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Particle-in-Cell Modeling of Magnetron Sputtering Devices JOHN R. CARY[1], University of Colorado, T. G. JENKINS, N. CROSSETTE, PETER H. STOLTZ, Tech-X Corporation, J. M. MCGUGAN, Northrop Grumman — In magnetron sputtering devices, ions arising from the interaction of magnetically trapped electrons with neutral background gas are accelerated via a negative voltage bias to strike a target cathode. Neutral atoms ejected from the target by such collisions then condense on neighboring material surfaces to form a thin coating of target material; a variety of industrial applications which require thin surface coatings are enabled by this plasma vapor deposition technique. In this poster we discuss efforts to simulate various magnetron sputtering devices using the Vorpal PIC code in 2D axisymmetric cylindrical geometry. Field solves are fully self-consistent, and discrete models for sputtering, secondary electron emission, and Monte Carlo collisions are included in the simulations. In addition, the simulated device can be coupled to an external feedback circuit. Erosion/deposition profiles and steady-state plasma parameters are obtained, and modifications due to self consistency are seen. Computational performance issues are also discussed.

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