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An Improved Collision Algorithm for Explicit and Hybrid Implicit PIC Simulations LARISSA A. COTTRILL, ANDREAS KEMP, MAX TABAK, Lawrence Livermore National Laboratory — Since its acclimation from the ion beam community, the LSP code has been used to model a wide range of laser-plasma configurations relevant to fast ignition research. Given the high density, low temperature regimes of interest for some of these problems, there has been an increased concern for the role collisionality might play in hot electron beam transport and how one would appropriately model this in an electromagnetic hybrid-implicit particle-in-cell code such as LSP. Although a number of scattering models exist in the literature and in practice, there are always underlying concerns for computational efficiency and kinematic accuracy. This work will present a new collision algorithm for the LSP code that will improve upon the inter- and intra-species collision algorithms that currently exist within the code. Comparisons between various aspects of the old and new models will be presented for several beam-plasma problems of interest. This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under contract W-7405-ENG-48.

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