Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Cavity enhanced spectroscopy on the clock transition in ^{87}Sr[1]
JUAN A. MUNIZ, JULIA R. K. CLINE, DYLAN YOUNG, JAMES K. THOMPSON, JILA, University of Colorado at Boulder, THOMSPON LAB TEAM — Ultranarrow optical transitions are being used for the new generation of optical atomic clocks. Due to its weak strength and the difficulties to achieve atomic coherence times comparable with the excited state lifetime, the precise determination of its electric dipole moment has been elusive. In this work, we present a series of cavity-enhanced dispersive measurements of the phase shift on the cavity field caused by an ensemble of trapped ^{87}Sr atoms inside a high finesse optical cavity, that allows for direct spectroscopy on the 1 mHz optical clock transition. Together with dispersive cavity frequency shift measurements on the 7.5 kHz transition, this measurement gains atom number insensitivity. We present our results as well as comment on how this technique can be used to perform non-destructive and real time measurements of driven atomic systems.

[1]DARPA QuASAR and Extreme Sensing, NIST, NSF PFC

Juan Muniz
University of Colorado, Boulder

Date submitted: 01 Feb 2019 Electronic form version 1.4