Abstract Submitted
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Spectroscopy for a few atoms trapped in a one-dimensional harmonic well N.L. HARSHMAN, American University — Spectroscopic labels for a few particles that are harmonically trapped in one-dimension and are interacting through zero-range interactions are uniquely specified by three quantum numbers that characterize the symmetries of the Hamiltonian: permutations of identical particles, parity inversion, and the separability of the center-of-mass. The exact solutions for the non-interacting and infinitely repulsive cases are reduced with respect to these symmetries. This reduction explains how states of single-component and multi-component fermions and bosons transform under adiabatic evolution from non-interacting to strong hard-core repulsion. These spectroscopic methods also clarify previous analytic and numerical results for intermediate values of interaction strength. Several examples, including adiabatic mapping for two-component fermionic states in the cases $N = 3 - 5$, are provided.

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