

# Analysis of AC loss reduction potential in round HTS cables

*Friday 5 May 2023 11:00 (30 minutes)*

The Coated Conductor (CC) tapes seem to be prospective for the production of magnets and cables, because of a high upper critical magnetic field as well as temperature, and competitive critical current density in combination with good mechanical properties. On the other hand, the superconducting layer may exhibit high energy dissipation in the external magnetic field because of rather large magnetization currents induced in the commercial tapes currently available in 2-12 mm widths. This could be a limiting factor of the ReBCO tapes application in the transient field or AC regime. It is possible to play with the cable geometry, but a higher impact on reducing the AC losses is expected from the tape filamentation. There are positive experiences in using narrow filaments for low  $T_c$  superconductors. But, the CC tape manufacturing technology complicates the dividing of the superconducting layer into narrow filaments. Moreover, the filamentary architecture suitable for AC loss reduction could lead to insufficient electro-thermal stability. In the present study, we analyze the impact of round cable geometry and the filaments coupling effect on the overall AC losses of the cable. The combination of an experimental investigation with FEM modelling and the use of analytical solutions allowed us to formulate relevant conclusions.

**Primary author:** Dr SOLOVIOV, Mykola (Institute of Electrical Engineering, Slovak Academy of Sciences)

**Co-author:** Dr GÖMÖRY, Fedor (Institute of Electrical Engineering, Slovak Academy of Sciences)

**Presenter:** Dr SOLOVIOV, Mykola (Institute of Electrical Engineering, Slovak Academy of Sciences)

**Session Classification:** Electro-magnetic modelling - 3