

ELECTRON EFFECTS DUE TO GRAZING COLLISIONS BETWEEN HEAVY IONS AND WALLS*

P. H. Stoltz, S. A. Veitzer, Tech-X Corp., 5621 Arapahoe Ave. Ste. A, Boulder,
CO, 80303

R. Cohen, A. Molvik, LLNL, 7000 East Ave., Livermore, CA 94550-9234

J.-L. Vay, LBNL, 1 Cyclotron Road Bldg 47R0112, Berkeley, CA, 94720-8201

In a heavy ion fusion accelerator, halo ions collide with the beampipe walls at grazing incidence. Standard theories for interactions between ions and wall materials break down at these highly-grazing angles. Effects that are typically neglected, such as surface roughness and ion scattering, become important. We present models of ion-wall interactions that take into account surface roughness and ion scattering, and we show how these factors effect electron production and neutral gas desorption. We compare electron production with experimental data from the High Current Experiment and from an experiment at Brookhaven National Laboratories and show how these models help explain a deficit in the electron yield compared with standard theories. Also, we combine these models with WARP simulations to help predict the magnitude of electron effects in the High Current Experiment.

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