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New self-consistent simulation tools for the modeling of particle beam/plasma interaction with its environment.[1] J.-L. VAY, M.A. FURMAN, P.A. SEIDL, LBNL, R.H. COHEN, A. FRIEDMAN, D.P. GROTE, M. KIREEFF COVO, A.W. MOLVIK, LLNL, P.H. STOLTZ, S. VEITZER, Tech-X Corp., J.P. VERBONCOEUR, UC Berkeley — We have completed the first round of development of a new self-consistent 3-D simulation tool to study the interaction of intense charged particle beams with the environment in a particle accelerator; i.e. interactions with walls, electron clouds and background gas. The new capability is built around the 3-D PIC accelerator/plasma code WARP, with additional functionalities: (a) generation of secondary electrons and desorbed gas from ion and electron impact*, (b) tracking dynamics of neutrals and interactions with a beam through ionization of neutrals and/or beam particles, (c) bridging time scales between electron and ion motion in a space-and-time varying magnetic field with a novel particle mover***. We will present the new functionalities together with tests of the new mover on "textbook" cases and comparisons of the new capabilities with experiments**. * P. Stoltz, this conference, ** A.W. Molvik et al., P. Seidl et al., this conference, ***R. Cohen, POP, 12, 056708 (2005).

[1]This work was performed under the auspices of the U.S. Department of Energy by University of California, LLNL and LBNL under contracts W-7405-Eng-48, and DE-AC03-76F00098.

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