
Contribution ID: **224** Contribution code: **WED-OR2-703-02** Type: **Oral**

# NI test coil program at the Paul Scherrer Institute

*Wednesday, November 17, 2021 8:45 AM (15 minutes)*

This work concerns the development of non-insulated (NI) HTS magnets at the Paul Scherrer Institute (PSI), Switzerland.
The Swiss Light Source (SLS) synchrotron at PSI uses superbend magnets as a brilliant source of X-rays. As part of an upgrade of the SLS, two LTS superbends are being constructed. These NbTi-based magnets will each consist of a pair of racetracks to generate the desired peak magnetic field, and a pair of Helmholtz coils to satisfy the required magnetic field integral.
To keep the SLS in a leading position in the future, PSI is currently investigating superbend magnets made from ReBCO-based NI coils, pushing to higher peak magnetic fields. The high current density, high stability, and relatively straightforward cooling at 10-20 K make NI coils ideally suited for this DC application.
The presented work focuses on the manufacturing, testing, and modeling of NI test magnets at PSI. The first test magnets consist of ReBCO-based pancake solenoids wound in-house, stacked together using a modular approach to generate a bore magnetic field of up to 14 T. Testing is performed in a cryocooled set-up. Results are compared with a coupled thermo-electromagnetic FEM model. The solenoid test program serves as a stepping stone to NI HTS superbends, and lessons learned will be applicable to racetrack-based NI magnets in general.

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**Session Classification:** WED-OR2-703 Mechanical Behavior and Coil Tests