Spin Relaxation of P Dimer Electrons in Silicon[1] MASSOUD
BORHANI, XUEDONG HU, SUNY at Buffalo — We study the transition rates
from different energy states of two P donor electrons to the ground state singlet. By
considering the full set of the states of the two donor electrons within the Heitler-
London approximation, we classify them according to their hyperfine interaction
with P nuclei. Here the electron spin-flip is assisted by hyperfine interaction with
the phosphorus nuclei and phonon emissions. This study is crucial in order to find an
upper bound for the relaxation time of the silicon-based qubits, and finding various
regimes to decelerate the spin decay rate.

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