Abstract Submitted
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Monte Carlo Ground State Energy for Trapped Boson Systems
ETHAN RUDD, N.P. MEHTA, None — Diffusion Monte Carlo (DMC) and Green's Function Monte Carlo (GFMC) algorithms were implemented to obtain numerical approximations for the ground state energies of systems of bosons in a harmonic trap potential. Gaussian pairwise particle interactions of the form $V_0 e^{-|r_i - r_j|^2/{r_0}^2}$ were implemented in the DMC code. These results were verified for small values of V_0 via a first-order perturbation theory approximation for which the N-particle matrix element evaluated to $\binom{N}{2}\frac{V_0}{(1+1/{r_0}^2)^{3/2}}$. By obtaining the scattering length from the 2-body potential in the perturbative regime ($\frac{V_0}{\hbar\omega} \ll 1$), ground state energy results were compared to modern renormalized models by P.R. Johnson *et. al*, New J. Phys. **11**, 093022 (2009).

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None

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