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Enhancement of magnetic flux distribution using roundly stacked-HTS tape

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Field pole magnet composed of stacks of high-temperature superconducting (HTS) tapes is a featured technology due to its simple manufacturing process, flexibility, and high current density thanks to intensified characteristic of HTS characteristics.

In this study, our group measured magnetic distribution of rounded stacks of HTS tapes in comparison with flat shaped ones. Normally, critical current in the bended tape is degraded by decreasing bending radius. However, results of the trapped field measurements on rounded and flat stacks showed an improvement for trapped magnetic field properties.

On the other hand, a modeling method based on the T-A formulation our group implemented to the commercial electromagnetic analysis was investigated to simulate trapped magnetic field of superconducting materials in previous research. We obtained tendency of the trapped magnetic field of HTS material even though the calculation method is affected by Jc-B curve used in the T formulation.
In this study, two models of stacked HTS magnets were created, one with a rounded stacks and the other with flat stacks. These models are created with electromagnetic analysis software and simulated with electromagnetic modeling based on the T-A formulation.

In the presentation, the results that the arrangement of tapes in fabricating stacked HTS magnet with rounded shape needs to consider together with stacking method and shape to optimize will be reported with latest calculation data.

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