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Critical Bending Radius Test and Analysis of 7-Filament Ba1-xKxFe2As2 Iron-Based Superconductor Tapes under 12 T Background Field

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7-filamentary Ba1-xKxFe2As2 (Ba122) iron-based superconductor (IBS) tapes were proven to be applicable to fabricate the high field insert coils in recent years. The iron-based superconductors with ultrahigh upper critical fields have expected to be used in future high-field applications. However, the current 7-filamentary Ba122 tape is also sensitive to strain. In order to promote the development of iron-based magnet technology, the mechanical properties of the Ba122 tape under high field were required to be tested and analyzed. This study focuses on the test and analysis of the critical soft-way and hard-way bending radius of 7-filamentary Ba122 tape. In this study, the mechanical structure designs for the critical bending radius test were presented. The Ba122 tapes within the structure of the bending radius test were simulated under the high background field. The bent Ba122 tape samples were assembled with the test mechanical structures before the reaction. The fabrication and testing process of the bent Ba122 tape samples were presented. The testing results of the critical bending radius of Ba122 tapes under 12 T background field were analyzed and summarized.

Primary authors: LIU, Xiao (Hefei Institutes of Physical Science, Chinese Academy of Science); ZHANG, Zhan (Chinese Academy of Sciences (CAS)); LIU, fang; WANG, Dongliang (Institute of Electrical Engineering, CAS); SHI, Yi (Institute of Plasma Physics); HONG, wenzhe; WANG, Qiqi (Institute of Plasma Physics, Chinese Academy of Sciences); ZHOU, Chao (Institute of Plasma Physics, Chinese Academy of Sciences); QIN, Jinggang; XU, Peng (TIPCCAS)

Co-authors: LIU, Huajun (Chinese Academy of Sciences); MA, Yanwei (Institute of Electrical Engineering, Chinese Academy of Sciences)

Presenter: LIU, Xiao (Hefei Institutes of Physical Science, Chinese Academy of Science)

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