

## Analysis of a Magnetization Loss for a 2.5 MJ Toroidal SMES

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This paper presents some design results of modular HTS magnets for a 2.5 MJ toroidal superconducting magnetic energy storage (SMES). A modular toroidal type magnet for the SMES consists of a number of pancake coils. We considered a choice of BSCCO-2223 or stacked YBCO tapes as the conductors for the HTS magnets of the SMES. Operating temperature was decided to be 20 K which could be accomplished by a conduction cooling with a couple of GM cryo-coolers. A SMES magnet may be in three different modes—charging, storing, and discharging. Even though the SMES is not an AC power device, time varying current during charging and discharging period will generate a magnetization loss that may result in thermal instability in the HTS magnet. In this paper, the magnetization loss of the HTS magnet is analyzed and discussed.

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