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## A Validation Study of Updated Features in a New 835-MHz REBCO Insert Coil for the MIT 1.3-GHz NMR Magnet

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We present the updated REBCO insert coil technologies applied to the 835-MHz REBCO insert (H835) for the MIT 1.3-GHz NMR magnet (1.3G). As a replacement for the previous 800-MHz REBCO insert that was damaged when it quenched during operation in 2018, we are constructing the 19.6-T H835 based on our new single-coil formation design with a stacked of 40 stainless-steel-co-wound no-insulation (NI) double pancake (DP) coils, each of which has an electrically and mechanically reinforced cross-over turn. We have renewed the H835 design which uses high-performance 4-mm-wide REBCO tapes for the end DP coils, replacing wider 6-mm-wide regular-performance tapes used in our previous design. We can expect to reduce the length of conductors and the screening-current-induced stresses in the end DP coils. We have built and validated a full-scale over-banded DP coil test module with a protection heater and a copper cooling disk attached on the coil surfaces. In this paper, we present: 1) a new H835 DP coil fabrication process including an over-banding; 2) analytical results of effectiveness of the cross-over reinforcement; 3) charging characteristic and  $I_c$  of the DP test coil cooled via the attached copper disk in the conduction-cooling system; and 4) a quench-protection heater design and its performance validation.

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**Primary author:** Dr PARK, Dongkeun (Massachusetts Institute of Technology)

**Co-authors:** BASCUÑÁN, Juan (Massachusetts Institute of Technology); LEE, Wooseung (Massachusetts Institute of Technology); IWASA, Yukikazu (Massachusetts Institute of Technology)

**Presenter:** BASCUÑÁN, Juan (Massachusetts Institute of Technology)

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