# Monte Carlo – Metropolis Example

## Ising model

The Ising Hamiltonian can be written as,

$$\mathcal{H} = -J \sum_{\langle ij \rangle} S_i S_j.$$

- The spins $S_i$ can take values $\pm 1$,
- $\langle ij \rangle$ implies nearest-neighbor interaction only,
- $J > 0$ is the strength of exchange interaction,

The goal is to study the existence of a phase transition between an ordered (magnetized) phase with m $\neq$0 and a disordered (non magnetic) phase m=0 depending on the temperature T

$$m = \frac{\langle S \rangle}{N},$$