# **PH 366 Day 12:**
# Ising Model Animation

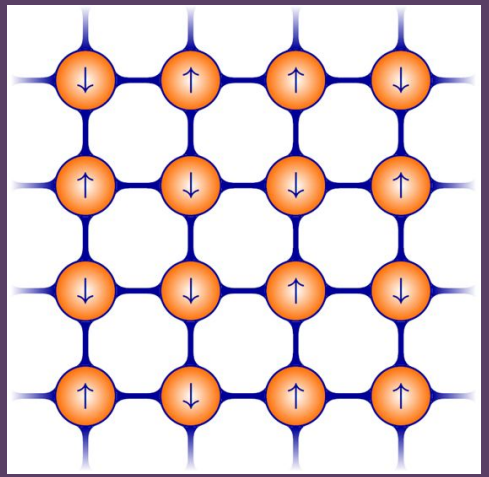
17 Feb 2025

# Announcements

Mini-projects graded – please let me know any questions!

# Metropolis Algorithm for a Spin Lattice

1. Establish a random 2D array of spins
2. Randomly choose a spin
3. **Calculate the probability of flipping that spin**
4. Decide whether to flip the spin
5. Go back to **Step 2** and repeat the algorithm



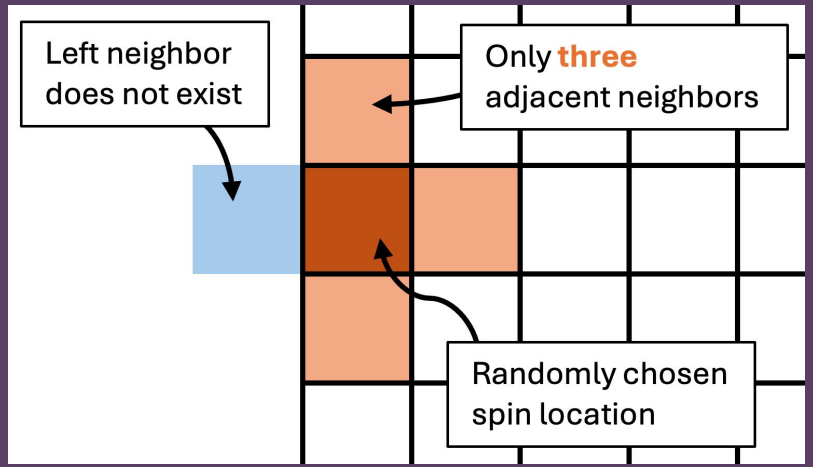
$$\mathcal{P}(\text{accept}) = \begin{cases} 1 & \text{if } \mathrm{d}E \leq 0 \\ e^{-\mathrm{d}E/T} & \text{if } \mathrm{d}E > 0 \end{cases}$$

# Computing dE for a spin-flip

$$\mathrm{d}E_{i,j} = 2s_{i,j} \sum_{\text{neighbors of } i,j} s_{\text{neighbor}}$$

Need to spin values of neighbors

But what if the location is on the edge of the lattice?



# A function for computing dE

There is not a **best** solution

See today's assignment for different possibilities