

Single-photon interference experiments with single ions

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We present experiments that study the interaction of single Barium ions with single photons and weak coherent fields in front of high-numerical aperture optical elements.

We observed entanglement of two effectively meter distant atomic qubits using single photon interference. We show that a single detection event into a single optical mode projects the two-ions into a maximally entangled Bell state.

We will also present our current efforts in the design of ion traps with even higher numerical aperture objectives and mirrors for efficient single photon collection and higher entanglement rates.