

Investigation of Resonance Properties of the Φ_0 Josephson Junction

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The phase dynamics and resonance properties of the Φ_0 Josephson junction are investigated. As the Φ_0 junction is considered a superconductor-ferromagnet-superconductor (S-F-S) Josephson junction, in which the symmetry with respect to time inversion is broken and the current-phase relationship has a phase shift by Φ_0 proportional to the magnetization, perpendicular to the gradient of the asymmetric spin-orbit potential. Based on the numerical solution of the equations of the resistive model for the Josephson junction and the Landau-Lifsch-Gilbert equation for magnetization, the manifestation of resonance properties on the volt-ampere characteristic of the Φ_0 junction is shown. The influence of the model parameters on the resonance properties of the Φ_0 junction is demonstrated. An approximate analytical equation similar to the Mathieu equation is obtained, which shows the possibility of realization of parametric resonance in the Φ_0 junction.

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