

# Verification between experiments and predictive modelling of scenarios with off-axis current in EAST

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## Abstract

Recently, the scenario with off-axis current is achieved in EAST experiments[1]. And, previously, off-axis current profiles are predicted accompanied by large-radius internal transport barriers, high bootstrap current fraction and high poloidal beta in modelling work. In this work, experimental data with off-axis current is studied, and comparison between the simulations and experimental results is made. It is found that off-axis current is achieved in EAST experiments under the condition of high density, high off-axis external heating and current drive (H&CD), especially EC and LHW which are similar to those used in the modelling work. This indicates that simulation tools can provide us reliable results in the investigation of EAST scenarios with off-axis current density profiles and the simulation results can serve as a reference for future development of experimental plans although there are some differences in quantification. Besides, it is worth noting that in the modelling work only core profiles are evaluated meaning that simulation tools can be used to predict the core profiles and obtain rational results under reasonable setting of pedestal profiles which is consistent with previous validation work[2]. Lessons are drawn from the modeling and EAST experiments: Simulation tools can provide reasonable results qualitatively, but there may still be a certain gap between experimental results, and key parameters need to be modified based on experimental results to achieve expected goals.

## References

- [1] Huang J et al 2023 *Phys. Plasmas* **30** 062504
- [2] Zhai X M et al 2022 *Nucl. Fusion* **62** 076015