

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Full-Scale 3D Simulation of a sputtering magnetron¹ C.C. WALTON, S.C. WILKS, LLNL, V. AYYASWAMY, Purdue U, J.P. VERBONCOEUR, UC Berkeley, P.B. PARKS, W. WU, General Atomics, C.D. ZHOU, P.H. STOLTZ, TechX Corp. — PIC simulations have been used to study ion energy distributions in magnetron plasmas, and coupled with other simulations to relate plasma processes to properties of sputtered films. The plasma is weakly ionized and exchanges heat with the background gas by scattering and charge-exchange reactions. Resulting heating of neutral background gas up to $\sim 1200\text{K}$, leading to $\sim 5\text{X}$ rarefaction and increased plasma impedance, was studied with coupled PIC and Direct Simulation Monte Carlo (DSMC) simulations. Effects of scaling the PIC simulations from 0.1X to 1X physical size, and modifying the plasma potential by a dc substrate bias, will be presented. Comparison to experimental I-V relations and importance for roughness and density of sputtered films will be discussed.

¹This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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Date submitted: 20 Jul 2010

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