Contribution ID: **348** Type: **Poster**

Thu-Mo-Po.10-07: Study of CORC@ conductors with respect to individual tapes properties

Thursday 3 July 2025 08:45 (2 hours)

CEA has been studying the advantages of a conductor based on an assembly of CORC-like cables (CORC®: Conductor on Round Core) in the high field zone of a hybrid Central Solenoid (CS) magnet for EU-DEMO. To this end, the detailed study of geometrical and electrical parameters of a CORC-like structure are studied in order to evaluate the cable's electrical performance as well as to determine a number of important parameters (crossing points, contact surface etc⋯) as function of the cable structure. The paper first presents these geometrical and performance analyses.
It will then introduce smeared models in order to reduce the cable's performance to 1D tape scaling law using effective parameters. That reduction is of importance for use in thermal-hydraulic models.
Finally, the paper will present the case study of a particular CORC@ conductor that is being procured and is foreseen to be tested in the SULTAN superconducting conductors test facility in 2025. The paper will try to give some predictive estimate of the cable performance and identify some of the unknowns related to current redistribution and joint resistance.

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Session Classification: Thu-Mo-Po.10 - Modelling of Fusion Conductors and Coils II