# Lattice Gasses

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- What two factors is it important to consider when calculating the partition function for a model system?

- What Hamiltonian is stuided in this video? What do all the terms in the Hamiltonian describe? What does the sum run over?

- How many states can each of the spins be in?

- Why is it significant that each term in the summation in the Hamiltonian depends on the value of only one spin variable?

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- Suppose each spin could be in one of three states rather than one of two states. How many different microstates would there be for a system containing $N$ such spins?

- Explain why (using the arguments in the video) the partition function for the lattice spins is $Z = 2^N \cosh(\beta\mu H)$

- How is the average energy of the system calculated from the partition function? What is the average energy for the system of spins under study in this exercise?

- What happens to the the average energy of the system in the low and high-temperature limits? What does this imply about the behavior of the psins?