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Effects of drifts and parallel current on divertor asymmetries

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ABSTRACT

The dominancy between radial and poloidal components of drifts in determining the divertor asymmetries is still unambiguous for specific tokamaks. A detailed study of drifts and parallel current effects under Experimental Advanced Superconducting Tokamak (EAST) tokamak parameters is carried out by using the B2.5 (SOLPS-ITER) edge plasma transport code. The influences of the poloidal component as well as the radial component of the drift are analyzed, respectively. The results demonstrate that the divertor asymmetry is caused or amplified by the poloidal E×B drift and parallel thermal current. Inclusion of E×B drifts and parallel currents lead to an up–down asymmetry of the power to the target plates in the connected double null configuration. For the single null configuration, the drifts and parallel current contribute significantly to the in-out asymmetry besides the geometric effect. Based on the simulation results, the approaches to mitigate asymmetry distribution of the power loads on the low- and high-field-side target plates are discussed.