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Mon-Mo-Po1.04-13 [45]: Fabrication and High-field Performance of the First Iron-Based Superconductor Racetrack Coil

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The first 100-m iron-based superconductor (IBS) tape was produced by Institute of Electrical Engineering, Chinese Academy of Sciences (IEE-CAS) using the powder-in-tube technique in 2016. Since then, the development of IBS tape provides an opportunity to propel the practical IBS application. In this study, the world first IBS racetrack coil was made using a 100-m 7-filamentary Ba1-xKxFe2As2 (Ba122) tape at the Institute of High Energy Physics, Chinese Academy of Sciences (IHEP-CAS). The IBS tape was winded in parallel with stainless steel tape before heat reaction and impregnated with epoxy resin after reaction. The performance of the IBS coil was tested at 4.2 K and 0 - 7.5 T background field provided by an Nb3Sn Common-Coil dipole magnet named LPF1.2. The racetrack coil quenched at 7.5 T with operating current of 45.9 A, which is about 64% of the quench current at self-field. And the quench was caused by heat from one joint. The details of fabrication process and performance test results were presented in this paper.

Primary authors: Dr ZHANG, Zhan (IHEP, Chinese Academy of Sciences (CAS)); Dr WEI, Shaoqing (IHEP, Chinese Academy of Sciences (CAS))

Co-authors: Dr WANG, Chengtao (Institute of High Energy Physics, University of Chinese Academy of Sciences); Mrs WANG, Yingzhe; Mr CHEN, Da; Mr KONG, Ershuang; WANG, Dongliang (Institute of Electrical Engineering, CAS); ZHANG, Xianping (Institute of Electrical Engineering, Chinese Academy of Science); Prof. LIU, Fang (CAS Technical Institute of Physics and Chemistry); LIU, Huajun (Chinese Academy of Sciences); Mr ZHANG, Zhen; Dr GONG, Lingling; Mr YANG, Xiangchen; Prof. PENG, Quanling; MA, Yanwei (Institute of Electrical Engineering, Chinese Academy of Sciences); XU, Qingjin (IHEP)

Presenter: Dr ZHANG, Zhan (IHEP, Chinese Academy of Sciences (CAS))

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