



Contribution ID: 230

Type: **Oral presentation (15min)**

Construction and test of a non-insulated insert coil using coated conductor tape

Tuesday, 8 July 2014 11:45 (15 minutes)

An insert coil was constructed using coated conductor tape without electrical insulation. The coil inner diameter, outer diameter and height are 43 mm, 56 mm and 120 mm respectively; the coil constant is 16.7 mT/A. The coil is composed of 13 double pancakes (270 m of tape in total) with insulating disks placed in between the pancakes; the coil was impregnated with beeswax. The reason for choosing a coil without turn to turn insulation is to obtain a better tolerance to over-current. Indeed, at 77 K it was possible to apply twice the critical current, without any thermal run-away, because of the current sharing between tapes in adjacent turns; of course at such high currents the magnetic field generated in coil centre is lower than the expected value, the current flowing radially instead that azimuthally (along the superconducting ceramic). The quench protection is a simple circuit which switches the power supply off when the voltage exceeds a threshold value that can be set between 50 mV and 200 mV. After the power supply is switched off the energy stored in the coil is dissipated in the coil itself, with the contact resistance between turns replacing the dump resistor usually found in standard insulated coils. Quench tests at 4.2 K in self field and in background field (up to 12 T) were also carried out.

Primary author: UGLIETTI, Davide (EPFL)

Co-authors: BRUZZONE, Pierluigi (EPFL-CRPP); WESCHE, Rainer (Ecole Polytechnique Fédérale de Lausanne (EPFL))

Presenter: UGLIETTI, Davide (EPFL)

Session Classification: Tue-Mo-Orals Session 1

Track Classification: C-07: Magnet technology