Contribution ID: **909** Type: **Invited Oral Presentation**

M3Or1A-02 [Invited]: Development of ReBCO-CORC Conductors and Magnet Technology at CERN

Wednesday 24 July 2019 10:00 (30 minutes)

ReBCO-CORC is a versatile and unique multi-tape round conductor, developed for application in magnets, bus-bars and links to operate at elevated temperatures like 30 to 50 K, as well as for application in high-field magnets operating at 4.5 K. Experiments on CORC conductors and their application have been performed by many institutes from all around the globe. In combination with technological advancements in the ReBCO tape itself, it has led to a significant improvement in the conductor's current density and its bending and handling performance. The development of CORC conductors at CERN is now pushed further towards their application in high-field magnets and their bus-bars.

A two-layer CORC demonstrator solenoid is in development at CERN to exercise and mature the coil technology. A first solenoid uses a 3.3 mm diameter CORC wire and can be used either as standalone magnet or as high-field insert. It aims to demonstrate the high performance of CORC wires for magnets, as well as to find critical parameters in the design and handling of both wire and magnet for further advancing CORC technology. The coil design shows an inductance of 53 μH, a critical current of 9.7 kA in self-field and 4.2 K, able to generate a 4.5 T central magnetic field.

In parallel, a new version (of a series) of a CORC Cable-In-Conduit Conductor is developed at CERN. This CICC, aimed for application in high-current bus-bars and detector-type magnets, features a copper jacket for high thermal and electrical stability and embeds practical conduction cooling. A 2.8 m long conductor sample rated 100 kA at 5 K and 10 T is currently being prepared for test in the Sultan conductor test facility.

Research on CORC wires and demonstration coils at CERN is in full swing and exciting new developments are expected in the near future.

Authors: Dr MULDER, Tim (CERN); DUDAREV, Alexey (CERN); WEISS, Jeremy (Advanced Conductor Technologies and University of Colorado, Boulder); VAN DER LAAN, Danko (Advanced Conductor Technologies); TEN KATE, Herman (CERN)

Presenter: TEN KATE, Herman (CERN)

Session Classification: M3Or1A - REBCO & Nb3Sn Cables for Magnets