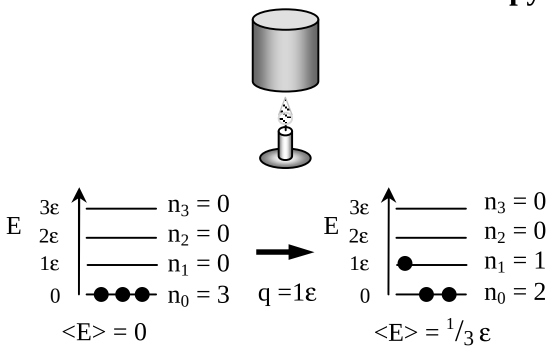
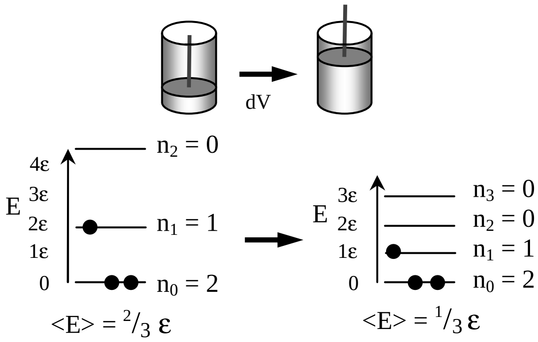
Entropy and Heat Transfer





$$dS = \frac{1}{T}\sum_i E_i\, dp_i \qquad \text{(cst. V)}$$

$$d\langle E\rangle = \frac{1}{\mathcal{N}}\left(\sum_i E_i\, dn_i + \sum_i n_i\, dE_i\right)$$

$$dE_i = \left(\frac{\partial E_i}{\partial V}\right)_{n_i} dV$$

$$d\langle E\rangle = \frac{1}{\mathcal{N}}\left(\sum_i E_i\, dn_i + \sum_i n_i \left(\frac{\partial E_i}{\partial V}\right)_{n_i} dV\right)$$

heat *work*

$$đq_{rev} = \frac{1}{\mathcal{N}}\sum_i E_i\, dn_i = \sum_i E_i\, dp_i$$

$$dS = \frac{1}{T}\sum_i E_i\, dp_i = \frac{đq_{rev}}{T}$$

A phase transition at equilibrium is a reversible process at T_{tr}:
$đq_{rev} = đq_p = dH$

$$\Delta_{tr}S = \frac{q_{rev}}{T} = \frac{\Delta_{tr}H}{T_{tr}}$$