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Thu-Af-Or24-04: "Thermal Eraser" to Mitigate Screening Current by Optimal Control on Temperature in an HTS Pancake Coil

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This paper presents a method to mitigate screening current by manipulating temperature in a high temperature superconductor (HTS) pancake coil. Named as "Thermal Eraser", it utilizes an electric heater that is optimally designed to "create" a target temperature profile in the HTS pancake coil. The key idea is to control field and temperature dependent critical current $I_c(B,T)$ of "individual" turns in the HTS coil by an optimal operation of the heater, i.e., Thermal Eraser. Here we report: (1) principle of operation; (2) design of an electric heater that is dedicated to an REBCO test pancake coil; (3) construction and operation of the heater to demonstrate the feasibility of Thermal Eraser experimentally.

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