Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Intermittent Aging Dynamics in a Metallic Glass Studied by X-ray Photon Correlation Spectroscopy ZACH EVENSON, Technical University Munich / Maier-Leibnitz Zentrum (MLZ), BEATRICE RUTA, ESRF - The European Synchrotron, SIMON HECHLER, MORITZ STOLPE, Saarland University, ELOI PINEDA, Universitat Politcnica de Catalunya-BarcelonaTech, ISABELLA GALLINO, RALF BUSCH, Saarland University — Although physical aging is a universal feature of glasses and other non-equilibrium matter, the atomic-level processes involved still remain a puzzling mystery. Here we study the microscopic aging dynamics of a metallic glass using coherent X-rays. Contrary to the common assumption of a steady slowing down of the dynamics usually observed in macroscopic studies, we show that the structural relaxation processes underlying aging in this metallic glass are intermittent and highly heterogeneous at the atomic scale. Moreover, physical aging is triggered by cooperative atomic rearrangements, driven by the relaxation of internal stresses. These results strengthen the similarities between metallic glasses and non-equilibrium soft materials and a suggest a common microscopic origin stemming from from a complex energy landscape.

Zach Evenson
Technical University Munich / Maier-Leibnitz Zentrum (MLZ)

Date submitted: 29 Oct 2015 Electronic form version 1.4