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Entanglement between the charge and phase degrees of freedom in a superconducting qubit MUN DAE KIM, Yonsei University — The charge and phase are conjugate variables with each other in superconducting qubits which are characterized by either the charge or the phase degree of freedom. In this study we propose a qubit scheme where the charge and phase degrees of freedom are entangled in the qubit. In our qubit the qubit states consists of the phase states of the qubit, while the qubit states can be measured through the charge state detection. The qubit operation can be performed at the optimal point with respect to both the external magnetic flux and gate voltage. We discuss the fidelity of the Rabi oscillation and the possible way of enhancement of fidelity.

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