Condensed Matter > Mesoscale and Nanoscale Physics

Tailoring population inversion in Landau-Zener-Stückelberg interferometry of flux qubits

Alejandro Ferron, Daniel Dominguez, Maria Jose Sanchez

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We distinguish different mechanisms for population inversion in flux qubits driven by dc+ac magnetic fields. We show that for driving amplitudes such that there are Landau-Zener-St\"uckelberg intereferences, it is possible to have population inversion solely mediated by the environmental bath at long driving times. We study the effect of the resonant frequency Ω_p of the measuring circuit, finding different regimes for the asymptotic population of the state of the flux qubit. By tailoring Ω_p the degree of population inversion can be controlled. Our studies are based on realistic simulations of the device for the Josephson flux qubit using the Floquet-Born-Markov formalism.

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