Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

PIC Simulation for ICF Plasma Sputter Coater[1] W. WU, H. HUANG, P.B. PARKS, V.S. CHAN, GA, C.C. WALTON, S.C. WILKS, LLNL — To satisfy mesh spacing constraint $\Delta/\lambda_{Debye} \leq 1$ particle In Cell (PIC) simulations at 25$\times$ reduced cathode currents levels are used to numerically model the distribution of currents, electrostatic potentials and particle kinetics in a Type II "unbalanced" cylindrically symmetric magnetron discharge used for Be sputter coating of ICF capsules. Simulation indicates a strong magnetic field confinement of the plasma in the closed field lines region adjacent to cathode, and accompanying cross-field line plasma diffusion into the open-field line region connected to wall/anode. A narrow Charles-Langmuir sheath and a pre-sheath that is $\sim$10$\times$ wider due to the existence of the B-field are observed. The effects of varying boundary conditions, e.g., the separation between the anode/cathode, the anode bias voltage, etc., are studied, which is expected to aid experimentalists in turning these "knobs" for better coating qualities. We also show that the etch rate due to sputtering of Be targets predicted by the results of our PIC simulations, after rescaling to experimental conditions, agrees with experiments.

[1]Supported by the US Department of Energy under DE-FC02-04ER54698 and DE-AC52-07NA27344.

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Date submitted: 16 Jul 2010 Electronic form version 1.4