PHY831 Statistical Mechanics
Chapter 2: 2.6 - 2.7 (Conceptual)

Mason Boles and *Teh, Chi En*

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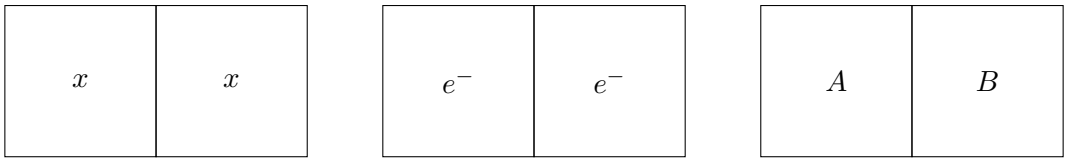
1. ***(2.6 Grand Canonical vs. Canonical)***
Suppose you are studying an open system with many moles in number count. Is it reasonable to approximate a canonical ensemble as a grant canonical ensemble in this case? Why?

2. ***(2.7 Gibb's Paradox)***
Consider three equally parted boxes that are kept under constant temperature, with each partition containing $N/2$ number of the following particles:

(a) identical spinless particles x in both sides;

(b) electrons in both sides;

(c) 2 types of identical spinless particles A and B in each side.



(a) *(b)* *(c)*

After removing the partitions from all these boxes, which of the following relation correctly describes their respective changes in entropy?

(A) $0 = \Delta S_a < \Delta S_b < \Delta S_c$

(B) $0 < \Delta S_a = \Delta S_b < \Delta S_c$

(C) $0 < \Delta S_a < \Delta S_b = \Delta S_c$

(D) $0 = \Delta S_a = \Delta S_b < \Delta S_c$

(E) None of the above.