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Two-Dimensional Analysis Of Electron Transport And Heating In a Capacitively Coupled Plasma CHANG HO KIM, HWANHO KIM, HAE JUNE LEE, Pusan Natl Univ — A lot of researches has been conducted to investigate underlying electron kinetics in a capacitvely coupled plasma (CCP) with one-dimensional (1D) particle-in-cell (PIC) simulations due to the high computational cost of multi-dimensional PIC simulations. However, 1D PIC simulations consider only the axial directional phenomena, and thus cannot investigate the effect of the radial directional electron dynamics. Examples are the sidewall effect and standing wave effects on electron heating and the nonlinear electron transport in the radial direction. In this study, we have observed the electron transport and heating mechanisms with the variations of neutral gas pressure, the driving voltage, and the electrode size using a two-dimensional PIC simulation parallelized with a graphics processing unit (GPU) [1,2]. The non-uniformity of electron density and temperature is analyzed by the balance of ion transport and ionization by electron heating. We found that the radial perturbations are inherently coupled with the electron oscillation inside of the sheath. [1] J. S. Kim, M. Y. Hur, C. H. Kim, H. J. Kim, and H. J. Lee, J. Phys. D: Appl. Phys. 51, 104004 (2018). [2] M. Y. Hur, J. S. Kim, I. C. Song, J. P. Verboncoeur, H. J. Lee, Plasma Res. Express 1, 015016 (2019).

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