

## LNP-3

### First-cut Design of a No-Insulation All-REBCO 7 T Whole-body MRI Magnet

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As high temperature superconductor (HTS) magnets exhibit noble current-carrying abilities under high magnetic field while being capable of operations at cryogen free conditions, they could be possible candidates for the future use for main magnets of ultra-high field magnetic resonance imaging scanners (UHF-MRIs). With employment of the well-known no-insulation (NI) technique, strong magnetic fields may be achieved within relatively small volumes, which is an attractive trait for commercial MRI. In this paper, we present a first-cut design of a no-insulation HTS magnet that generates a center field of 7 T in a 800-mm room-temperature bore. The magnet consists of a stack of double-pancake coils wound with multi-width REBCO tapes. The so-called “inside-notch” winding configuration is adopted to generate a target field homogeneity of <10 ppm in 40 cm diameter spherical volume (DSV). This paper presents: (1) detailed design parameters of the magnet; (2) performance analyses with the intrinsic “NI-behaviors” considered; and (3) discussion on the options for active shielding.

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