Abstract Submitted
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Two ^{87}Sr lattice clocks with $10^{-17}/\sqrt{\tau}$ level stability[1] LINDSAY SONDERHOUSE, ERIC OELKER, TOBIAS BOTHWELL, ROSS HUTSON, COLIN KENNEDY, EDWARD MARTI, DHRUV KEDAR, AKIHISA GOBAN, SARAH BROMLEY, SARA CAMPBELL, JOHN ROBINSON, WILLIAM MILNER, SHIMON KOLKOWITZ, CHRISTIAN SANNER, JILA Univ of Colorado - Boulder, DAN MATEI, THOMAS LEGERO, FRITZ RIEHLE, UWE STERR, Physikalisch-Technische Bundesanstalt, JUN YE, JILA Univ of Colorado - Boulder, JILA UNIVERSITY OF COLORADO - BOULDER TEAM, PHYSIKALISCH-TECHNISCHE BUNDESANSTALT TEAM — Optical lattice clocks have reached unprecedented precision by interrogating high-Q optical transitions with thousands of atoms simultaneously. The stability of optical lattice clocks is generally limited by the Dick effect, aliasing of the local oscillator's frequency noise. I detail the use of a laser stabilized to a 124 K silicon cavity to improve the stability of the JILA 1D and 3D ^{87}Sr lattice clocks. The laser has a thermal-noise-limited stability of mod$\sigma = 4 \times 10^{-17}$, the current world record. Self-comparisons within each clock and asynchronous comparisons between the clocks demonstrate mid-$10^{-17}/\sqrt{\tau}$ stability for the 1D clock, and high-$10^{-17}/\sqrt{\tau}$ stability for the 3D clock. The 1D result is a record stability for a laser locked to a single atomic clock. I also discuss efforts to further improve the stability of the 3D clock by reducing its dead time.

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