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P2.1059 ECCD effects on the divertor power distributions on W7-X

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see full abstract here
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Wendelstein 7-X (W7-X) is one of the world's most advanced stellarators. Electron cyclotron resonance heating (ECRH) [1] was the main heating system during the operation phase 1.2 (OP 1.2) in W7-X. Apart from heating, the remotely steerable launchers of the ECRH-system allow to drive current at different plasma radii during experiments.

The finite intrinsic toroidal plasma currents (on the order of 10 kA) composed of bootstrap and the accompanying time-varying shielding currents have been measured throughout the campaign with Rogowski coils [2, 3]. The evolution of these currents modifies the edge magnetic rotational transform, and, as a result, can change the magnetic topology of the three dimensional boundary. The effects of a freely evolving plasma current on the strike-line movement have been observed and analysed.

Electron cyclotron current drive (ECCD) [4] can be generated to control the local rotational transform of the magnetic flux surface inside the confined region, but also modify the rotational transform at the separatrix to shift the strike lines [5]. This paper focuses on the possibilities of ECCD for strike-line control. With co- and counter-ECCD, one can add current with the polarity of the bootstrap current or compensate the intrinsic bootstrap current. The power deposition on the divertor targets measured by an infra-red thermographic system for both cases (dedicated experiments in OP1.2) will be shown in this paper for a quantitative comparison.

References

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