

Abstract Submitted  
for the DAMOP08 Meeting of  
The American Physical Society

**Cavity QED determination of atomic statistics in optical lattices - power spectrum and entanglement** WENZHOU CHEN, University of Arizona, PIERRE MEYSTRE — We study theoretically the interaction between a quantized light field and ultracold bosonic atoms in a double-well trap located inside a high-Q optical resonator. Using a Monte-Carlo wave function method to account for dissipation we show that the statistical properties of the scattered light reflect the state of the atomic field, allowing one to distinguish in particular between a superfluid from a Mott-insulator state. The two-time correlation functions of the scattered light and its entanglement with the matter waves are also discussed.

Wenzhou Chen  
University of Arizona

Date submitted: 17 Jan 2008

Electronic form version 1.4