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Mean-field description of non-equilibrium dynamics of a 1D Bose gas in a weak optical lattice potential JUAN CARRASQUILLA, Georgetown University and The Pennsylvania State University, AARON REINHARD, LAURA ZUNDEL, JEAN-FELIX RIOU, DAVID WEISS, The Pennsylvania State University, MARCOS RIGOL, Georgetown University and The Pennsylvania State University — We study the expansion of a large array of one-dimensional Bose gases subject to a weak optical lattice potential using Gutzwiller mean-field calculations aimed at describing a recent experiment with ultracold atoms. We calculate the evolution of the density profile, the quasimomentum distribution, and the density profile after a band-mapping protocol followed in experiments with ultracold atoms designed to measure the quasimomentum distribution. We find that a large fraction of bosons remains trapped at the center of the lattice. Furthermore, interactions during the expansion dramatically change the momentum distribution. Our simulations qualitatively capture most aspects of the experiment.

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