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Trapped-ion systems for Quantum Simulation of Lattice Gauge Theory

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Linear arrays of trapped and laser cooled atomic ions are among the foremost candidates for realizing quantum simulation and computation platforms. High fidelity coherent manipulations together with nearly perfect detection guarantee an unprecedented control over a large number of qubits, which can be used to run quantum algorithms [1] or engineer Hamiltonians to emulate physical systems of interest [2]. Recently trapped ions have been employed for proof of principle demonstrations of quantum simulation of high energy physics, including the Dirac equation [3] and the 1+1D Schwinger model [4]. In this talk I will describe the main features of the trapped-ion quantum hardware and discuss proposals [5,6] and perspectives for an analog implementation of lattice gauge theories in trapped-ion systems.

References

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