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Electronic Friction in Warm Dense Matter[1] JACOPO SIMONI, Lawrence Berkeley National Laboratory, JEROME DALIGAULT, Los Alamos National Laboratory — When an ion in a warm dense plasma moves through the medium, it experiences frictional forces arising from electronic excitations induced by the motion of all the ions, as well as rapidly changing forces from the electronic density fluctuations. The question of whether these nonadiabatic electron-ion interactions, which represent a violation of the widely used Born-Oppenheimer approximation, are sufficiently strong to be important remains largely unexplored. To assess the basic properties of electronic friction, we present ab-initio calculations of the full friction tensor in warm dense hydrogen and aluminum. The friction tensor is generally inhomogeneous, anisotropic and non-diagonal, especially at lower densities. The nonadiabatic interactions introduce hydrodynamic couplings between the ionic degrees of freedom, which are sizeable between nearest neigbors.

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