Pancharatnam Phase of a Mesoscopic Coupled Circuit

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Abstract: We derive a formula of the nonadiabatic noncyclic Pancharatnam phase for a mesoscopic circuit with coupled inductors and capacitors. It shows that, because of coupling effect, the circuit is in squeezed quantum state initially, and the time evolution of Pancharatnam phase exhibits an oscillation in a complex way. Especially we find that when the capacity of the coupled capacitors is larger than that of other ones in the circuit, with the variation of time Pancharatnam phase becomes nearly periodic square-wave, which perhaps can provide a new approach for the realization of quantum logic gate.

Key words: mesoscopic coupled circuits, Pancharatnam phase, oscillation

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