Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**Femtosecond x-ray measurements of inertial atomic-scale motion** AARON LINDENBERG, KELLY GAFFNEY, JERRY HASTINGS, Stanford Synchrotron Radiation Laboratory, JORGEN LARSSON, OLA SYNNERGREN, Lund Institute of Technology, KLAUS SOKOLOWSKI-TINTEN, Friedrich-Schiller-Universitat Jena, JONATHAN SHEPPARD, Oxford University, CHRISTIAN BLOME, Deutsches Elektronen-Synchrotron DESY, CARL CALEMAN, Uppsala University — Using a new source of femtosecond x-rays at the Stanford Linear Accelerator Center, we present new measurements of the first step in the ultrafast transition from solid to liquid. We show that the transition is predominantly inertial in character and point to analogies with intrinsic dynamics in the liquid state.

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Date submitted: 30 Nov 2004 Electronic form version 1.4