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High Frequency Capacitively Coupled Plasmas: Implicit Electron Momentum Transport with a Full-wave Maxwell Solver[1] YANG YANG, Iowa State University, MARK KUSHNER, University of Michigan — Excitation frequencies for capacitively coupled plasmas (CCPs) are increasing to hundreds of MHz. At these high frequencies electrons may not be in equilibrium with the local electric field. Modeling electron transport in high frequency CCP tools requires solving the electron momentum equation to address inertia; and the full set of Maxwell's equations to address wave effects. In this talk, we discuss results from a 2-dimensional modeling study of the plasma properties in 300 mm and 450 mm dual frequency CCP (DF-CCPs) tools. Algorithms for electron transport are improved by integrating the electron momentum equation into the full-wave Maxwell equation solver. To capture the high frequency heating, excitation rates are provided by spatially dependent electron energy distributions generated by a Monte Carlo simulation. Results will be discussed for plasma properties in DF-CCPs for low frequencies of $\leq$ 10 MHz and high frequencies up to 200 MHz, and gas pressure of <10s mTorr in argon. Comparisons of plasma properties will be made to those obtained using drift-diffusion formulations.

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