Abstract Submitted
for the TSF07 Meeting of
The American Physical Society

Pulsed Magnetic Slowing of Atoms and Molecules CHRISTIAN G. PARTHEY, EDVARDAS NAREVICIUS, ADAM LIBSON, JULIA NAREVICIUS, ISAAC CHAVEZ, Center for Nonlinear Dynamics and Department of Physics, The University of Texas at Austin, UZI EVEN, Sackler School of Chemistry, Tel-Aviv University, MARK G. RAIZEN, Center for Nonlinear Dynamics and Department of Physics, The University of Texas at Austin — Supersonic beams are a high brightness source of atoms and molecules. Although the atoms' temperature in the co-moving frame is in the sub-kelvin range their velocity is on the order of several hundreds of meters per second. We report the experimental demonstration of a novel method to slow atoms and molecules with permanent magnetic moments using pulsed magnetic fields. The method is suitable for most atoms since most elements are paramagnetic, and can also be applied to certain molecules as well as electronically excited metastable states. We show the feasibility of this technique by slowing a supersonic beam of metastable neon from (461.0 $\pm$ 7.7) m/s to (403 $\pm$ 16) m/s in 18 stages.

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Date submitted: 28 Sep 2007 Electronic form version 1.4