

Abstract Submitted  
for the DAMOP11 Meeting of  
The American Physical Society

**Heterodimer of Two Distinguishable Atoms in a One-dimensional Optical Lattice** OTIM ODONG, JEROME SANDERS, JUHA JAVANAINEN, University of Connecticut — Within the Bose-Hubbard model, we theoretically analyze the stationary states of two distinguishable atoms in a one-dimensional optical lattice. A partial separation of the center-of-mass motion and the relative motion of the two atoms is used to determine the eigenstates in a finite lattice. These states are then analyzed in the limit of an infinitely long lattice. We highlight the differences between the results for two distinguishable atoms and two identical atoms. One interesting example is that if the lattice parameters are modulated, the dimer may dissociate into a channel in which there is no atom-atom interaction.

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Date submitted: 04 Feb 2011

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