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## **Mon-Af-Or6-04: AC Loss Measurements of the DEMO TF React&Wind Conductor Prototype no. 2**

*Monday, 23 September 2019 17:30 (15 minutes)*

The EUROfusion DEMO is being designed as the fusion machine to be built after ITER. During the preconceptual phase, several design options are investigated by theoretical analyses as well as tests on newly developed conductor prototypes.

One design option for the toroidal field magnet (TF) and central solenoid (CS) is based on flat Nb<sub>3</sub>Sn forced-flow conductors made with react&wind technique. The usage of these conductors simplifies some steps in the conductor and coil manufacturing, and together with graded layer-winding allows approx. 50% reduction of the required amount of Nb<sub>3</sub>Sn compared to ITER-like design based on wind-react-insulate pancake-winding.

Two full-size prototype cables for DEMO TF coil were manufactured, jacketed and tested in several test campaigns in SULTAN test facility. The DC results for the second prototype, RW2, rated for 63 kA at 12.3 T, were presented and published in 2018. The extensive AC loss measurements are subject of this paper. The AC loss data were collected over several test campaigns performed on various assemblies of RW2 at parallel and perpendicular cable orientation with respect to the AC field. The measurements done at 4.5 K and 20 K allow us to decompose the AC loss contributions originating from the bundle of superconducting strands and copper-matrix stabilizer located around the cable. The AC loss for sinusoidal and trapezoidal field variations will be presented and discussed. The low AC loss of the flat cable makes the cable an attractive choice for the central solenoid operating in a pulse mode.

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