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Thu-Mo-Po4.04-05 [28]: Demountable Coaxial Clamped Joint For ITER Central Solenoid Module Final Test Program

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The ITER Central Solenoid Modules (CSM) are being fabricated at General Atomics (GA) at their Poway, CA Magnet Technologies Center. Each of the seven modules will undergo final testing at the GA facility to demonstrate their performance with full current of 48.5 kA, 11 T and at 4.5 K. In order to perform tests on multiple modules, a demountable coaxial joint using indium wires was developed to connect the modules to the feeders. Two full scale joints were fabricated to establish the assembly technique and preliminary tested (up to 3 kA) on the CSM qualification coil (Cu conductor). The same joint components were then tested using a superconducting jumper (NbTi) and their resistance measured (2.3 and 4.9 nΩ, at 4.5 K, 40 kA). In parallel to measuring the voltage across the joints, a calorimetric evaluation was also performed and it confirmed the low resistance measurements of both joints. Testing of the same coaxial clamped joints on a heat treated Nb3Sn jumper took place in February 2019 and the results are reported in the paper. With acceptable results, the same joint components and assembly techniques will be utilized to connect the 14 joints on the seven CSM (Nb3Sn) for full current testing. This work was supported by UT-Battelle/Oak Ridge National Laboratory under sponsorship of the US Department of Energy Office of Science under Awards 4000103039 and DE-AC05-00OR22725.

Keywords: Superconducting Coils, coaxial joints, Indium, resistance, Cable in conduit conductor, ITER, 4.5K test facility, Nb3Sn, NbTi

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