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## **P410 Second Exam Topic List**

Maxwell-Boltzmann speed and velocity distributions  
Thermal deBroglie wavelength and its meaning  
Free Energy (i.e. Helmholtz Free Energy)  $F = U - TS$   
Approach to equilibrium – minimum in Free Energy  
Classical equipartition theorem  
Entropy, magnetization, and free energy of a paramagnet  
Negative temperature  
Enthalpy  $H = U + pV$   
Maxwell relations (mixed partial derivatives of thermodynamic potentials)  
Gibbs Free Energy  $G = U + pV - TS$   
Clausius-Clapeyron Equation  
Grand Sum  
Gibbs Factor  
Chemical and phase equilibria  
Sievert's Law  
Quantum Distribution Functions (Fermi-Dirac and Bose-Einstein)  
The Fermi Gas  
    Fermi energy, temperature, wave-vector  
    Degeneracy pressure  
    Temperature dependence of the chemical potential  
    Sommerfeld Expansion  
    Mean energy of a Fermi Gas  
    Linear heat capacity  
Classical limit for the F-D and B-E distributions  
photon gas  
    density of states  
    blackbody radiation  
    Planck spectrum  
    Stefan's Law  
    Wein's Law  
    formal treatment of photon gas