

Abstract Submitted
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Individual Atoms In Their Quantum Ground State¹ EYAL SCHWARTZ, PIMONPAN SOMPET, YIN HSIEN FUNG, MIKKEL F. ANDERSEN, Otago University — An ultimate control of pure quantum states is an excellent platform for various quantum science and engineering. In this work, we perform quantum manipulation of individual Rubidium atoms in a tightly focus optical tweezer in order to cool them into their vibrational ground state via Raman sideband cooling. Our experimental scheme involves a combination of Raman sideband transitions and optical pumping of the atoms that couples two magnetic field sublevels indifferent to magnetic noise thus providing a much longer atomic coherence time compared to previous cooling schemes. By installing most of the atoms in their ground state, we managed to achieve two-dimensional cooling on the way to create a full nil entropy quantum state of single atoms and single molecules.

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