# Effects of toroidal plasma currents on the strike-line movements on W7-X

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Wendelstein 7-X (W7-X) stellarator has been optimized amongst other criteria for small bootstrap current. However, even small plasma currents can change the rotational transform and displace the magnetic island chains at the plasma edge, due to its low shear characteristic. Besides possible changes to the plasma core confinement, the power loads to the plasma facing components are affected, which is most important for divertor operation. Thus scenarios with a small bootstrap current are crucial for W7-X [1].

The evolution of toroidal plasma currents has been measured by a set of Rogowski coils [2, 3], during the first divertor operation phase on W7-X. In the case of freely evolving bootstrap currents (without electron cyclotron current drive), strike lines on the divertor targets monitored by means of infra-red cameras are observed to move in accordance with the measured toroidal current. The net positive toroidal current shifts the strike lines on the vertical and horizontal targets away from the pumping gap in the standard magnetic configuration.

Heat flux profiles have been calculated and compared with diffusive field line tracing modelling [4] considering also the effective plasma current. As a preliminary result we see qualitative consistency between experimental results and modelling suggesting a strike-line movement of $\sim 3\,\mathrm{cm}$ along the target surface caused by a net toroidal current of $\sim 5\,\mathrm{kA}$. This current is developed in the order of 10 s. This movement of the strike line corresponds to approximately one third of the strike-line width.

## References

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