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## Numerical evaluation of the potential methods of reducing screening-current-induced stress in NI-REBCO coil

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In recent years, the no-insulation REBCO (NI-REBCO) coils show remarkable attraction and potential in high field areas. For a REBCO coil, the stress generated by screening current under high magnetic field is a crucial concern for the magnet operating performance. Therefore, how to effectively reduce strain created by screening current is a key challenge in the NI-REBCO coil magnet's mechanical design. In this study, we developed a numerical model to analyze the mechanical behavior including screening current influence of NI-REBCO coil, and its validation was realized by comparing numerical results with corresponding experimental data. In order to evaluate effective methods of reducing the impact of screening current induced stress, we design a NI-REBCO coil magnet as a benchmark model. Then, we mainly focus on three potential methods to reduce screening current induced stress: winding tension and over-band in the fabrication process, monofilament and multifilament REBCO tape, co-winding metal tape. By comparing the mechanical response during charging of benchmark REBCO coil and coils with the three aforementioned methods, we quantitatively analyze the effects of these potential methods separately. Based on the numerical results, we present a series of NI-REBCO coil magnet design suggestions to reduce screening current induced stress.

**Author:** JIANG, Zhaofei

**Presenter:** JIANG, Zhaofei

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