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Wed-Af-Po.10-01: Electromechanical Characterization of Flat Round-Edge Former Tape Cable for Fusion Devices

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Future fusion devices must leverage the advantages of high temperature superconductors. To meet this challenge, a novel Rutherford-type cable winding of superconducting (REBCO) tape stacks has been proposed. This cable, known as the Flat Round-Edge Former Tape Cable (FReTC) is comprised of several multi-tape subcables wrapped around a flat, round-edge former. As part of enabling the use of FReTC, thorough investigations of cable electrical and mechanical properties are required.

Previous work established simplified quarter-twist-pitch, single-tape models of the FReTC geometry in ANSYS Mechanical APDL software. Building on this work, hard bending and easy bending models will be developed for the analysis of strains and stresses in the cable. From these results, the critical current degradation of the cable will be deduced. Finally, experiments measuring the critical current carrying capacity as a function of the load will be used for model validation.

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