

Abstract Submitted
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Effect of environment on the Berry phase measurements¹ MAXIM VAVILOV, CANRAN XU, Univ of Wisconsin, Madison — We study the effect of quantum environment on the Berry phase. The Berry phase was recently measured in interference experiments of a ground and excited states of a qubit. We analyze how the relaxation of the excited state affects measurements of the Berry phase. For this purpose, we first represent the environment by a damped harmonic oscillator and evaluate an error in the Berry phase measurements as a function of the coupling strength between the qubit and the oscillator. Then, we apply the Bloch-Redfield equations for a time dependent Hamiltonian to describe the effect of an Ohmic environment on experimental observation of the Berry phase. We also evaluate non-adiabatic corrections to the Berry arising when the time that takes to close the loop in the Hamiltonian parameter space is finite.

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