Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Stationary and traveling solitons in one-dimensional quartic lattices SANGHAMITRA NEOGI[1], GERALD D. MAHAN [2], Department of Physics, The Pennsylvania State University — We discuss the solutions to classical vibrations of a monatomic one-dimensional lattice. The interaction potential between the nearest neighbor atoms in the lattice contains nonlinear quartic terms. We found a total of N normal modes, that are symmetric and antisymmetric with respect to the center of the chain consisting of N atoms. Also, there exist stationary soliton solutions that are neither symmetric nor antisymmetric suggesting the total number of solutions exceeds the number of atoms in the chain. We generated traveling solitons by giving an impulse to the atoms at the end of the chain which has free ends. However, if the end of the chain is bound to a wall, we could not find any solitary waves to sustain more than few atoms.

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Date submitted: 22 Nov 2006 Electronic form version 1.4