Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

An optical clock platform with strontium atoms in tweezers MATTHEW NORCIA, AARON YOUNG, WILLIAM ECKNER, BENJAMIN JOHNSTON, ADAM KAUFMAN, JILA, NIST, University of Colorado at Boulder — Arrays of strontium atoms trapped within optical tweezers provide an intriguing new platform for optical frequency metrology, with a unique combination of appealing features including relatively large particle numbers, absence of interatomic collisions, long coherence times, and low dead times through repeated lossless imaging. Further, if Rydberg interactions were introduced between the tweezer-trapped atoms, the microscopic control afforded by this system may enable entanglement-enhanced performance. Here, we demonstrate highly coherent excitation of the ultra narrow $^1S_0$ to $^3P_0$ clock transition in arrays of tweezer-trapped ^{88}Sr atoms, as well as repeated interrogation of the same ensemble of atoms using high-fidelity, low loss measurements. These results provide the key ingredients for a new form of highly capable optical clocks.

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Date submitted: 26 Jan 2019 Electronic form version 1.4