

Strongly Interacting Particles in One Dimensional Traps

We examine trapped one-dimensional systems assuming that two-body potentials have zero range. We show that when the repulsion between particles is very large the properties of the system can be found analytically. Using this analytical approach we also demonstrate that strongly interacting gases in one dimension realize the Heisenberg Hamiltonian with coupling constants highly dependent on the confining potential. In order to illustrate the perspectives of our findings we show the dependence of the quantum state transfer on the shape of the trapping potential.