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## **Thu-Mo-Po4.04-01 [24]: Design and Manufacture of a prototype Nb<sub>3</sub>Sn-NbTi full-size joint sample for the CFETR Central Solenoid Model Coil**

*Thursday, 26 September 2019 08:45 (2 hours)*

In order to develop and verify the key techniques and manufacturing process of the full-size central solenoid (CS) coil for China fusion engineering test reactor (CFETR), the central solenoid model coil (CSMC) project has been launched in the Institute of Plasma and Physics, Chinese Academy of Sciences (ASIPP). The CFETR CS model coil is a hybrid superconducting magnet of 12 T maximum magnetic field when the running current is 47.65 kA, which consists of two Nb<sub>3</sub>Sn windings in internal high field and three NbTi windings in external low field. The five windings contains six joints and two leads for two NbTi feedthroughs are used to connect the three windings of them. The six joints contains 4 Nb<sub>3</sub>Sn-NbTi lap joints and 2 NbTi-NbTi lap joints. A full-size Nb<sub>3</sub>Sn-NbTi prototype joint sample has been designed and manufactured. This sample composed of two single conductor legs, a lower joint of praying hands structure to be placed in the high field, and two upper terminals to be connected to the transformer of the test facility. In this paper, the sample design, the techniques used for the manufacturing steps of the different conductor legs, the terminations and the assembly are described in detail. This prototype sample will be tested in the Sultan facility at Villigen (Switzerland) and will be a model for the manufacture of joints for the CSMC.

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