Abstract Submitted
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Universal quantum computing with a multi-qubit device with untunable always-on coupling[1] ZHONGYUAN ZHOU, SHIH-I CHU, Department of Chemistry, University of Kansas, Lawrence, KS 66045, SIYUAN HAN, Department of Physics and Astronomy, University of Kansas, Lawrence, KS 66045 — We present a method to implement universal one-bit and two-bit quantum logical gates in a two-qubit device with fixed always-on coupling. In this method the one-bit gate is decomposed into two conditional two-bit gates that are implemented by local manipulations similar to those for the two-bit gates. We demonstrate, by implementing one-bit NOT gate and creating Bell states, that this method can be realized in rf-driven inductively coupled two SQUID flux qubits with realistic device parameters. This method is simple, does not need any additional hardware resources, and can be readily extended to multi-qubit logical gates required for scalable quantum computation.

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