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Thu-Af-Po.03-01: Thermal and mechanical design of superconducting field coil modules for offshore wind generators

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One of the greatest challenges in designing the superconducting field winding for a superconducting generator (SCG) is balancing mechanical loads while limiting heat that can enter via mechanical structure. This paper outlines the thermal and mechanical co-design of the field coils for a low speed, high torque, partially superconducting generator using LTS wire. Mechanical design is focused on minimizing loads in and around the field coils, thereby minimizing the amount of structure through which heat can enter. Conduction cooling is used to simplify the system. Material selection, thermal design, and performance projections for an SCG designed for offshore wind turbines are reviewed.

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