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Cavity QED determination of atomic number statistics in optical lattices DOMINIC MEISER, JILA, WENZHOU CHEN, PIERRE MEYSTRE, University of Arizona — The number statistics of atoms in an optical lattice contain valuable information about their many-particle state. Usually the number statistics are difficult to measure experimentally. In this talk we present a method to measure the number statistics by means of reflection of a quantized light field off the atomic lattice inside a high-Q ring resonator. Depending on the lattice spacing, the light field is sensitive to various density-density correlations of the atoms. We discuss the cases of atoms in a Mott insulator state and atoms in a superfluid state and show how the two can be distinguished with our scheme.

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