

Physics 136a, Week 5: Statistical Thermodynamics and Random Processes

(Dated: November 3, 2011; due **Wednesday November 9, 2011**)

The maximum number of points you can get for this assignment is **50**, although you could choose to do problems that worth more than 50 points.

This week, we kinetic theory and statistical mechanics. This corresponds to Secs. 5.5 – 5.7 (Version 1105.3) and Secs. 6.1 – 6.4.3 (Version 1106.4) of Blandford and Thorne (BT).

1. **Latent Heat and the Clausius-Clapeyron Equation.** Exercise 5.7 of BT [15 Points]
2. **Example: Electron-Positron Equilibrium at "Low" Temperatures.** Exercise 5.8 of BT [15 Points]
3. **Fluctuations of Temperature and Volume in an Ideal Gas.** Exercise 5.11 of BT [20 Points]
4. **Random Walk.** Exercise 6.4 of BT [15 Points]
5. **Doob's Theorem.** Exercise 6.5 of BT [15 Points]