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【503】 Linking trapped-ion quantum nodes

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Future quantum networks offer a route to quantum-secure communication, distributed quantum computing, and quantum-enhanced sensing. The applications of a given network will depend on the capabilities available at its nodes, which may be as simple as quantum-state generation and measurement or as advanced as universal quantum computing. Here, we focus on quantum nodes based on trapped ions, an experimental platform with which high-fidelity state preparation, gate operations, and readout have been demonstrated. By coupling trapped ions to the mode of an optical resonator, we construct a coherent interface between single ions and single photons. I will present ongoing work to transfer quantum states between remote trapped-ion systems, highlighting experimental challenges and addressing the question of how to optimize this process.

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