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Entangled-state generation via light-induced atom-atom interaction[1]

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The performance of the best atomic clocks is limited by the quantum projection noise in the final readout measurement, a situation referred to as the standard quantum limit. Entangled states of the many-body system can be used to overcome the standard quantum limit. We show how to generate such states in an ensemble of distant atoms using their common interaction with a driven mode of an optical resonator. We also demonstrate an atomic clock operated with a phase-squeezed input state that achieves a given precision almost three times faster than a clock operating at the standard quantum limit.

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