PHY 410
HW#7
Assigned: March 1: Due March 15

Please Read Chapter 5, pages 122-131 dealing with internal and external chemical potentials

7.1 Calculate μ/τ and the absolute activity (or fugacity) λ for Ar gas at 300K for concentrations 10^{16}, 10^{18}, 10^{20} (in units of 1/cm^3).

7.2 Starting from the thermodynamic identity

$$\tau\, d\sigma = dU + p\, d\mathrm{V} - \mu\, \mathrm{dN}$$

Calculate pressure p and entropy σ in terms of derivatives of Helmholtz free energy $F(N,\tau,V)$.

Show that: $\left(\frac{\partial p}{\partial \tau}\right)_{N,V} = \left(\frac{\partial \sigma}{\partial V}\right)_{N,\tau}$: Maxwell Relation

7.3 Problem 1, Chapter 5 of the text

7.4 Problem 5, Chapter 5 of the text.