

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Symmetry methods for five bodies in a one-dimensional harmonic trap JENNIFER VERNIERO, NATHAN HARSHMAN, JOSHUA LANSKY, American University — We present a method of studying few body systems of five particles in a one-dimensional harmonic trap. This model exhibits a simple but rich mathematical structure that allows us to explore the relationships among symmetry, integrability, and entanglement for cold atoms in an optical well. In particular, calculations are simplified by exploiting the S_5 permutation symmetry of the system. The ramifications of this symmetry are investigated using methods of Young Tableaux to construct irreducible representations and basis vectors. The group S_5 is unsolvable and not simply reducible and that distinguishes the five body case as qualitatively more complex than fewer bodies. This complexity in the energy and entanglement spectra offers novel prospects for quantum information encoding.

Jennifer Verniero
American University

Date submitted: 22 Nov 2013

Electronic form version 1.4