Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Measurement of Excited State Fraction in a MOT versus Laser Detuning M.A. GEARBA, Department of Physics and Astronomy, University of Southern Mississippi, Hattiesburg, MS 39406, H.A. CAMP, M.H. SHAH, M.L. TRACHY, H. NGUYEN, B.D. DEPAOLA, Department of Physics, Kansas State University, Manhattan, KS 66506, R. BREDY, Laboratoire de Spectrometrie Ionique et Moleculaire (LASIM) URM CNRS 5579 Universite Claude Bernard Lyon1, 69622 Villeurbanne, France, X. FLECHARD, LPC CAEN, BCD du Marechal Juin, 14050 CAEN CEDEX, France — A reliable model-independent, semi-empirical method for determining the excited state fraction in a magneto-optical trap is demonstrated. This method does not rely on fluorescence; the excited state fraction is measured directly using Magneto-Optical Trap Recoil Ion Momentum Spectroscopy (MOTRIMS). The MOTRIMS technique uses an ion beam as a probe of the internal states of the trapped atoms, and the excited-state fraction emerges directly from this "Q-value" measurement. Experimental results are compared with theoretical models.

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Date submitted: 28 Jan 2005 Electronic form version 1.4