

Abstract Submitted
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Coherent Dynamics in Dressed Optical Lattices Beyond the Born-Oppenheimer Approximation¹ JEREMY REEVES, LUDWIG KRINER, MIKE STEWART, ARTURO PAZMINO, DOMINIK SCHNEBLE, Stony Brook University — Usual treatments of matter-wave diffraction assume that the zero-point energy in the diffracting potential is much smaller than the gap between the dressed levels. However, in near-resonant weak-driving scenarios, zero-point motion can mix the adiabatic dressed states, making the diffracting potentials highly non-adiabatic, such that the usual Born-Oppenheimer approximation for the external and internal degrees of freedom no longer applies. We model the dynamics of a matter wave in a microwave-coupled state-dependent lattice in this regime, and quantify the importance of these effects on recent experiments.

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