

Homework 9, PHY 7500, Fall 2008 (due on November 11/18, 2008)

1. Derive an expression for thermionic current density in classical statistics.
2. Find an equation describing the dependence of the chemical potential of a degenerate electron gas at distance r from the center of a 'white dwarf' star. (Hint: start from the equation for the gravitational potential $\nabla^2\phi = 4G\pi\rho$)
3. Consider a one dimensional gas of N "hard spheres" (hard sticks, really) of diameter a and confined to an interval of length L .
 - Calculate explicitly the partition function and the equation of state.
 - Evaluate the second and the third virial coefficients and show that your results are consistent with your explicit calculations.