

## **Production of High Energy Tail Electrons by Electron Bernstein Waves during the Current Start-up Discharges in the LATE Device**

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Formation of closed flux surfaces and subsequent ramp-up of toroidal plasma current by ECH/ECCD have been demonstrated in the LATE device [1, 2]. High energy tail electrons are produced and carry the plasma current. Main part of the plasma pressure is due to the high energy tail electrons. In recent experiments with 2.45 GHz, 60 kW microwave power, we changed the position of the ECR layer shot by shot and observed that the plasma current was ramped up to 10 kA with  $\sim 10$  times the plasma cutoff density when the ECR layer was located at major radius  $R \sim 21$  cm, while the bulk electron density became nearly half when the ECR layer was at  $R \sim 19$  cm. Pulse height analysis of hard X-ray emission along vertical chords indicates that energy and population of high energy tail electrons in the low field side decrease when the bulk electron density increases. Magnetic measurement and equilibrium analysis show that the perpendicular plasma pressure decreases and the parallel plasma pressure increases in the high field side when the bulk electron density increases. Impurity line radiation from higher excitation levels such as CV(304eV) and OV(72eV) becomes much stronger compared with the density increment, suggesting the bulk electron heating. These results may be due to change of power absorption of EBW by the bulk electrons or by the high energy tail electrons.

[1] T. Yoshinaga et al., Phys. Rev. Lett. **96**, 125005 (2006).

[2] M. Uchida et al., Phys. Rev. Lett. **104**, 065001 (2010).