Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

Calculation of g_2 for a Finite Temperature Gas ALICE BEZETT, EMESE TOTH, BLAIR BLAKIE, Jack Dodd and Dan Walls Centre for Photonics and Ultra-Cold Atoms — The landmark experiment done by Hanbury-Brown and Twiss (HBT) in 1956 has seen a renewal of interest in application to ultra-cold gases. It has long been desired that the HBT effect, that is, correlations between photons from a thermal source, be verified for bosonic atoms from a thermal cloud. There is a prohibitively small probability of observing a many-particle correlation effect in a conventional particle beam, and for this reason laser cooling and a combination of laser and evaporative cooling are employed in studies of particle correlations. We present a finite temperature theoretical model for calculating correlations in degenerate Bose gas that systematically includes the effects of harmonic trap confinement, interactions between the particles and is valid in the critical regime. This model is based on the non-pertubative Projected Gross Pitaevskii (PGPE) formalism, which includes the dynamics of the low lying modes of the thermal cloud, coupled to a semiclassical description of high the energy modes. We discuss results of these simulations for a three dimensional cloud of ultra-cold bosons at a range of temperatures below T_c.

Alice Bezett
Jack Dodd and Dan Walls Centre for Photonics and Ultra-Cold Atoms

Date submitted: 31 Jan 2007 Electronic form version 1.4