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Vlasov-Fokker-Planck Simulation of a Collisional Ion-Electron Shockwave WILLIAM TAITANO, University of New Mexico, DANA KNOLL, Los Alamos New Mexico, ANIL PRINJA, University of New Mexico, UNIVERSITY OF NEW MEXICO COLLABORATION, LOS ALAMOS NATIONAL LABORATORY COLLABORATION — There has been recent increased interest in a range of kinetic plasma physics phenomena which may be important in simulating ICF pellet performance. [1] have numerically demonstrated the limitations of the classic Spitzer, Braginski fluid closures in collisional plasmas for shockwave problems. [1] has shown the importance of modeling kinetic effects for scale lengths of shockwave much larger than the ion collision mean free path. In [1], the ions were modeled kinetically using the Fokker-Planck approximation while the electrons were modeled as a fluid. An investigation of a full kinetic treatment of electron with collision is computationally intractable with standard explicit schemes due to collision CFL limitation that requires resolving the electron-electron collision timescale. [2] has developed a new, fully implicit and discretely consistent moment based accelerator method to solve the full ion-electron kinetic Vlasov-Ampere system. A similar moment based accelerator will be extended to a collisionless shock problem in order to accelerate the Fokker-Planck collision source in the kinetic equations. In the presentation, we provide some preliminary results.

[1] M. Casanova and O. Larroche, Phys. Rev. Let. 67-(16), 1991.
[2] W.T. Taitano et al. SISC in review.

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