

Quantum-State Engineering of Multiple Trapped Ions for Center-of-Mass Mode

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Abstract: We propose a scheme to generate a superposition of coherent states with arbitrary coefficients on a line in phase space for the center-of-mass vibrational mode of N ions by means of isolating all other spectator vibrational modes from the center-of-mass mode. It can be viewed as the generalization of previous methods for preparing motional states of one ion. For a large number of ions, only one cyclic operation enables one to generate such a superposition of many coherent states.

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