Abstract Submitted
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A dynamic neutral fluid model for the PIC scheme[1] ALAN WU, MICHAEL LIEBERMAN, JOHN VERBONCOEUR, University of California, Berkeley — Fluid diffusion is an important aspect of plasma simulation. A new dynamic model is implemented using the continuity and boundary equations in OOPD1, an object oriented one-dimensional particle-in-cell code developed at UC Berkeley. The model is described and compared with analytical methods given in [1]. A boundary absorption parameter can be adjusted from ideal absorption to ideal reflection. Simulations exhibit good agreement with analytic time dependent solutions for the two ideal cases, as well as steady state solutions for mixed cases. For the next step, fluid sources and sinks due to particle-particle or particle-fluid collisions within the simulation volume and to surface reactions resulting in emission or absorption of fluid species will be implemented. The resulting dynamic interaction between particle and fluid species will be an improvement to the static fluid in the existing code. As the final step in the development, diffusion for multiple fluid species will be implemented.

[1] M.A. Lieberman and A.J. Lichtenberg, Principles of Plasma Discharges and Materials Processing, 2nd Ed, Wiley, 2005.

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Michael Lieberman
University of California, Berkeley

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