Abstract Submitted
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The Wave-Kinetic Landau Fluid[1] ILON JOSEPH, ANDRIS DIMITS, Lawrence Livermore National Lab — Efficient representation of kinetic effects such as Landau damping and particle trapping is crucial for the accuracy of reduced fluid models used to describe collisionless plasma turbulence. A new method for representing nonlinear resonance effects has been developed for Landau fluid [1] models. Wave-kinetic basis functions that focus velocity space resolution on wave-particle resonances naturally generate correct linear and nonlinear Landau damping amplitudes. Perhaps surprisingly, closely spaced resonances are accurately treated using "inverse" or "pseudo" moments [2] in velocity space. The closure for the fluid moment system is equivalent to the choice of a companion matrix that determines the linear response. This freedom can be used to generate multiple families of closures that generate the same Padé approximation to the linear response [1], but have different nonlinear behavior. Results have been formally generalized to include trapped particle effects and collisions.

[1] G. W. Hammett and F. W. Perkins, Phys. Rev. Lett. **64**, 3019 (1990).
[2] P. Amendt, Phys. Plasmas **8**, 1437 (2001).

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