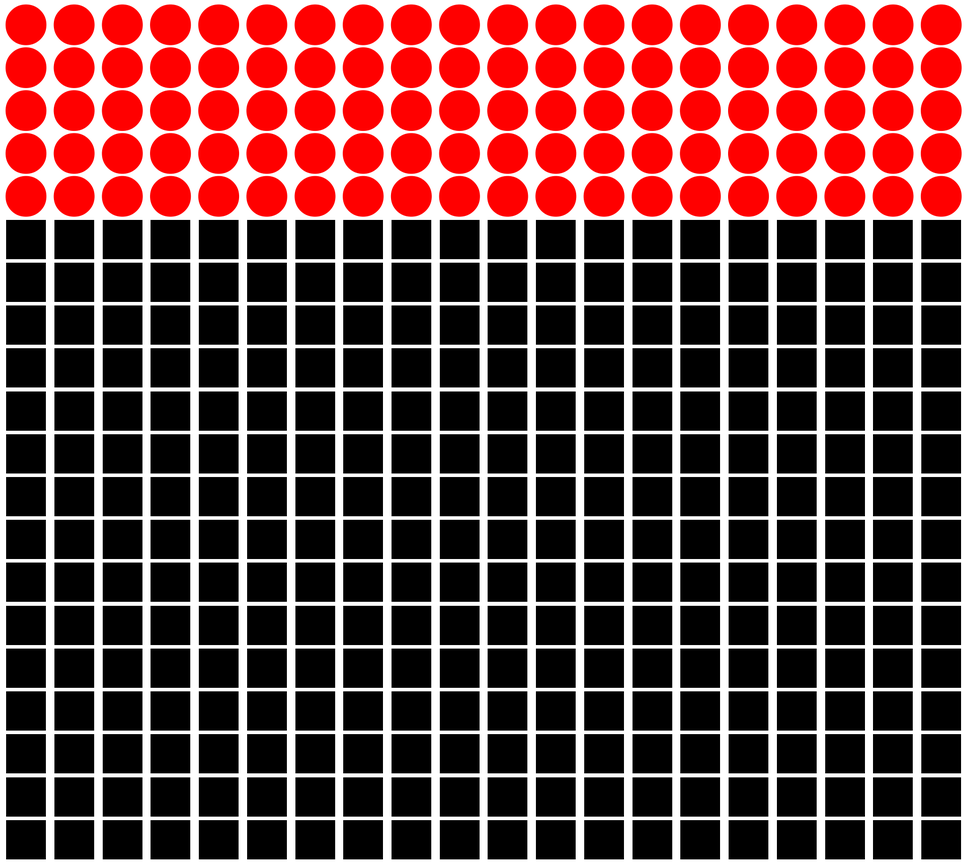
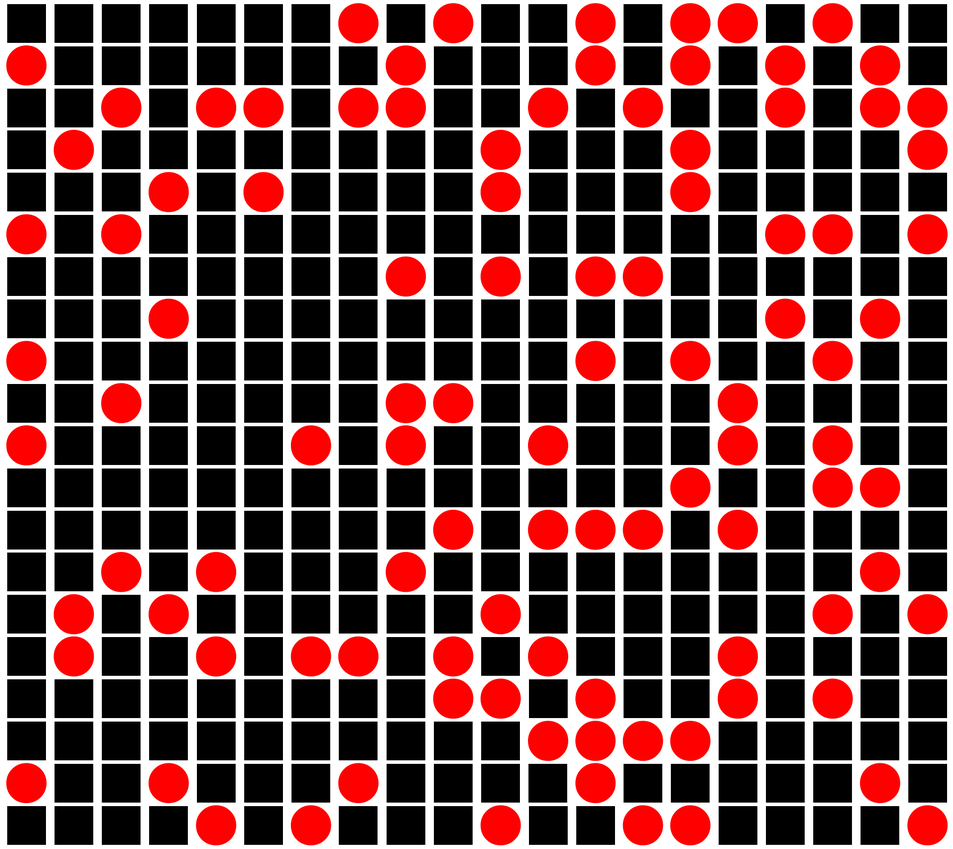
Ordered versus typical state: e^{225} states in total

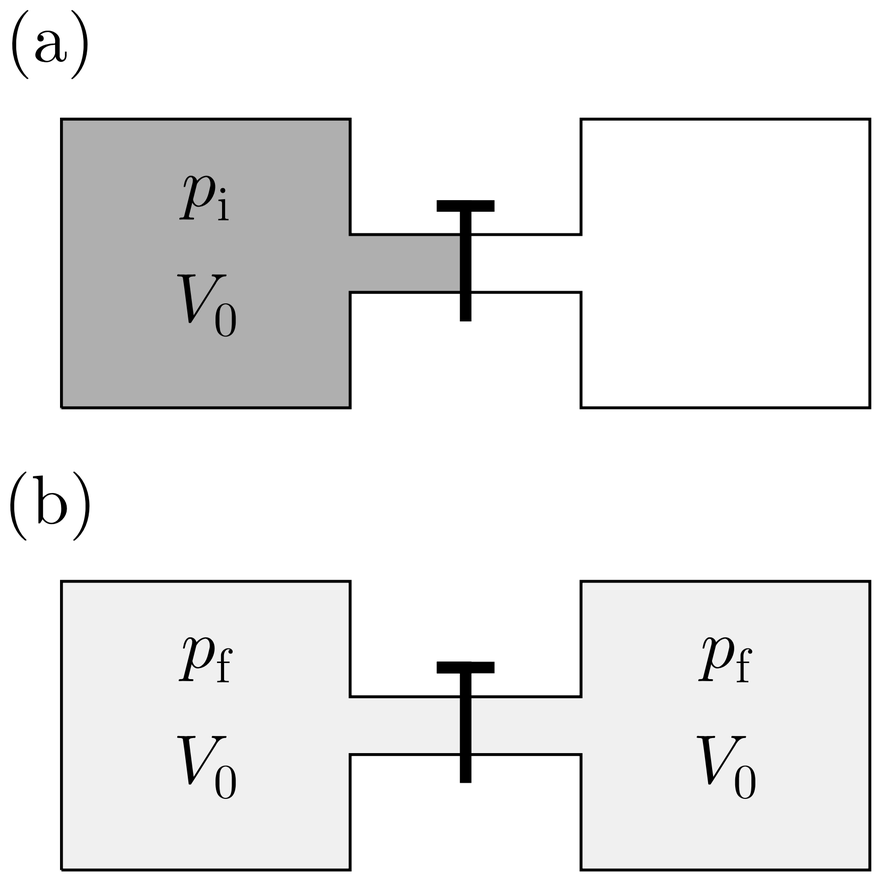


Ordered state: 400 atoms, 1/4 are excited, $E = 100\,\Delta$



a typical state: the energy is still, $E = 100\,\Delta$

Joule Expansion



The expansion
is a highly non-equilibrium process.

During the expansion no heat
enters the system. Thus the
energy initial equals the final energy