

Controlling the spontaneous emission of multiple trapped ions

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We present a setup based on a phase spatial light modulator for manipulating the spatial characteristics of spontaneous emission of trapped ions. We delineate three specific applications where our setup demonstrates superior performance compared to current state-of-the-art solutions. Anticipated benefits include the potential to entangle more than two ions through a single photon detection event, the efficient channeling of all fluorescence photons emitted by an ion into an optical fiber, and the controlled modulation of visibility for distinguishable emitters. The setup controls the ions' emission in the far-field and can be adapted to most of the existing ion traps commonly used in quantum technology.

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