RF Models for Plasma-Surface Interactions in VSim[1] THOMAS
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ments to the Plasma Discharge (PD) module of Tech-X's VSim software tool is
presented. A sub-grid kinetic sheath model, developed for the accurate computa-
tion of sheath potentials near metal and dielectric-coated walls, enables the physical
effects of DC and RF sheath physics to be included in macroscopic-scale plasma
simulations that need not explicitly resolve sheath scale lengths. Sheath potential
evolution, together with particle behavior near the sheath, can thus be simulated in
complex geometries. Generalizations of the model to include sputtering, secondary
electron emission, and effects from multiple ion species and background magnetic
fields are summarized; related numerical results are also presented. In addition, im-
proved tools for plasma chemistry and IEDF/EEDF visualization and modeling are
discussed, as well as our initial efforts toward the development of hybrid fluid/kinetic
transition capabilities within VSim. Ultimately, we aim to establish VSimPD as a
robust, efficient computational tool for modeling industrial plasma processes.

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