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**Hybrid Simulation of Plasma Boundary Problems**[1] A.M. DIMITS, B.I. COHEN, Lawrence Livermore National Laboratory, R.E. CAFLISCH, C.M. WANG, University of California, Los Angeles — New hybrid kinetic algorithms for the simulation of plasma systems that span a wide range of collisionality are being developed. An algorithm that is an adaptation to a fully ionized plasma of the "interpolated-fluid-Monte-Carlo" (IFMC) method,[2] successfully used in rarefied gas dynamics (RGD), is investigated. The distribution function is split into a fluid component and a kinetic component. The latter is represented with a particle-in-cell (PIC) method. Particles that undergo sufficient collisional velocity deviation are "thermalized," i.e. they are removed, and their mass (and charge), momentum, and energy are added to the fluid variables. An evaluation of the algorithm, with various possible options for the thermalization criteria, through simulations of a collisional electrostatic sheath and other plasma-boundary relevant problems, will be presented.

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[2]L. Pareschi and R.E. Caflisch, J. Comput. Phys. **154**, 90 (1999).

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