
Dynamics of ultracold bosons under strong confinement

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Abstract

I plan to give an overview over the experiments in my group on the dynamics of ultracold bosons in lattice potentials and under strong confinement. In 1D geometry we have studied (higher-order) tunneling dynamics in tilted lattices [1,2]. In particular, we have observed the effect of density-induced tunneling [3]. We have observed collapse and revival for Bloch oscillations in 1D and the transition to the quantum chaotic regime in the Bose-Hubbard model [4]. Also in 1D we have measured the excitation spectrum of the strongly correlated Lieb-Liniger system for a wide range of the interaction parameter [5]. Presently, we are studying the dynamics of a strongly interacting spin impurity in 1D and the effect of rapidly modulating the interaction strength in the context of the Bose-Hubbard model.

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