Interfacial instabilities and structure during high velocity sliding\textsuperscript{1}

J.E. HAMMERBERG, T.C. GERMANN, B.L. HOLIAN, Los Alamos National Laboratory, R. RAVELO, University of Texas - El Paso — Interfacial sliding under high pressure loading at high velocities ($0 < v < 1 \text{ km/s}$) results in a variety of mesoscale phenomena at extreme strain rates. For ductile metal interfacial pairs, these include nano- and mesoscale dynamical structural transitions, local melting and amorphization, material mixing, and localization of plastic deformation. We illustrate these phenomena with large scale NonEquilibrium Molecular Dynamics (NEMD) simulations for Cu/Ag, Ta/Al, and Al/Al interfaces. These suggest universal behavior in sliding velocity for the frictional force and a scaling form for the frictional force vs. velocity at high velocities which will be discussed.

\textsuperscript{1}This work supported by the Department of Energy under contract W-7405-ENG-36.