

Overview and updates of the Burning Plasma Experimental Superconducting Tokamak (BEST)

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The Burning Plasma Experimental Superconducting Tokamak (BEST) is under construction in Hefei, China. Designed as a compact high-field tokamak, BEST aims to explore burning plasma physics, achieve advanced steady-state plasma performance ($Q>1$), and develop high- Q fusion operations and realization of real-time T production, extraction and cycling. With long pulse duration and compact size, BEST will have high neutron fluence, high density and flux of energy and particles, which provide a test bed for some challenge issues of a reactor: i) Material and PWI physics; ii) Test blanket module; iii) Power and particle exhaust of D&T burning plasma. The physics design has been completed three years ago, and the main parameters have been fixed with Major radius: $R=3.6\text{m}$, Minor radius: $a=1.1\text{m}$, Toroidal $B_t=6.15\text{T}$, Plasma Current: $I_P=4\sim7\text{MA}$, Power: $P_{\text{fusion}}=20\sim200\text{MW}$, Elongation: $\kappa = 1.7\sim 1.9$, fusion power of 20-200 MW and $Q=1\sim 5$. The construction of the BEST campus started on 30th June 2023, the main building will be completed in 31st June 2025 and start the pre-assembly of sectors of BEST. The construction of the BEST device is progressing steadily as planned and is going to be completed by the end 2027. With lower cost (both economic cost and time cost), BEST will accelerate the fusion research toward burning plasma. Together with ITER, BEST will strengthen the physics basis and reduce scientific risk of the CFETR and other future reactors.

Country or International Organisation

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