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CEPC superconducting quadrupole magnets in interaction region

This poster primarily details the design and development of a superconducting quadrupole magnet in the interaction region for the CEPC project. It focuses on the magnet design scheme based on direct winding technology. The design for the direct winding CCT magnet is described, employing the surface current method to derive the magnetic field of the CCT coil and the interference field between angled double-aperture magnets. Analytical formulas are used to modify the coil winding path, thereby resolving the issue of the dipole field exceeding design specifications within the high-field region of the magnet aperture. Finally, it demonstrates CCT coil winding experiments conducted using existing direct-winding machines and multi-shape winding control software. Combined with winding experience from the BEPCII-U superconducting quadrupole magnets interaction region, this demonstrates the feasibility of implementing this design scheme.

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