Physics 136a, Week 4:Statistical Mechanics and Thermodynamics

(Dated: October 28, 2011; due **Wednesday November 2, 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. 4.4 – 4.10 (Version 1104.3) and Secs. 5.1–5.4 (Version 1105.3) of Blandford and Thorne (BT).

1. **Entropy of a monatomic gas in the Microcanonical Ensemble.** BT Exercise 4.7. [15 Points]
2. **Primordial Element Formation.** BT Exercise 4.10 [20 Points]
3. **Onset of Bose-Einstein Condensate.** BT Exercise 4.11 [15 Points]
4. **Energy Representation of Thermodynamics.** BT Exercise 5.2 [15 Points]
5. **Grand Canonical Ensemble for Ideal Relativistic Gas.** BT Exercise 5.3 [15 Points]
6. **Adiabatic Index for Ideal Gas.** BT Exercise 5.4 [15 Points]