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A temperature and over current controlled persistent current switch for high temperature superconducting magnets

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Persistent current switches (PCS) which switch between superconducting and resistive states enrich the operation scenarios of superconducting magnets and lead to simple but colorful charging procedures. The state of a PCS can be controlled through superconducting phase change such as in temperature controlled case, global failure of flux pinning such as in over current controlled case, or a series of local forced flux flow such as in the dynamic resistance controlled case. Thanks to the thermal stability of high temperature superconductors, over current becomes feasible for practical PCS control strategy, which is promising in real applications of superconducting magnets due to its simplicity. In this work, temperature and over current control of PCS are combined, leading to novel charging procedure of superconducting magnets. The PCS made by copper laminated ReBCO coated conductors is fabricated and tested under various of temperature and current conditions.

key words: Persistent current switch, over current controlled, superconducting magnets, HTS

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