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Manufacture and Electrical Properties of Instrumentation Wire Extraction Specimens for the ITER Feeder HV Insulation

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For the quench detection of the superconducting busbars and joints in the ITER Feeder system, several high voltage (HV) instrumentation wires should be led out from the electrical insulation layers to transmit the voltage potential signal to the data acquisition systems. The penetration of the HV instrumentation wires through the intact insulation layers introduces a potential defect in the insulation, which could open up a path from the HV potential to ground; if this were to happen Paschen discharge would inevitably occur, which is the destructive accident for the safe operation of the Feeders.. Since 2015, ITER Organization and ASIIPP have collaborated on the architecture and technology of instrumentation wire extraction, and an R&D program was undertaken in ASIIPP. In this paper, the detailed HV wire extraction design is presented, along with specimens validating the design. The electrical properties of the wire extractions specimens, including DC hipot test, Paschen test and Partial discharge test, are presented and discussed.

Keywords: high voltage, instrumentation wire, Paschen test, ITER, joint

Eligible for student paper award?

Yes

Authors: LINLIN, Fang; LI, Guoliang; HUANG, Xiongyi

Co-authors: DEVRED, Arnaud; WANG, Chao; GUNG, Chen-yu; WANG, Chunyu; ZHU, Haisheng; WANG, Jun; LU, Kun; CLAYTON, Nicholas; PICCIN, Roland; DAI, Zhiheng

Presenter: LINLIN, Fang

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