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Simulation Study of Heat Transport with On-Off Axis ICRH in Thailand Tokamak Using BALDUR Code

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Self-consistent simulations of plasma in a proposed tokamak design of Thailand Tokamak. (major radius = 65 cm, minor radius = 20 cm, plasma current = 100 kA, toroidal magnetic field = 1.5 T) are carried out using the 1.5D BALDUR integrated predictive modeling code. The simulations are used to investigate plasma transport with on and off axis positions of ion cyclotron resonance heating (ICRH) in the range of 0.3 – 5 MW. The core transport is predicted using the combination of Multimode (MMM95) or Mixed Bohm/gyro-Bohm (Mixed B/gB) anomalous core transport model and NCLASS neoclassical transport model. It is found that the electron temperatures obtained from both simulations are in the range of 0.3 - 1 keV which agree with the HT-6M experimental results. When the ICRH is applied, ion and electron thermal transport increase. Consequently, ion and electron temperature and plasma stored energy increase. During ICRH for both MMM95 and Mixed B/gB model, the electron temperature at the center (Te(0)) ranges from 1 to 1.5 keV with on axis and from 1 to 1.9 keV with off axis. The ion temperature at the center (Ti(0)) ranges from 0.7 to 25 keV with on axis and 50 eV to 7 keV with off axis.

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