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Coupled Axial and Transverse Currents Method for Periodic Superconductors Modelling

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In this contribution, we present a fast and accurate finite element approach for modelling the electric and magnetic behavior of periodic composite superconducting conductors. It uses two coupled two-dimensional models and accounts for the conductor periodicity via circuit equations. This allows to capture three-dimensional effects while leading to a significant reduction in computational time compared to conventional three-dimensional models. The method is directly applicable to multifilamentary Nb-Ti, Nb₃Sn, MgB₂, and Bi-2212 wires, and can be extended to other periodic HTS conductor geometries.

Topic

Applications in large instruments such as high-field magnets, medical magnets and accelerator magnets

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