Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Correlation Effects in the Quench-Induced Phase Separation Dynamics of a Two-Component Ultracold Quantum Gas[1] SIMEON MISTAKIDIS, GARYFALLIA KATSIMIGA, University of Hamburg, PANAYOTIS KEVREKIDIS, University of Massachusetts, PETER SCHMELCHER , University of Hamburg, THEORY GROUP OF FUNDAMENTAL PROCESSES IN QUANTUM PHYSICS TEAM — We explore the quench dynamics of a binary Bose-Einstein condensate crossing the miscibility-immiscibility threshold and vice versa, both within and in particular beyond the mean-field approximation. Increasing the interspecies repulsion leads to the filamentation of the density of each component, involving shorter wavenumbers and longer spatial scales in the many-body approach. These filaments appear to be strongly correlated and exhibit domain-wall structures. Following the reverse quench process multiple dark-antidark solitary waves are spontaneously generated and subsequently found to decay in the many-body scenario. We simulate single-shot images to connect our findings to possible experimental realizations. Finally, quenches within the miscible and the immiscible regime are discussed.

[1]Deutsche Forschungsgemeinschaft (DFG) in the framework of the SFB 925 "Light induced dynamics and control of correlated quantum systems", NSF-PHY-1602994 and the Alexander von Humboldt Foundation.

Simeon Mistakidis
University of Hamburg

Date submitted: 10 Dec 2017 Electronic form version 1.4