

Abstract

The ground state properties of trapped atomic Boson-Fermion mixture at near absolute zero temperature Kelvin is studied using second quantization techniques. An effective Hamiltonian for the Binary system is developed in terms of the magnitude of fluctuations to bring out the interplay between boson-boson, boson-fermion & fermion-fermion interactions and their implications on the thermodynamics properties of the system. The study focused on a Grand Canonical Binary system of $^3\text{He}^4\text{He}$ isotopes whose thermodynamic properties have been determined by distinctively singling out the boson-boson, bosonfermion, and fermion-fermion interactions from which the energy density is established algebraically. The specific heat and the entropy of the system were consequently established and analyzed. The total energy of the system is found to increase with increase in occupation number of the system. The jump in the specific heat seems to suggest a phase-like transition at temperature of about 0.4K. Entropy decreases with temperatures.