Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Development Of Sputtering Models For Fluids-Based Plasma Simulation Codes[1] SETH VEITZER, KRISTIAN BECKWITH, PETER STOLTZ, Tech-X Corporation — Rf-driven plasma devices such as ion sources and plasma processing devices for many industrial and research applications benefit from detailed numerical modeling. Simulation of these devices using explicit PIC codes is difficult due to inherent separations of time and spatial scales. One alternative type of model is fluid-based codes coupled with electromagnetics, that are applicable to modeling higher-density plasmas in the time domain, but can relax time step requirements. To accurately model plasma-surface processes, such as physical sputtering and secondary electron emission, kinetic particle models have been developed, where particles are emitted from a material surface due to plasma ion bombardment. In fluid models plasma properties are defined on a cell-by-cell basis, and distributions for individual particle properties are assumed. This adds a complexity to surface process modeling, which we describe here. We describe the implementation of sputtering models into the hydrodynamic plasma simulation code USim, as well as methods to improve the accuracy of fluids-based simulation of plasmas-surface interactions by better modeling of heat fluxes.

[1]This work was performed under the auspices of the Department of Energy, Office of Basic Energy Sciences Award #DE-SC0009585.

Seth Veitzer
Tech-X Corporation

Date submitted: 19 Jun 2015 Electronic form version 1.4