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Decoherence of superposition states in trapped ions

We investigate the decoherence of superpositions of hyperfine states of $^{9}Be^{+}$ ions due to spontaneous scattering of off-resonant light. We find that, contrary to conventional wisdom, elastic Rayleigh scattering can have majour contributions to decoherence when compared to the effect of inelastic Raman scattering.

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