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Phonon decoherence in a double dot qubit embedded inside a suspended phonon cavity YING-YEN LIAO, Department of Electrophysics, National Chiao-Tung University, Hsinchu 300, Taiwan, YUEH-NAN CHEN, National Center for Theoretical Sciences, Tainan 701, Taiwan, DER-SAN CHUU, Department of Electrophysics, National Chiao-Tung University, Hsinchu 300, Taiwan — The phonon-induced decoherence in a double dot charge qubit embedded inside a semiconductor slab is investigated theoretically. We employ the Redfield formalism to solve the density matrix in the Born-Markov approximation. Our calculations show some interesting results in the presence of slab cavity. In particular, the decoherence behaves significantly due to particular phonon couplings such as the van Hove singularity and vanishing deformation potential.

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