Ion Bernstein Wave heating experiments on HT-7 Super Conducting Tokamak

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Ion Bernstein Wave (IBW) heating has been investigated recent years in HT-7 super conducting Tokamak. Heating was concentrated on deuterium plasma with an injecting power up to 400kw. Significant progresses on the IBW heating and control of profiles has been obtained after a series of technical improvements and intensive RF boronization. Both on-axis and off-axis electron heating with global peaked and local steeped electron pressure profiles were realized if the resonant layer is selected in plasma far from the edge region. Reduction of electron heat transport has been observed from sawtooth heat pulse propagation. The direct electron heating via electron Landau damping from IBW was observed. Experiment results show that the maximum increment of electron temperature was more than 1keV, electron temperature profile was modified by IBW under different plasma conditions and both energy and particle confinement improvements have been obtained.

Experiments also demonstrated that MHD activities were suppressed by IBW off-axis heating. Results show that resonant frequency $5\Omega_D/2$ is corresponding to rational surface q=2. Plasma electron density and temperature grads are reduced, thus allowing current redistribute to lead to MHD partially or entirely suppressed. Experiments show that a RF power threshold of 100kW is required for MHD suppression.