Current carrying performance of IBS tape under spiral winding stress and torsional stress

Hongjun Ma, Jingfeng Zhang, Huajun Liu , Fang Liu

Hefei Institutes of Physical Science, Chinese Academy of Sciences

---

The iron-based superconductor (IBS) is a good candidate for high field applications. In order to be able to run larger currents and reduce the inductance of the magnets, superconducting magnets for fusion reactors and high energy accelerators use high-current-carrying conductors containing multiple superconducting wires or tapes. Conductor on Round Core (CORC) and Twisted Stacked Tape Cable (TSTC) are two kinds of cable structures based on superconducting tape. The superconducting tape is subjected to spiral winding stress and torsional stress respectively during the cable forming stage. The influence of spiral winding stress and torsional stress on critical current are studied. Smaller angle winding helps to reduce core diameter while keeping high critical current retention rate. The critical twist pitch of IBS tape after heat treatment is 240 mm. This research have guiding significance for the development of iron-based cables.