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Wed-Mo-Po3.08-02 [54]: Modelling and experimental verification of dc inductive superconducting fault current limiter

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Due to its excellent current-limiting capacity, especially at the initial dc fault transient stage, the analyses of dc inductive superconducting fault current limiter (I-SFCL) are attracting more attention. In this paper, a modelling method for dc I-SFCL was proposed to describe its nonlinear characteristic of inductance. Firstly, the structure of dc I-SFCL was briefly introduced. Then the magnetic field distribution, including the leakage magnetic field distribution, was considered by finite element method (FEM) to establish an equivalent magnetic circuit of the dc I-SFCL. By analyzing the equivalent magnetic circuit, the relationship between dc transient current and the inductance of dc I-SFCL was calculated. Accordingly, a mathematical I-SFCL model can be built in MATLAB to discuss the current-limiting performance. A dc I-SFCL prototype has been fabricated to verify the accuracy of the proposed modelling method and simulation result.

KEY WORDS: dc inductive SFCL, leakage magnetic field distribution, equivalent magnetic circuit, modelling method, dc SFCL prototype.

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