

Abstract Submitted
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EEDF effect on the plasma hysteresis: Theory, Experiment, and Modeling in RF inductive plasmas¹ HYO-CHANG LEE, Korea Research Institute of Standards and Science — Hysteresis, which is the history dependence of physical systems, is one of the most important topics in physics. Interestingly, bistability of plasma with a huge hysteresis loop has been observed in inductive plasma discharges. Despite long plasma research, how this plasma hysteresis occurs remains an unresolved question in plasma physics. Here, we report theory, experiment, and modeling of the hysteresis. It was found experimentally and theoretically that evolution of the electron energy distribution (EED) makes a strong plasma hysteresis. In Ramsauer and non-Ramsauer gas experiments, it was revealed that the plasma hysteresis is observed only at high pressure Ramsauer gas where the EED deviates considerably from a Maxwellian shape. This hysteresis was presented in the plasma balance model where the EED is considered. Because electrons in plasmas are usually not in a thermal equilibrium, this EED-effect can be regarded as a universal phenomenon in plasma physics. [1] H Lee and C Chung, *Sci. Rep.* 5, 15254 (2015), [2] H Lee, *Appl. Phys. Rev.* 5, 011108 (2018).

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