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Wed-Af-Po3.15-09 [13]: Effect of Screening Current Induced Field on Field Quality of an Air-Core HTS Quadruple Magnet

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An air-core HTS quadruple magnet has many advantages by eliminating iron-core of an iron-core quadruple magnet. Study on air-core HTS quadruple magnet for accelerator application is currently ongoing at Applied Superconductivity Laboratory, Yonsei University. It is comprised of 8 metal-insulation double-pancake racetrack coils, each wound with 4 mm wide REBCO tapes. An REBCO tape is of high critical current, but magnetization current can flow in the tape due to its monofilament architecture. The magnetization current generates so called Screening Current Induced Field (SCIF). For an air-core HTS quadruple magnet, the SCIF could be critical for the field quality, such as gradient, uniformity, and effective length. In this paper, the current distribution in the REBCO tape of an air-core HTS quadruple magnet led to magnetization current is calculated, and the effect of the SCIF on field quality of the magnet is analyzed and discussed.

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