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## **New Screening Current Simulations on REBCO Pancake Coils**

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A screening current is one of serious problems for real applications of REBCO magnets. A screening current deteriorates a magnetic field generated by REBCO magnets, hence it is desired to simulate a screening current-induced magnetic field. Researchers have already proposed a few kinds of simulation methods. For example, a finite element method coupling with thin film approximation method (FEM+TAM) is a powerful method. It gives accurate results, but it takes a long computation time. A circular coil approximation method is very simple. Both the methods need a large-memory computer.

In this presentation, we will propose two different screening current simulation methods. One is very simple, and a large memory is unnecessary. The results are not good accurate, but they give enough solutions in a very short time.

Another proposed method takes into account a thickness effect. As mentioned above, the FEM+TAM produces accurate solutions, but the magnetic field parallel to REBCO tapes is ignored in the TAM. However, Norris said the magnetic field parallel to REBCO tapes strongly affects the current distribution in the REBCO layers. We call it the "thickness effect." Therefore, we propose a new thin film approximation method to consider the thickness effect.

We will present a few simulation results together with measurement data, and discuss the validity of these screening current simulations.

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**Primary authors:** NOGUCHI, So (Hokkaido University); UEDA, Hiroshi (Osaka University); HAHN, Seungyong (Seoul National University); ISHIYAMA, Atsushi (Waseda University)

**Presenter:** NOGUCHI, So (Hokkaido University)

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