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【284】Energy-efficient FCC-ee operation via HTS nested magnets

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We present our work on energy-efficient nested high-temperature superconducting (HTS) magnets for FCC-ee. By replacing the normal-conducting sextupole and quadrupole magnets in the 2900 short-straight-sections by HTS nested variants, and by including dipole coils, significant energy can be saved, estimated at 20-30% of the total FCC-ee energy consumption. The optimum operating temperature, 4˜K, of such an HTS magnet system is found by balancing the operational costs (dominated by electricity use for cooling) with capital costs (dominated by HTS conductor). The end goal of the project, a 1˜m prototype, is supported by demonstrators manufactured at CERN and PSI.

This work is part of the CHART framework and the FCC Feasibility Study.

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