Stuff for Tuesday, May 22, 2012

- Thursday (robot day!): Just go over Wednesday 1094 session.
- Quiz #8 Friday on T4, T5, and T6. (Note: pre-quiz blood-letting in PRB!)
- Final exam is Thursday, June 7, 3:30pm–5:18pm (ugh!)
  - "What you need to know" review sheets up front
  - Annotate for final exam

T4, T5, and T6 stuff:

- *macrostate* specified by macroscopic variables (e.g., 3 of P, V, N, T for ideal gas)
- *microstate* specified by quantum state of *every* molecule
- *multiplicity* Ω is number of microstates with same macrostate (e.g., same U, N)
- macropartition table given $\Omega(U, N)$ uses $U = U_A + U_B = \text{constant}$; $\Omega_{AB} = \Omega_A \times \Omega_B$
- fundamental assumption: each accessible microstate is equally probable
  $\Longrightarrow$ relative probabilities of macropartitions equals ratio of (total) multiplicities
- Einstein solid with oscillator energy $\varepsilon = \hbar\omega$:
  - $\Omega(N, U) = \dfrac{(3N + U/\varepsilon - 1)!}{(3N-1)!(U/\varepsilon)!}$ $\qquad U = \sum_i^{3N} n_i\varepsilon$ $\qquad U = 3Nk_BT$
- Entropy $S = k_b \ln\Omega$, so $\Omega = e^{S/k_b}$; for systems A and B, $S_{AB} = S_A + S_B$
  - $\partial S/\partial U = 1/T$ defines temperature (hold other variables fixed)