

Interacting Einstein Solids

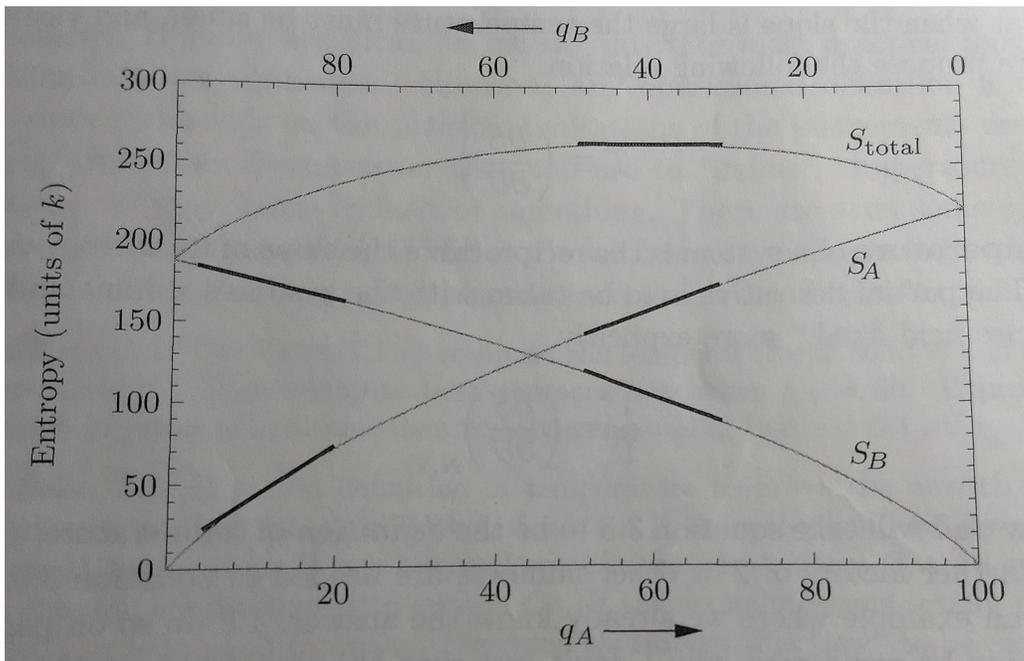
Thermodynamics

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College of the Atlantic.

| q_A | Ω_A | S_A/k | q_B | Ω_B | S_B/k | Ω_{total} | S_{total}/k |
|----------|----------------------|----------|----------|----------------------|----------|-------------------------|----------------------|
| 0 | 1 | 0 | 100 | 2.8×10^{81} | 187.5 | 2.8×10^{81} | 187.5 |
| 1 | 300 | 5.7 | 99 | 9.3×10^{80} | 186.4 | 2.8×10^{83} | 192.1 |
| 2 | 45150 | 10.7 | 98 | 3.1×10^{80} | 185.3 | 1.4×10^{85} | 196.0 |
| \vdots | \vdots | \vdots | \vdots | \vdots | \vdots | \vdots | \vdots |
| 11 | 5.3×10^{19} | 45.4 | 89 | 1.1×10^{76} | 175.1 | 5.9×10^{95} | 220.5 |
| 12 | 1.4×10^{21} | 48.7 | 88 | 3.4×10^{75} | 173.9 | 4.7×10^{96} | 222.6 |
| 13 | 3.3×10^{22} | 51.9 | 87 | 1.0×10^{75} | 172.7 | 3.5×10^{97} | 224.6 |
| \vdots | \vdots | \vdots | \vdots | \vdots | \vdots | \vdots | \vdots |
| 59 | 2.2×10^{68} | 157.4 | 41 | 3.1×10^{46} | 107.0 | 6.8×10^{114} | 264.4 |
| 60 | 1.3×10^{69} | 159.1 | 40 | 5.3×10^{45} | 105.5 | 6.9×10^{114} | 264.4 |
| 61 | 7.7×10^{69} | 160.9 | 39 | 8.8×10^{44} | 103.5 | 6.8×10^{114} | 264.4 |
| \vdots | \vdots | \vdots | \vdots | \vdots | \vdots | \vdots | \vdots |
| 100 | 1.7×10^{96} | 221.6 | 0 | 1 | 0 | 1.7×10^{96} | 221.6 |

Table 3.1. Macrostates, multiplicities, and entropies of a system of two Einstein solids, one with 300 oscillators and the other with 200, sharing a total of 100 units of energy.



Figures from Daniel V. Schroeder, *Thermal Physics*, Addison Wesley, 2000.