

Simulation of Quantum Magnets

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The magnetic order of interacting quantum spins is of fundamental interest in many areas of physics, and it is related to several exotic material phenomena, such as magnetic frustration, spin liquids, and high-T_c superconductivity. Theoretical studies on those phenomena would demand a quantum computer, because quantum superposition and entanglement make a many-body system classically intractable. Trapped ion systems have been identified as a promising physical implementation of a quantum simulator, thanks to the strong and tunable couplings between ions and its advanced status on quantum computation applications. In this talk we will present our results of quantum simulations of frustrated Ising spins utilizing trapped ions.