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Sat-Mo-Or3-03: Current Sharing Experiment for YBCO cable with Defects

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This study investigates the impact of nickel-plated YBCO (Yttrium Barium Copper Oxide) tapes on current sharing levels and performance, as compared to traditional copper-wrapped tapes. Prior simulations demonstrated a correlation between defect density and current sharing levels, prompting an experimental evaluation. Nickel-plated tapes were utilized to enhance thermal conductivity by replacing the copper oxide layer found in traditional YBCO tapes. The tape was laser cut one to three cracks in the YBCO layers, followed by structural verification using microCT or TEM imaging (not sure yet). Experiments were conducted under 4T magnetic fields in liquid nitrogen environments. Additionally, the nickel-plated tape is made by corroding the copper layer of YBCO tapes with acid and plating the nickel in its place. The crack experiment verified the current sharing level decreases when the density of crack increases which we got from the previous simulation study. The Nickel-plated YBCO tape results showed its current sharing levels is higher than traditional YBCO tapes. This enhancement is attributed to the improved thermal conductivity provided by the nickel layer, offering a promising alternative for advanced applications of YBCO-based materials.

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