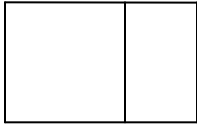


Phy 410

Quiz #6, March 5, 2010



S1

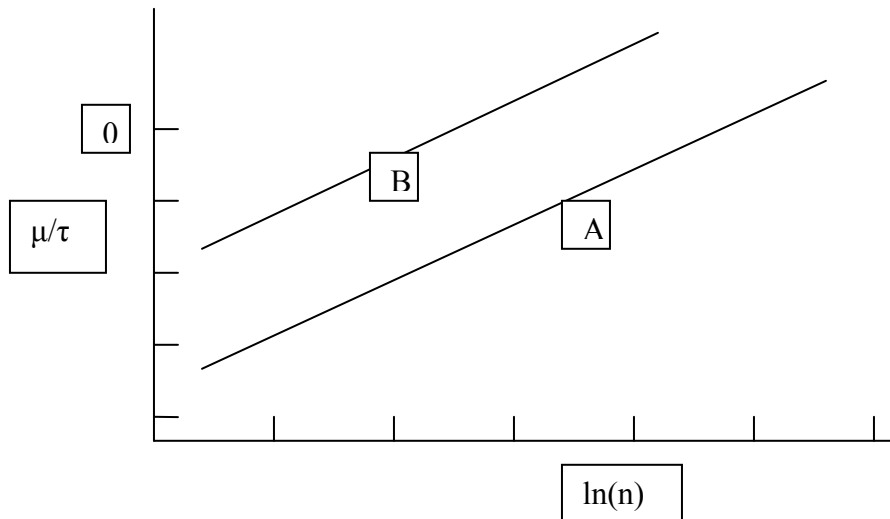
S2

- (i) **The temperature of *S1* is τ_1 and of *S2* is τ_2 . Only energy is exchanged. If $\tau_1 > \tau_2$ then which direction the energy flows?(2.5pts)**

From 1 to 2

- (ii) **Two systems have same τ but can exchange particles. If $\mu_2 > \mu_1$, which directions the particles flow? (2.5pt)**

From 2 to 1



- (iii) **Two ideal gas systems A and B are at the same τ and have the above μ/τ . Which atoms are heavier and why? (5 points)**

$$\mu/\tau = \ln\left(\frac{n}{n_Q}\right); n_Q = \frac{1}{\lambda_{th}^3} \propto M^{3/2}$$

From the figure:

For fixed μ/τ ; $n_A > n_B$; Therefore $n_{QA} > n_{QB}$

OR for fixed $\ln(n)$ or n ; $\mu_A/\tau < \mu_B/\tau$; Therefore $n_{QA} > n_{QB}$

Since $n_{QA} > n_{QB}$ and $n_Q \propto M^{3/2}$; $M_A > M_B$