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DC Performance of a Nb₃Sn Rutherford Cable Solenoid Insert

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Whole body ultra-magnetic field 14 T magnetic resonance imaging (MRI) magnet is now under design at Institute of Plasma Physics, Chinese Academy of Sciences, the main coil based on the preliminary designed of Nb₃Sn Rutherford cable in Channel Conductor (RICC). Rutherford cable is a core components of the conductor. During cabling the strands are inevitably experience plastic deformation that strongly change the geometrical dimensions of the sub-elements. These deformations are especially severe on the cable edges and can result in significant reduction of the cable or strands critical current as well as of the Residual Resistivity Ratio (RRR) of the stabilizing copper. To check the stability of the current-carrying properties of the Nb₃Sn Rutherford cable under combined thermal and EM loads, a 4-turn solenoid insert magnet was wound using Nb₃Sn Rutherford cable and tested at 4.2 K in a background magnetic field of up to 14T, the measured results are present in this paper.

Primary authors: ZHANG, Yongliang (Chinese Academy of Science); Dr DAI, Chao (Institute of Plasma Physics); Prof. WU, Yu (Institute of Plasma Physics); Dr MA, Hongjun (Institute of Plasma Physics); Prof. ZHANG, Changneng (Institute of Plasma Physics); Dr XU, Aihua (Changzhou Vocational Institute of Mechatronic Technology); Prof. SHI, Yi (Institute of Plasma Physics); Mr WU, Kaihong (Institute of Plasma Physics)

Presenter: ZHANG, Yongliang (Chinese Academy of Science)

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