

Abstract Submitted  
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**Dual Mott Insulator in a Spin-Dependent Optical Lattice** HIROKAZU MIYAKE, GEORGIOS SIVILOGLOU, COLIN KENNEDY, MIT, DAVID WELD, University of California, Santa Barbara, DAVID PRITCHARD, WOLFGANG KETTERLE, MIT — A major goal of the field of ultracold atoms is the realization of quantum magnetism. It has been theoretically proposed that for a two-component system in an optical lattice, one can emulate the Heisenberg Hamiltonian and observe phases such as XY-ferromagnetism and anti-ferromagnetism by controlling the spin-exchange constants. Towards this goal, we have developed a spin-dependent optical lattice for bosonic  $^{87}\text{Rb}$  atoms that allows us to tune the inter-species interaction energy. In particular, we have studied its effect on the superfluid-to-Mott insulator transition.

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