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Simulations of neutral loading process in ECR sources¹ PETER MESSMER, DAVID FILLMORE, KEVIN PAUL, PAUL MULLOWNEY, ANDREY SOBOL, Tech-X Corporation, DAMON TODD, DANIELA LEITNER, LBNL, DAVID BRUHWILER, Tech-X Corporation — High intensity, high charge-state beams for a broad variety of ions are a requirement for next-generation heavy-ion beam accelerators. As the intensities produced by current Electron Cyclotron Resonance (ECR) sources insufficient for many ions, the ion beam production has to be optimized. Efficient loading of the neutrals into the ECR plasma is one of the key elements for optimizing the ion beam production. Kinetic simulations provide a means to understanding where along the interior walls the uncaptured metal atoms are deposited and, hence, how to optimize loading of the metal into the ECR plasma. We are currently extending the plasma simulation framework VORPAL with models to investigate effective loading of heavy metals into ECR ion sources via alternate mechanisms, including vapor loading, ion sputtering and laser ablation. Here we will present the models, simulation results of vapor loading and initial comparisons with experiments at the VENUS source at LBNL.

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