

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Tunneling and two particle interference with laser cooled bosons in optical tweezers ADAM KAUFMAN, BRIAN LESTER, COLLIN REYNOLDS, CINDY REGAL, JILA, University of Colorado at Boulder — We report on experiments realizing coherent tunneling of laser cooled atoms between precisely tunable optical tweezers. To verify the degree of indistinguishability achieved via laser cooling, we perform Hong-Ou-Mandel interferometry of massive bosons in tunnel-coupled tweezers. This marks the first direct observation of quantum indistinguishability with independently prepared laser cooled atoms. Our results demonstrate the viability of the tweezer plus laser cooling platform for studying few-body systems in the quantum regime, with highly tunable parameters of tunneling and interaction.

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Date submitted: 14 Nov 2013

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