

Motivation

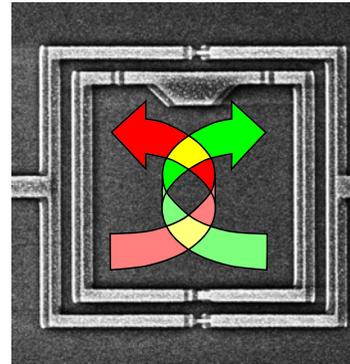
When we observe quantum superposition state, the quantum state reduce to an eigen state. To perform ideal measurement, which have a small backaction, we observe wavefunction reduction.

Originality

By using Josephson bifurcation amplifier, we succeeded to control strength of a quantum measurement. And we make it clear when the wavefunction reduction occurs.

Impact

This is important for understanding the mechanism of quantum state measurement. This readout method is indispensable technique to realize an algorithm such as quantum error correction.

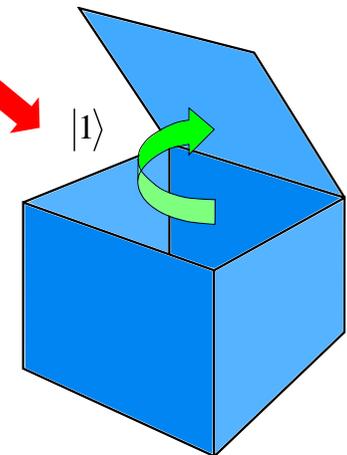
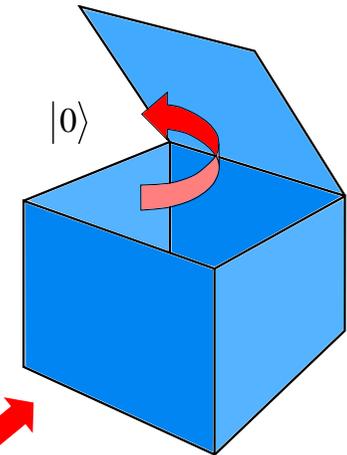
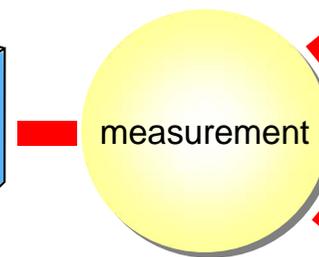
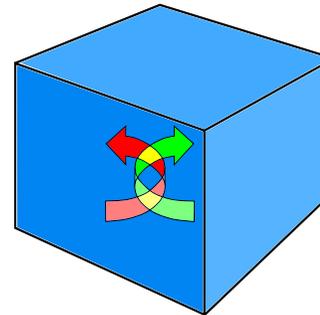


Superconducting flux qubit

A clockwise current state and an anti-clockwise current state are eigenstates of the superconducting flux qubit.

$$|\psi\rangle = a|0\rangle + b|1\rangle$$

$$|a|^2 + |b|^2 = 1$$



By measurement, qubit wavefunction of superposition state probabilistically reduce to either eigenstate.

