

Abstract Submitted
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A New Record in Atomic Clock Performance TRAVIS NICHOLSON, BENJAMIN BLOOM, JASON WILLIAMS¹, SARA CAMPBELL, MICHAEL BISHOF, XIBO ZHANG, WEI ZHANG, SARAH BROMLEY, JUN YE, JILA, University of Colorado — The exquisite control exhibited over quantum states of individual particles has revolutionized the field of precision measurement, as exemplified by highly accurate atomic clocks. Two classes of clocks have outperformed the Cs primary standard in both accuracy and precision: single-ion clocks and many-atom lattice clocks. Historically single-ion clocks have been at least 20 times more accurate than lattice clocks, and the two systems have demonstrated comparable precision. In this presentation we announce the first lattice clock that has surpassed single-ion clocks in both precision and accuracy. With the best reported accuracy and precision, lattice clocks are now a strong candidate as a primary frequency standard. This work paves the way for a better realization of SI units, the development of more sophisticated quantum sensors, and precision tests of the fundamental laws of nature.

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