

Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Observation of Self-Similar Scaling Dynamics in a Far-from-equilibrium Homogeneous Bose Gas TIMON HILKER, JAKE GLIDDEN, LENA DOGRA, CHRISTOPH EIGEN, University of Cambridge, ROBERT SMITH, University of Oxford, ZORAN HADZIBABIC, University of Cambridge — Out-of-equilibrium processes can exhibit remarkable universal properties independent of a systems microscopic details. Here we demonstrate dynamical scaling that has recently been predicted in the context of a non-thermal fix-point. Starting with a weakly interacting Bose gas of ^{39}K in a homogeneous 3D trapping potential above T_c , we heavily truncate the Bose distribution and observe a self-similar time evolution of the closed quantum system in momentum space while the system relaxes through the BEC phase transition. We experimentally find scaling exponents in the UV and IR, which we compare to recent theoretical predictions. Measurements at different interactions collapse by scaling time with the scattering length.

Timon Hilker
University of Cambridge

Date submitted: 02 Feb 2020

Electronic form version 1.4