



Contribution ID: 209 Contribution code: THU-PO3-707-02

Type: Poster

A Numerical Method for Simulating the Quench Behavior of Superconductors

Thursday, 18 November 2021 10:00 (20 minutes)

Based on finite element method (FEM) and difference method, a simulation method for the quench behavior of superconductors is introduced in this paper. With this method, the heat conduction equation of a superconductor under a thermal disturbance can be solved simply and visually. The stability of an REBCO high temperature superconducting tape under adiabatic approximation is simulated, and results are in good agreement with experimental results. Based on this simulation method, two-dimensional even three-dimensional model of superconductors adiabatically or non-adiabatically can also be developed. It is very important to study the electromagnetic characteristics of superconductors under thermal disturbances and develop superconducting magnets with high stability.

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Session Classification: THU-PO3-707 Quench Analysis I