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Weakly-tunable transmon qubits in a multi-qubit architecture JARED HERTZBERG, NICHOLAS BRONN, ANTONIO CORCOLES, MARKUS BRINK, GEORGE KEEFE, MAIKA TAKITA, IBM T J Watson Res Ctr, M. HUTCHINGS, B. L. T. PLOURDE, Syracuse University, JAY GAMBETTA, JERRY CHOW, IBM T J Watson Res Ctr — Quantum error-correction employing a 2D lattice of qubits requires a strong coupling between adjacent qubits and consistently high gate fidelity among them. In such a system, all-microwave cross-resonance gates offer simplicity of setup and operation. [1] However, the relative frequencies of adjacent qubits must be carefully arranged in order to optimize gate rates and eliminate unwanted couplings. [2] We discuss the incorporation of weakly-flux-tunable transmon qubits into such an architecture. Using DC tuning through filtered flux-bias lines, we adjust qubit frequencies while minimizing the effects of flux noise on decoherence. [1] J.M. Chow et al, Nat Comm 5, 4015 (2014). [2] A.D. Corcoles et al, Nat Comm 6, 6979 (2015).

Jared Hertzberg
IBM T J Watson Res Ctr

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