

Abstract Submitted  
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**A New Coulomb Collision Model for PIC Codes**<sup>1</sup> DON LEMONS, B.J. ALBRIGHT, DAN WINSKE, Los Alamos National Laboratory — We develop a Coulomb collision algorithm for PIC codes based on a Langevin particle pusher that incorporates velocity sensitive collision rates. According to the algorithm, every time step of the simulation each particle collides with all other particles in a cell where the latter are modeled as one or more drifting Maxwellians. Thus, the collisional particle advance is order  $N$  where  $N$  is the number of particles in the cell. Particle-Maxwellian collisions reproduce the usual Spitzer velocity diffusion rates. Each particle-Maxwellian collision conserves momentum exactly and energy statistically. Energy conservation can be made exact with a linear velocity shift. Furthermore, the time step can be either very large or very small compared to equilibration time scales. We apply a zero-dimensional version of the algorithm to standard equilibration test problems and compare the results to other (order  $N^2$  and particle pairing) algorithms exercised on the same problems.

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