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Two-electron dephasing in a single silicon quantum dot[1] JOHN KING GAMBLE, MARK FRIESEN, S.N. COPPERSMITH, Department of Physics, University of Wisconsin-Madison, Madison, WI 53706, USA, XUEDONG HU, Department of Physics, University at Buffalo, SUNY, Buffalo, NY 14260, USA — We study the dephasing of two-electron states in a single silicon quantum dot. Specifically, we consider dephasing due to the electron-phonon coupling and charge noise, treating orbital, valley, and mixed valley-orbit excitations. For phonon-induced dephasing, the intervalley processes are most important and lead to a dephasing rate of about 1 MHz. In an ideal system, dephasing due to charge noise is strongly suppressed due to a vanishing dipole moment. However, introduction of disorder or anharmonicity leads to large effective dipole moments, and hence possibly strong dephasing.

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John King Gamble
Department of Physics, University of Wisconsin-Madison,
Madison, WI 53706, USA

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