

## **Recent experiments towards to the steady-state operation in the EAST and HT-7 superconducting tokamaks**

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Achievement of the first plasma has demonstrated that EAST engineering construction is completely successful. First diverter plasma configuration in EAST was obtained in the second campaign at beginning of 2007. To support the long pulse diverted plasma discharges, new capabilities including the fully actively water cooled in-vessel components, current drive and heating powers, diagnostics, real-time plasma control algorithm were developed. These developments were primarily validated in recent experimental campaign. Pre-program shape and RZIP feedback control produce a variety of shaped plasma, and RTEFIT/ISOFLUX control algorithm was primarily realized. The LHW was used for current drive both in sustaining plasma discharges and assisting the plasma start-up. Nearly 0.8MW LHW has been successfully delivered to the shaped plasma, which can almost sustain a fully non-inductive plasma discharge at  $I_p=250\text{kA}$  and the line averaged density of  $\sim 1.5 \times 10^{19}\text{m}^{-3}$ . The plasma discharges can be sustained over 20 seconds in such operation scenarios. A number of operational issues, such as plasma initiation, ramp up and configuration control with constraints of superconducting coils were successfully investigated. The physical engineering capability on the superconducting magnetic system of EAST was assessed by simulating discharges. In the last two years, experiments in HT-7 focused on long pulse discharges under different scenarios and high power heating to support EAST experiments both physically and technically. The long pulse discharges up to 400s renews the records in HT-7. The high performance regimes have been also greatly extended.

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