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Magnetic Field Reduction Phenomenon of a Metal Insulation and a No-insulation Coil by External Fluctuating Magnetic Field

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This study analyzes the output characteristics of a 100-turn non-rotational-type metal insulation (MI) coil and a no-insulation (NI) coil installed inside a 1-MW armature with external fluctuating magnetic fields. Experiments were conducted to investigate the change of state and output performance of the superconducting coils based on the fluctuating magnetic field prior to the development of a superconducting rotating machine. Results showed the output magnetic field of the two coils decreased and the reduction of the NI coil was more significant than that of the MI coil. It was verified that the reduction rate was proportional to the intensity of the fluctuating magnetic field and the operating current value of the superconducting coil. The results were analyzed and the correlations were investigated by performing an eddy-effect analysis using the finite element method.

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