Non-Interacting Bosons on an Optical Lattice Subject to a Time-Dependent Potential

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Abstract

We extend techniques used to measure observables on a system of non-interacted bosons under a time-independednt trapping potential to the case of a time-dependent potential. This is accomplished by approximating the system's hamiltonian as a combination of its time-independent non-diagonal kinetic and time-dependent diagonal parts using a Trotter approximation.

1   Introduction

Existing methods for measuring observable quantities on bose-einstein condenstates are computational expensive when we impliment them for systems with time-dependent hamiltonians. This prohibitive computational cost comes from the need to re-diagonalize the hamiltonian at each time step. In this paper we propose a solution which uses a Trotter approximation to efficiently factor a hamiltonian into it's time-dependent diagonal and time-independent off-diagonal components.

2   Background

3   Implimentation

4   Results