The Steady-State ECRH-System at Wendelstein7-X

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Electron Cyclotron Resonance Heating (ECRH) is the main heating system for the Wendelstein7-X (W7-X) stellarator and the only one for CW-operation in the first stage. The mission of W7-X, which is presently under construction at IPP-Greifswald, is to demonstrate the inherent steady state capability of stellarators at reactor relevant plasma parameters. A modular 10 MW ECRH plant at 140 GHz with 1 MW CW-capability power for each module is under construction to meet the scientific objectives. Simulations of different ECRH scenarios, which are foreseen for W7-X operation and base on ray-tracing calculations and confinement studies, will be presented. A steady state ECRH has specific requirements on the stellarator machine itself, on the ECRH-sources, transmissions elements and on the experimental environment. In particular all elements have to be sufficiently cooled, screened and armoured against microwaves. The commissioning of the ECRH plant is well under way, the strategy and status of the project will be reported. First full power, CW integral tests of one ECRH module have been performed. A large microwave stray radiation chamber for integrated in-vessel component tests had been brought into operation. A bi-axially movable, motor driven ECRH antenna mock-up was build and is tested for reliability now.

A strategy for the commissioning and the first experimental campaign at W7-X has been developed.