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Thermal Stability Analysis of No-insulation Magnet under Dynamic Operational Conditions

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Due to excellent thermal stability and high-power density in steady state, no-insulation (NI) winding technology is widely used in the application of superconducting magnets. However, current ripple and background magnetic field fluctuations caused by relative devices result repetitive turn-to-turn current of the NI interpolated coil, which will impose a great impact on the thermal stability of NI magnet. This paper analyzes the power characteristics and other electromagnetic parameters of NI magnet under dynamic operating conditions by 2D finite-element method. The results provide references of thermal conductive structure design and assessment of operational reliability of NI magnets in changing working conditions.

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