Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Atomic structural evolution in metallic liquids and glasses: A measure of fragility NICHOLAS MAURO, Lawrence University, MATTHEW BLODGETT, MARK JOHNSON, ADAM VOGT, KENNETH KELTON, Washington University — The glass forming ability (GFA) of metallic alloys is widely varied. Bulk metallic glasses (BMGs) have been identified in a number of alloy systems but far more compositions can be vitrified only when their liquids are rapidly quenched. Understanding the structural evolution of metallic liquids as they are supercooled and quenched into glasses is critically important, not only for providing insight into the nature of the glass transition, but also for understanding technical aspects of glass formation and the thermal stability of the glassy solid. In this talk, we discuss the results of viscosity and high energy X-ray diffraction studies on a range of transition metal-based liquids and glasses. The temperature dependence of the X-ray structure factor has been measured in the glass by means of stationary diffraction and in the equilibrium and supercooled liquid state using Beamline Electrostatic Levitation. As will be shown, the temperature dependence of the structure factor above the glass transition shows anomalous acceleration. The degree of this acceleration has a strong correlation with liquid fragility as measured from non-contact viscosity data. These results suggest a *structural fragility* metric distinguishing good glass formers from poor ones.

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Date submitted: 15 Oct 2013 Electronic form version 1.4