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Spatial plasma potentials and electron energy distributions in inductively and capacitively coupled plasmas under a weakly collisional and nonlocal electron kinetic regime HYO-CHANG LEE, CHIN-WOOK CHUNG, Hanyang University — Spatial profiles of the plasma potential and electron energy distribution function (EEDF) were measured in inductively and capacitively coupled plasmas (ICP and CCP) under weakly collisional and nonlocal electron kinetic regimes [1]. The measured EEDF at the discharge center was a bi-Maxwellain distribution with low (T_1) and high (T_2) electron temperature groups at both the ICP and the CCP, while the EEDF at the radial boundary was closely Maxwellian distribution in the ICP due to cutting of the low energy electrons by relatively large ambipolar potential in this discharge regime. The ambipolar potential in the entire radial region was in the scale of T_{eff} -1.5 T_{eff}, where T_{eff} is the effective electron temperature. At the boundary region with the ion mean free path scale, the ambipolar potential increased abruptly and was about $T_{eff,edge}/2$, where the Teff,edge is the effective electron temperature at the boundary, which corresponds to the presheath scale. These results of the ICP, which are contrary to the ambipolar potential of the CCP in a nearly free-fall regime [2], are caused by relatively high T_1 and a small portion of low energy electron group density to total electron density in the ICP under the weakly collisional and nonlocal electron kinetic regimes.

[1] H. C. Lee and C. W. Chung, Phys. Plasmas **19** 033514 (2012).
[2] V. A. Godyak, V. P. Meytlis, and H. R. Strauss, IEEE Trans. Plasma Sci. **23** 728 (1995).

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