

Abstract Submitted
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Heisenberg limited sensitivity via transition from a two-component Mott insulator to a superfluid¹ MIRTA RODRIGUEZ, Present address: ICFO-Institut de Ciències Fotoniques, 08860 Castelldefels (Barcelona), Spain, STEPHEN CLARK, DIETER JAKSCH, Clarendon Laboratory, University of Oxford, Parks Road, Oxford OX1 3PU, U.K. — We analyze the outcome of a Mott insulator to superfluid transition for a two-component Bose gas with two atoms per site in an optical lattice in the limit of slow ramping down the lattice potential. We manipulate the initial state of the atoms in the Mott insulating regime and study how local correlations between hyperfine states of atom pairs transform into multiparticle correlations extending over the whole system. We show that under particular conditions one can create twin Fock and macroscopic superposition states and that in general, the superfluid states obtained in this way are highly depleted and present a complicated structure.

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