Abstract Submitted
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Time-dependent closures for plasma fluid equations[1] ERIC HELD[2], JEONG-YOUNG JI[3], MICHAEL ADDAE-KAGYAH, Utah State University, NIMROD TEAM, CEMM SCIDAC COLLABORATION, PSI-CENTER COLLABORATION — Two approaches to calculating time-dependent parallel closures for plasma fluid equations are presented. Both solve a lowest-order drift kinetic equation that includes time dependence, free streaming, and an exact treatment of the linearized Coulomb collision operator. The first approach extends the theory of Chang and Callen [4] by including additional moments in the treatment of the collision operator as well as initial value effects for the distribution function. Time-dependent equations for the closures are derived via inverse Laplace/Fourier transforms of single pole approximations to the pseudotransport equations. The second approach entails a continuum solution to the drift kinetic equation using 2-D finite elements for the velocity space variables. As enhancements to the first approach, this method allows for arbitrary geometry as well as the full Coulomb collision operator.

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[4]Z. Chang and J. D. Callen, *Phys. Fluids B* **4** (5), 1167 (1992).

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