Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Observation of local temporal correlations in trapped quantum gases VERA GUARRERA, GIOVANNI BARONTINI, RALF LABOUVIE, FELIX STUBENRAUCH, ANDREAS VOGLER, HERWIG OTT, Fachbereich Physik, Technische Universität Kaiserslautern, AG ULTRAKALTE QUANTENGASE TEAM — We measure the temporal pair correlation function of a 3-dimensional trapped gas of bosons above and below the critical temperature for Bose-Einstein condensation. The measurement is performed in situ using a local, time-resolved single-atom sensitive probing technique, based on scanning electron microscopy. Third and fourth order correlation functions are also extracted from the same data. We futher extend this diagnostics to samples of few 1-dimensional tubes of ultracold bosons in the quasi-condensate and strongly interacting regimes, obtaining, in the second case, clear antibunching signal as a consequence of interaction induced "fermionization." Our results promote temporal correlations as new observables to study the dynamical evolution of ultracold quantum gases.

Vera Guarrera
Fachbereich Physik, Technische Universität Kaiserslautern

Date submitted: 01 Mar 2012 Electronic form version 1.4