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Improved Modeling of Canted-Cosine-Theta Magnets

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The Canted-Cosine-Theta (CCT) is a design option for the next generation of high field superconducting dipoles which is being pursued within US Magnet Development Program. This paper presents new modeling techniques developed for design and analysis of this type of magnet. For mechanical modeling in ANSYS, three approaches with increasing accuracy will be compared: 2D symmetry models, 3D periodic symmetry models, and full 3D models. Methods for static and transient magnetic simulation using ANSYS will be presented with a focus on circuit coupled models for predicting magnet behavior following quench. Where applicable, simulation results will be compared to data from CCT magnet tests at Berkeley.

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