

Electron Bernstein Wave Heating and Current Drive with Multi-Electron Cyclotron Resonances During Non-inductive Start-up on LATE



Electron cyclotron heating and current drive (ECH/ECCD) by electron Bernstein waves (EBWs) with multi-electron cyclotron resonances (ECRs) is carried out by injecting microwaves at two frequencies during the non-inductive start-up of a spherical tokamak (ST). When the 1st EBW at 2.45 GHz is excited in the non-inductively produced ST plasma with the 2nd EBW at 5 GHz, electron density is increased while the plasma current is nearly the same. On the other hand, when the 2nd EBW at 5 GHz is excited in the non-inductively produced ST plasma with the 1st EBW at 2.45 GHz, plasma current is driven strongly while the bulk electron parameters such as density are nearly the same. In both cases, the 1st EBW at 2.45 GHz is absorbed at the fundamental ECR and heats the bulk electrons in spite of the existence of tail electrons, which corresponds to the calculation results on absorption of EBW by high energy tail electrons.

