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Entanglement of two superconducting qubits in a three-dimensional architecture via monochromatic two-photon excitation[1] STEFANO POLETTO, JAY M. GAMBETTA, SETH T. MERKEL, JOHN A. SMOLIN, JERRY M. CHOW, A.D. CORCOLES, D.W. ABRAHAM, CHAD RIGETTI, MATTHIAS STEFFEN, IBM T.J. Watson Research Center, Yorktown Heights, NY
— The superconducting qubit approach for the realization of a quantum processor is a promising candidate because of its compatibility with silicon microfabrication techniques. The coherence times of superconducting devices have continuously improved in the previous decade, with the most noticeably enhancement recently obtained by placing the qubit inside a three-dimensional waveguide cavity. I will present a novel implementation of a two-qubit three dimensional architecture using superconducting qubits, and I will describe a new gate for the direct generation of maximally entangled Bell states. The gate employs the forbidden two-photon 00 - 11 transition, made bright by the interaction between non computational energy levels. A microwave drive tuned to this transition induces Rabi-like oscillations between the ground and doubly excited state via the Bell basis, allowing the generation of entangled states.

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