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# [Invited] Engineering Design and R&D Work for Toroidal Field Superconducting Magnet of CFETR

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The Chinese Fusion Engineering Testing Reactor (CFETR) is a DEMO design to bridging the gap between ITER and the first commercial fusion power plant. Toroidal field (TF) magnet system is one of the most challenge for CFETR project. The operating current of the TF magnet is 95.6 kA. The major radius and minor radius of CFETR is designed as 7.2 m and 2.2 m, respectively. To reduce the manufacture cost, a hybrid magnet is creatively adopted in winding pack (WP). For validating the rationality of a TF structure, electromagnetic and structural analysis were conducted. The result indicates that the peak field of the toroidal field superconducting magnet reach to 14.5 T, which can provide the 6.5T at the 7.2 m major radius of the plasma. The max intensity stress of TFCC is about 872 MPa.
The prototype TF coil will be manufactured before 2025 and be tested in ASIPP to verify the safety of engineering design. In the past 3 years, we already finished the detailed engineering design work of the prototype TF coil and also start to do related R&D research work such as internal SC joints, high performance insulation material, TF case sample and so on. We would like to share the status and progress of the prototype TF coil's engineering design results and its key components'R&D work.

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