Department of Physics, University of Maryland, College Park, MD 20742-4111

Physics 404

HOMEWORK ASSIGNMENT #12

Spring 2012

The last, at last!!

Due date: Thursday, Dec. 6 **Deadline:** Tuesday, Dec. 11

1. (13) S 7.66 Bose condensation of ⁸⁷Rb atoms.

- 2. (10) S 7.70 a,b Heat capacity of gas of bosons. We did part c in class. Compare your predicted value of $C_V(T_c)$ with that in Fig. 7.37.
- 3. (12) S 7.75 a, b, c, d Leading corrections to classical results for boson gas at high temperature. For part b, show that the leading correction to μ is about $-k_BT (N/V) \Lambda_T^3/\sqrt{8}$.

In part d, start with

$$\ln \mathbf{Z} = (\pi/2) \int_0^\infty n^2 \ln \mathbf{Z}_n dn$$

use eqn. 7.24, assume the exponential term $\ll 1$, and expand $\ln(1+\delta) \approx \delta - \frac{1}{2} \delta^2$.