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Interfacial mixing in high energy-density matter with a multiphysics kinetic model JEFF HAACK, Los Alamos National Laboratory, CORY HAUCK, Oak Ridge National Laboratory, MICHAEL MURILLO, Michigan State University — We have extended a recently-developed multispecies, multitemperature BGK model [Haack et al. , J. Stat. Phys. (2017)] to include multiphysics capability that allows modeling of a wider range of plasma conditions. In particular, we have extended the model to describe one spatial dimension, and included a multispecies atomic ionization model, accurate collision physics across coupling regimes, self-consistent electric fields, and degeneracy in the electronic screening. We apply the new model to a warm dense matter scenario in which the ablator-fuel interface of an inertial confinement fusion target is heated, similar to a recent molecular dynamics study [Stanton et al., submitted to PRX], but for larger length and time scales and for much higher temperatures. From our numerical results we are able to explore a variety of phenomena, including hydrogen jetting, kinetic effects (non- Maxwellian and anisotropic distributions), plasma physics (size, persistence and role of electric fields) and transport (relative sizes of Fickean diffision, electrodiffusion and barodiffusion). As compared with the recent molecular dynamics work the kinetic model greatly extends the accessible physical domains we are able to model.

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