

# **Interacting Random-field Dipole Defect Model for Quasi-static Electric Fields in Semiconductor-based Qubit Devices**

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Semiconductor qubit devices suffer from the drift of important device parameters as they are operated. The most important example is a shift in qubit operating frequencies. This effect appears to be directly related to the heating of the system as gate operations are applied. We show that the main features of this phenomenon can be explained by the two-level systems that can also produce charge noise, if these systems are considered to form an interacting random-field glass. The most striking feature of the theory is that the frequency shift can be non-monotonic in temperature. The success of the theory, and the questions it raises, narrow considerably the possible models for the two-level systems.

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