



Contribution ID: 619

Type: **Poster Presentation of 1h45m**

## **Analytic Study of the Active Quench Detection Method for the HTS Magnet using Resonance circuit**

*Thursday, 31 August 2017 13:45 (1h 45m)*

Generally quench detection of high temperature superconducting (HTS) magnet is difficult compared with low temperature superconducting (LTS) magnet. Because normal zone propagation (NZZ) velocity of HTS is slower than LTS. In order to detect the quench signal for HTS magnet, signal wires for voltage taps are needed. However, owing to its slow NZZ velocity, the quench signal of HTS magnet is hard to detect when the voltage taps are attached on the HTS magnet with short distance. Moreover, HTS magnet have possibility to burn out when the voltage taps are attached both end of HTS tape. Because the hot spot is hardly dissipative and the thermal runaway occurs on the normal zone. In the other hand, inductive voltage can be a noise aspect to the quench detection of HTS magnet. And the larger magnet size, the bigger inductance is. Especially, the effect of inductive voltage get worse as the HTS tape transits from the superconducting state to normal state. Therefore, in this paper, quench detection method is presented for HTS magnet using resonance circuit to detect the quench signal sensitively. The simulation and experimental results show that proposed method can be a feasible technique to detect the quench of HTS magnet.

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**Session Classification:** Thu-Af-Po4.09

**Track Classification:** G1 - Quench Detection and Protection Systems