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Dynamical Quasicondensation of Hard-Core Bosons at Finite Momenta: A Non-equilibrium Condensation Effect[1] FABIAN HEIDRICH-MEISNER, LMU Munich, L. VIDMAR, Penn State University, J.P. RONZHEIMER, S. HODGMAN, M. SCHREIBER, S. BRAUN, LMU Munich & MPQ Garching, S. LANGER, Pittsburgh University, I. BLOCH, LMU Munich & MPQ Garching, U. SCHNEIDER, University of Cambridge, LMU Munich & MPQ Garching — Long-range order in quantum many-body systems is usually associated with equilibrium situations. Here, we experimentally investigate the quasicondensation of strongly interacting bosons at finite momenta in a far-from-equilibrium case [1]. We prepare an inhomogeneous initial state consisting of one-dimensional Mott insulators in the center of otherwise empty one-dimensional chains in an optical lattice with a lattice constant d. After suddenly quenching the trapping potential to zero, we observe the onset of coherence in spontaneously forming quasicondensates in the lattice. Remarkably, the emerging phase order differs from the ground-state order and is characterized by peaks at finite momenta $\pm(\pi/2)(\hbar/d)$ in the momentum distribution function. [1] Vidmar et al., Phys. Rev. Lett. 115, 175301 (2015)

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