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**Plasma Stratification by Planar Shocks** BRETT KEENAN, ANDREI SIMAKOV, WILLIAM TAITANO, LUIS CHACON, WILLIAM DAUGHTON, Los Alamos National Laboratory — A number of experimental observables in neutron yield and capsule compression [Li et al., PRL 100, 225001 (2008)] in Inertial Confinement Fusion (ICF) experiments have been evading explanation by standard, single-fluid, hydrodynamic (hydro) numerical simulations. Fuel stratification – resulting from particle diffusion, multi-ion temperature separation (in the case of OMEGA experiments with gas filled capsules), and certain kinetic effects – is a likely culprit. As a preliminary step to elucidate these effects, we consider mass fraction and temperature stratification by shocks in plasmas with two ion species. We present an analytical solution valid for very weak shocks ($M - 1 \ll 1$). Employing the state-of-the-art Vlasov-Fokker-Planck code, iFP [W.T. Taitano et al., JCP 318 (2016)], we describe the stratification for shocks with arbitrary mach number, and we rigorously delineate the kinetic and hydrodynamic regimes in terms of Mach number, relative species concentration, and ion species mass ratio – thereby clarifying the conditions under which significant departure from single-fluid hydrodynamics may occur.

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