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Towards Spin Squeezing via Collective Quantum Non-Demolition Measurements[1] ZILONG CHEN, JIAYAN (PHOENIX) DAI, JUSTIN G. BOHNET, JILA, University of Colorado at Boulder, JAMES K. THOMPSON, JILA, University of Colorado at Boulder, NIST — Current state-of-the-art microwave atomic clocks are limited by quantum projection noise associated with uncorrelated atoms. The current generation of neutral atom optical atomic clocks have already reached a frequency stability very close to the projection noise limit. By using entangled atoms, precision better than the projection noise limit can be obtained, so generating significant amounts of squeezing is of practical interest to the current generation of atomic clocks and precision measurement experiments. We will report experimental progress on generating spin squeezing via optical resonator-enhanced, collective Quantum Non-Demolition measurements on large ensembles of Rubidium 87 atoms.

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