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SELF-CONSISTENT SIMULATIONS OF HEAVY-ION BEAMS INTERACTING WITH ELECTRON-CLOUDS *

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Electron-clouds and rising desorbed gas pressure limit the performance of many existing accelerators and, potentially, that of future accelerators including heavy-ion warm-dense matter and fusion drivers. For the latter, self-consistent simulation of the interaction of the heavy-ion beam(s) with the electron-cloud is necessary. To this end, we have merged the two codes WARP (HIF accelerator code) and POSINST (high-energy e-cloud code), and added modules for neutral gas molecule generation, gas ionization, and electron tracking algorithms in magnetic fields with large time steps. The new tool is being benchmarked against the High-Current Experiment (HCX) and good agreement has been achieved. The simulations have also aided diagnostic interpretation and have identified unanticipated physical processes. We will present the “roadmap” describing the different modules and their interconnections, along with detailed comparisons with HCX experimental results.

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