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Progress Toward Building a Multiplexed Strontium Optical Lattice Clock MEGAN TABBUTT, XIN ZHENG, BRETT MERRIMAN, KELSEY JACOBUS, SHIMON KOLKOWITZ, University of Wisconsin - Madison — Optical lattice clocks are amongst the most accurate and precise devices ever built. Their remarkable stability is now giving rise to a number of novel applications. In contrast to traditional optical lattice clocks, we propose to build a multiplexed Strontium optical lattice clock, which will enable high precision differential measurements between two ensembles of ultra-cold Strontium atoms confined in independently addressable lattices. In this poster, we will present on current progress in building an ultra-high vacuum chamber capable of reaching 10^{-11} Torr, building a two-stage magneto-optical trap for laser cooling to μK temperatures, and characterization of our atomic beam source. Updates on a Strontium spectroscopy cell used for laser stabilization will also be shared. In addition, we will discuss plans to use light-assisted collisions to eliminate the collisional line-broadening of the clock transition and to study the photo-association of ^{87}Sr in a 1-D optical lattice. We also propose new methods for evaluating clock systematics, performing tests of relativity, and achieving quantum enhanced clocks via Rydberg interactions with our multiplexed clock apparatus.

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