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## **Wed-Mo-Po3.11-04 [91]: A Lumped Circuit Model for No-Insulation Pancake Coil to Consider Fast Electromagnetic Quench Propagation**

*Wednesday, 25 September 2019 09:30 (1h 45m)*

This paper proposes a new lumped-circuit model that has been modified from the conventional one to demonstrate the fast electromagnetic quench propagation among electromagnetically-coupled no-insulation high temperature superconductor (HTS) coils. Recently, multiple groups have reported that the conventional lumped-circuit model, which has well demonstrated charging and discharging behaviors of an NI magnet, could not account for post-quench behaviors. Specifically, terminal voltages of individual pancake coils were estimated to be too high than the simulated ones. This paper proposes a new lumped circuit model that focuses on the post-quench simulation of an NI HTS magnet. The key idea is to incorporate a new circuit element that may physically represent the fast electromagnetic quench propagation in the magnet. First, we define key assumptions and justify the use of the new element theoretically. Then, we apply our new model to selected high field NI HTS magnets. The simulation results with the new model are compared with experimental results as well as those simulated using the conventional lumped-circuit model.

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