Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

A ^{87}Sr Optical Lattice Clock SEBASTIAN BLATT, GRETCHEN K. CAMPBELL, ANDREW D. LUDLOW, MARTIN M. BOYD, JAN W. THOMSEN, MICHAEL J. MARTIN, JUN YE, JILA, National Institute of Standards and Technology and the University of Colorado, Department of Physics, University of Colorado, Boulder, CO, 80309 — We report on our recent progress on a optical atomic clock with high accuracy and stability based on ultracold fermionic lattice-confined ^{87}Sr atoms. We have evaluated the systematic effects at 1×10^{-16}, enabling an improved measurement of the absolute clock transition frequency. The frequency of the $^1S_0$-$^3P_0$ transition was measured as $429\,228\,004\,229\,873.83 \pm 0.37$ Hz, where the final fractional uncertainty represents one of the most accurate measurements of an optical atomic frequency to date. In combination with data from the Paris and Tokyo groups, this measurement is used to limit Local Position Invariance by limiting coupling of fundamental constants to the gravitational potential.

Sebastian Blatt
JILA, National Institute of Standards and Technology and the
University of Colorado, Department of Physics, University of Colorado, Boulder

Date submitted: 04 Feb 2008 Electronic form version 1.4