

Kittel 3.5

TP

$$Z_0 = \sum_i \exp\left[-\frac{\epsilon_i}{T}\right]$$

$$Z = \sum_i \exp\left[-\frac{\epsilon_i}{T}\right] + \sum_i \exp\left[-\frac{\epsilon_i - (\alpha-1)\epsilon}{T}\right]$$

$$= \sum_i \exp\left[-\frac{\epsilon_i}{T}\right] + \exp\left[\frac{(\alpha-1)\epsilon}{T}\right] \sum_i \exp\left[-\frac{\epsilon_i}{T}\right]$$

$$= \left\{ 1 + \exp\left[\frac{(\alpha-1)\epsilon}{T}\right] \right\} Z_0$$

The probability of the anomaly is given by

$$P[\epsilon_i - (\alpha-1)\epsilon] = \frac{\exp\left[-\frac{\epsilon_i - (\alpha-1)\epsilon}{T}\right]}{Z}$$

$$\Rightarrow P[\epsilon_i - (\alpha-1)\epsilon] = \frac{\exp\left[-\frac{\epsilon_i - (\alpha-1)\epsilon}{T}\right]}{Z}$$

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