Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

A qubit designed with a dynamically controlled bath of two-level system defects TIM KOHLER, YANIV ROSEN, SAMARESH GUCHHAIT, Univ of Maryland-College Park, KEVIN OSBORN, Laboratory of Physical Science — Although superconducting qubits have made tremendous gains, they still suffer decoherence from two level system (TLS) defects that are found at dielectric films including the native oxides on superconductors. Qubits often minimize TLS effects by choosing optimal device geometries. We have previously investigated methods to electrically sweep the energy of a bath of TLSs and control their excited-state population. Here we discuss a qubit design that incorporates a similar control over the TLSs, and which may prove to minimize TLS decoherence effects. In this device the qubit energy can remain constant while the TLS bath is dynamically controlled. We will discuss experimental progress towards realizing this qubit.

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Date submitted: 06 Nov 2015 Electronic form version 1.4