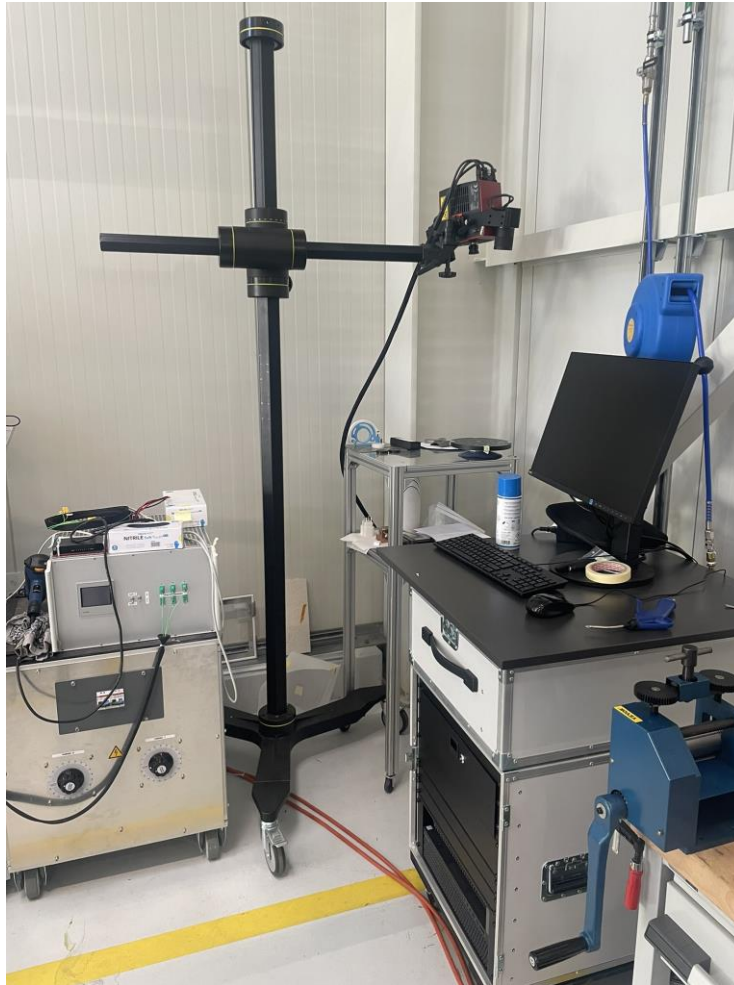


- Diamond wire saw.
- Polishing equipment.
- Optical microscope.

Instrumentation and Loading Tables



- “Instrumentation lab”
- Loading tables
(Welding tables, up to 8 t load)



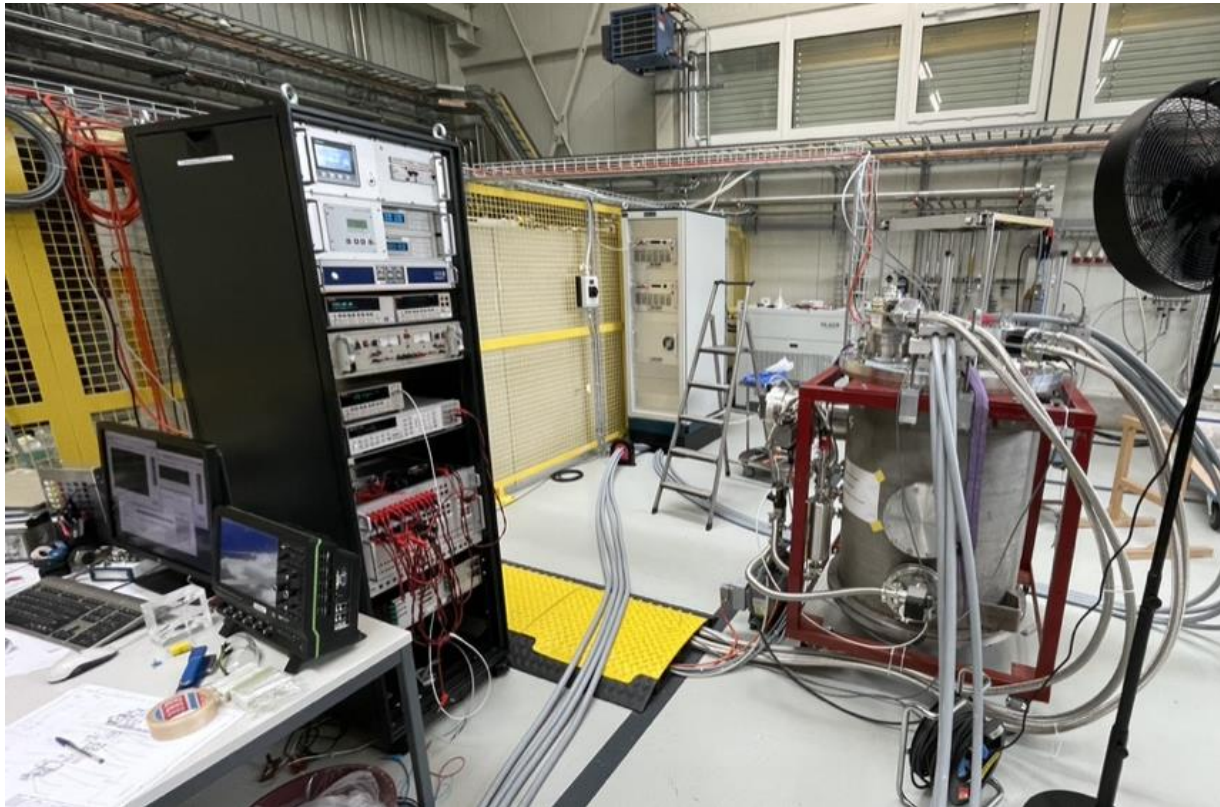
- 3D scanning metrology for fast-turnaround feedback on tolerances.



- Mobile workstations for engineers and technicians.
- Huddle space with clickshare hybrid-meeting equipment.
- Crowdsourced high-maintenance coffee machine.



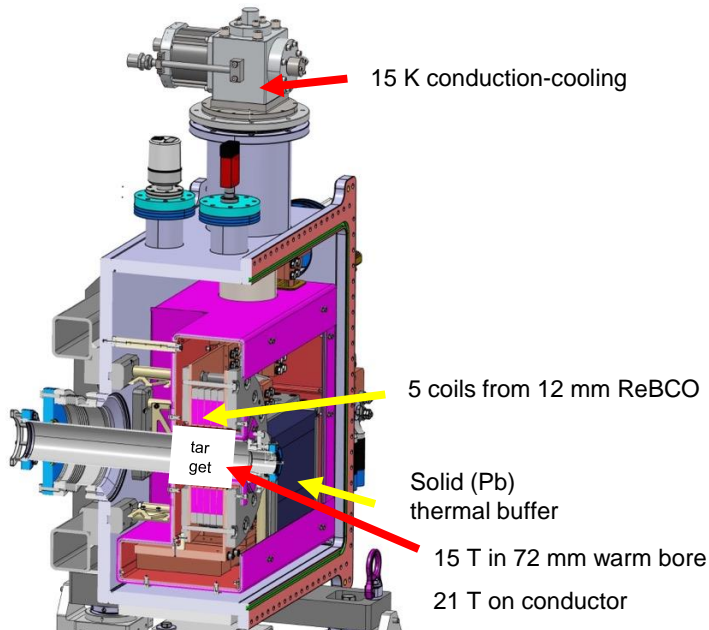
Cryogen-Free Test Station



- Cryostat with MLI heat shield.
- Single-stage (for lead cooling) and double-stage (heat shield and load) cryo-coolers.
- 2 kA two-quadrant power converter.
- uQDS TE-MPE quench detection and data acquisition unit.
- Electro-mechanical switch.

Cryogen-Free Test Station

- Re-design of header ongoing.
- Additional test place for stand-alone magnet systems such as positron-source NI capture solenoid.



Infrastructure Needs

- For modulus press, DSC, DMTA, etc, with ETHZ soft materials group.
- Cabling and LHe testing with CERN.
- Collaring / welding press – postponed until concrete need is known.
- Hydraulic systems for axial loading in '24.
- Low-cryogen test station forced-flow cooling, cryo-efficient powering, protection.
 - Current-range tbd
 - SC transformer for sample measurements.
- Need to improve competency in instrumentation!