

Abstract Submitted
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Introduction to TriForce: A Multiphysics Code for Hybrid Fluid-Kinetic Simulations¹ A. B. SEFKOW, J. G. SHAW, J. CARROLLNELLENBACK, S. PAI, E. G. BLACKMAN, D. CAO, R. K. FOLLETT, A. FRANK, M. HADDAD, E. C. HANSEN, S. B. HANSEN, S. X. HU, A. KISH, M. LAVELL, R. L. MCCRORY, P. W. MCKENTY, P. M. NILSON, A. SHVYDKY, R. B. SPIELMAN, A. TU, A. VELBERG, University of Rochester — We report on development progress of an open-source 3-D particle-based hybrid fluid-kinetic framework named TriForce, which is being benchmarked to data from HEDP facilities. The current status of the project and its applications will be surveyed. The hybrid model is constructed by combining meshless particle-based fluid algorithms with an electromagnetic and kinetic particle code. Current and planned modular packages, not all of which are mutually compatible, include: (a) gravity; (b) explicit and implicit EM fields and kinetic particles; (c) rectangular and triangular AMR; (d) extended MHD; (e) adaptive particle management; (f) user-supplied material models; (g) material strength and surface tension; (h) multigroup thermal diffusion and nonlocal transport; (i) low-noise laser ray tracing; (j) diffusion and particle-based radiation transport; (k) generalized collisional radiative model for atomic physics; (l) nuclear fusion with charged-particle and neutron transport; (m) molecular dynamics; (n) a circuit model; and (o) CPU and GPU parallelism.

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