

Many-body entanglement in quantum computing



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The idea of quantum computers is that "More is different" when it comes to qubits. One qubit is not so interesting but many of them together can create exotic and computationally powerful forms of many-body entanglement.

Given this, we might expect that many-body physics and quantum information would often be related. I will describe two recent examples.

1. The Ising model is a simple model of a magnet. But it turns out to also describe the competition between quantum interactions creating entanglement and measurements destroying entanglement. This can tell us about the power of near-term quantum computers.
2. How can a closed system reach thermal equilibrium? There have been many answers to this question dating back to the 19th century. I will explain how entanglement is a plausible source of thermalization.