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Collapse and revival of entanglement in the system of trapped ions VLADIMIR MALINOVSKY, MagiQ Technologies, Inc., 171 Madison Avenue, Suite 1300, New York, NY 10016 — Dynamics of the entangled states of two trapped ions is considered. We demonstrate the strong dependence of the population dynamics on the relative phase of the pulses used to prepare the entangled states. When the initial distribution of phonons is a coherent state, the population and entanglement exhibits collapses and full revivals. For an initial thermal distribution the revivals are not completed and the system loses entanglement and coherence. Unique discreteness of the effective Rabi frequency, proportional to $\sqrt{1+4n(n+1)\sin^2\phi}$, where n is the number of phonon state, and ϕ is the relative phase, is found. As a result, periodic collapse and perfect revival take place in the population dynamics even for thermal distribution of motional states. Effect of the relative phase on the entanglement dynamics in the system of trapped ions is also discussed.

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