Abstract Submitted
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Verification of a PIC-Fluid Hybrid Code With the Two-stream Plasma Instability Problem[1] SIDNEY SHIELDS, KEITH L. CARTWRIGHT, TIMOTHY D. POINTON, ERIC C. CYR, KRISTIAN BECKWITH, Sandia National Laboratories — While Particle in Cell (PIC) codes accurately model plasmas with a range of densities, high-density plasmas propose a computational challenge for PIC codes. If the particles in high-density plasma can be assumed to have a Maxwellian distribution, multi-fluid codes offer a significant computational advantage in these regimes. While these two types of plasma codes are well suited for modeling problems in their respective regimes, issues can arise when trying to model a plasma application that involves high density plasmas alongside particles with non-Maxwellian distributions. These such problems serve as a motivation for a hybrid approach that combines the two codes. This poster presents an implementation of a PIC-Fluid hybrid code, and application of such code to the two-stream plasma instability problem. The results are compared with analytic theory results taken from a linearized version of the governing equations, as well as results from the PIC and multi-fluid parts of the code. Through the comparison of these results, this poster will show the computational and numerical implications of using a Hybrid code over a PIC or multi-fluid code for certain problems.

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