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Prof. Nathan L. Harshman
American University, Washington DC

"Solvable Models for a Few Atoms in a Few Wells"

Montag, den 12. Dezember 2016
11:00 Uhr
O26/4309

Abstract:
This project identifies networks of few-particle, few-well models that can be smoothly connected by tuning trap shape and two-body interaction parameters. Solvable models within these networks are identified and analyzed by exploiting symmetries in few-body configuration space and phase space. Well permutation symmetry is particularly effective for generating new models. Well permutation symmetry is distinct from particle permutation symmetry and arises when there are similar regions in configuration space that are completely disconnected due to unitary interactions and/or infinite well barriers. Experiments with a few atoms or with ultracold gases trapped in effectively one-dimensional wells are analyzed by comparison with nearby solvable models using approximation schemes like perturbation theory or variational methods. The transition from systems with a few particles in a few wells to systems with many particles in large lattices can be explored using these techniques.