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Characterizing the dynamics of an out-of-equilibrium 1D Bose gas[1] JEAN-FELIX RIOU, AARON REINHARD, PHILLIP SCHAEFER, DAVID S. WEISS — We present experimental results on out-of-equilibrium quantum gases in optical lattices, where we trap Bose gases in one-dimensional tubes, and prepare them in an out-of-equilibrium state by modifying their momentum distribution. The lattice depth is a key experimental parameter, which gives us access to different regimes of evolution. We characterize the dynamics of the system using measures of the difference between observed distributions and various reference distributions, including what we determine to be the true equilibrium state of the system. This analysis requires us to quantitatively treat many effects specific to our experiment. In particular we discuss how the trapping parameters and the energy exchange in the system affect the dynamics. Finally, we show how we can gain insight into the processes involved in different regimes by keeping track of the density dependence of the evolution.

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