

Abstract Submitted
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Verification of high voltage rf capacitive sheath models with particle-in-cell simulations YING WANG, Dept. of Nuclear Engineering, University of California, Berkeley CA 94720, MICHAEL LIEBERMAN, Dept. of Electrical Engineering and Computer Science, University of California, Berkeley CA 94720, JOHN VERBONCOEUR, Dept. of Nuclear Engineering, University of California, Berkeley CA 94720 — Collisionless and collisional high voltage rf capacitive sheath models were developed in the late 1980's [1]. Given the external parameters of a single-frequency capacitively coupled discharge, plasma parameters including sheath width, electron and ion temperature, plasma density, power, and ion bombarding energy can be estimated. One-dimensional electrostatic PIC codes XPDP1 [2] and OOPD1 [3] are used to investigate plasma behaviors within rf sheaths and bulk plasma. Electron-neutral collisions only are considered for collisionless sheaths, while ion-neutral collisions are taken into account for collisional sheaths. The collisionless sheath model is verified very well by PIC simulations for the rf current-driven and voltage-driven cases. Results will be reported for collisional sheaths also. [1] M. A. Lieberman, IEEE Trans. Plasma Sci. 16 (1988) 638; 17 (1989) 338 [2] J. P. Verboncoeur, M. V. Alves, V. Vahedi, and C. K. Birdsall, J. Comp. Phys. 104 (1993) 321 [3] J. P. Verboncoeur, A. B. Langdon and N. T. Gladd, Comp. Phys. Comm. 87 (1995) 199

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