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## Performance Analysis and Electromagnetic Design of a Flux-coupling type SFCL

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Superconducting fault current limiter (SFCL) is an efficient way to solve the short-circuit problems in modern power system. A novel Flux-coupling type SFCL (FC-SFCL) based on disconnecting coupling windings for current-limiting has been proposed. For its low steady impedance at normal state and high limiting one after fault, FC-SFCL is considered as a potential scheme to limit short-current. It contains a pair of high temperature superconducting (HTS) coupling windings wound on an iron-core with air gap. Improving coupling coefficient of the HTS coils and reducing losses are essential issues, which are affected by iron-core structure and winding processes of HTS coils. In this paper, performance analysis of FC-SFCL is discussed. Magnetic field distributions of different structures are analyzed and the way to decrease leakage magnetic field is researched. Then the electro-magnetic design of a 10 kV / 500 A FC-SFCL prototype is carried out based on genetic algorithm. Coupling degree and losses of the prototype are evaluated to demonstrate that the electromagnetic parameters meet the design requirements.

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