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Modelling of electron cyclotron resonance heating and current drive in the T-15-MD tokamak with GENRAY and CQL3D codes

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The T-15-MD tokamak is planned as a normal magnetic-coil tokamak with a flexible ITER-like configuration of the poloidal magnetic field. The main goal of the tokamak T-15-MD is the achievement of long pulse, non-inductive current drive regimes for a high-aspect-ratio divertor plasma configurations.
The simulations of the ECRH and ECCD in T-15-MD tokamak are carried out with the ray-tracing code GENRAY and the kinetic Fokker—Planck code CQL3D for two formerly predicted regimes of tokamak operation, namely hybrid scenario with 12 MW auxiliary heating and 2 MA total plasma current, including inductive (Ohmic) current, and the steady-state scenario with 18 MW auxiliary heating and 1 MA fully non-inductive current. The results for 2D distribution of the ECRH power density and ECCD efficiency in the tokamak poloidal cross-section on the flat-top stage of discharge are presented for various injections angles and EC wave modes. It is shown that for the ECCD in the hybrid scenario the injection of the X2-wave from the LFS is more effective than injection of the X1-wave from the HFS.

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