Optimization of Transmon Qubit Fabrication

JOSEPHINE CHANG, MARY BETH ROTHWELL, GEORGE KEEFE, IBM T.J. Watson Research Center, IBM QUANTUM COMPUTING GROUP TEAM — Rapid advances in the field of superconducting transmon qubits have refined our understanding of the role that substrate and interfaces play in qubit decoherence. Here, we review strategies for enhancing coherence times in both 2D and 3D transmon qubits through substrate design, structural improvements, and process optimization. Results correlating processing techniques to decoherence times are presented, and some novel structures are proposed for further consideration.

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