Abstract Submitted
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Cavity-aided non-demolition measurements for enhanced spin squeezing[1] MATTHEW NORCIA, JUSTIN BOHNET, KEVIN COX, JOSHUA WEINER, ZILONG CHEN, JILA, University of Colorado at Boulder, JAMES THOMPSON, JILA, University of Colorado at Boulder, NIST — Projection noise sets a maximum resolution for all sensors that use population measurements of unentangled atoms to sense a quantum phase – the "Standard Quantum Limit." This limitation can be overcome through the use of entangled, "squeezed" ensembles of atoms, allowing for potential improvements in sensor performance. We use quantum non-demolition measurements to prepare and directly observe spin-squeezed states with phase resolution 10.2(6)dB below the SQL, with no background subtraction.

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