Symmetry-protected gates on superconducting circuits

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Abstract

The study of qubit architectures with intrinsic protection against noise has been an ever-growing field of research. The 0 - π qubit is an exciting case, owing to its multimode nature and resilience against noise. Here we deeply study the 0 - π qubit phenomenology and propose a novel perspective on single-qubit gates realization, based on adiabatic time evolution by taking advantage of its remarkable symmetry properties.

References

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[3] Peter Groszkowski, Agustin Di Paolo, Arne L. Grimsmo et al., New Journal of Physics 20, 043053 (April 2018)
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Figures

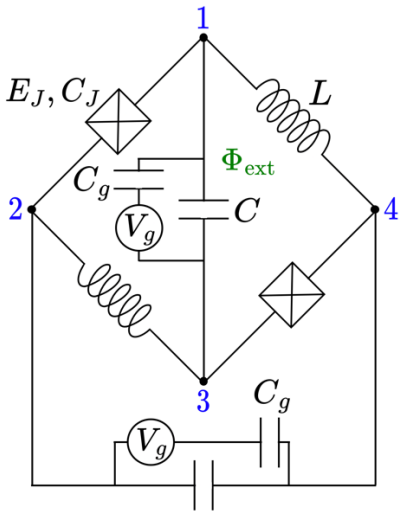

Figure 1: Circuit diagram of the 0-π qubit

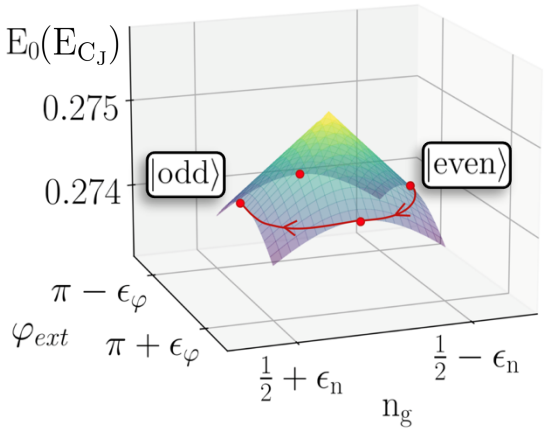

Figure 2: Schematic view of the logical qubit gate trajectory in the ground state surface for the 0-π qubit Hamiltonian