Second-order coherence of a Bose-Einstein condensate

The interference observed between two Bose-Einstein condensates demonstrated clearly the long-range coherence of a Bose condensate [1]. The fringe contrast is directly related to first-order coherence. Our paper [2] showed that previous measurements of the interaction energy of a condensate can be reinterpreted as a measure for second-order coherence and therefore provide direct evidence for the suppression of density fluctuations in a condensate compared to a thermal cloud. The same conclusion was reached for third-order coherence, which was measured through the observation of three-body collisions [3].

1. M.R. Andrews, C.G. Townsend, H.-J. Miesner, D.S. Durfee, D.M. Kurn, and W. Ketterle, Science **275**, 637 (1997).
2. W. Ketterle and H.-J. Miesner, Phys. Rev. A **56**, 3291 (1997).
3. E.A. Burt, R.W. Ghrist, C.J. Myatt, M.J. Holland, E.A. Cornell, and C.E. Wieman, Phys. Rev. Lett. **79**, 337 (1997).