Abstract Submitted
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A Simple, Rapid, and Accurate Method to Calculate Coupling in Coplanar Superconducting Qubit Circuits B. CHIARO, R. BARENDS, B. CAMPBELL, Y. CHEN, Z. CHEN, A. DUNSWORTH, E. JEFFREY, J. KELLY, M. MARIANTONI, A. MEGRANT, J. MUTUS, C. NEILL, P. O'MALLEY, C. QUINTANA, P. ROUSHAN, D. SANK, A. VAINSENCHER, J. WENNER, T. WHITE, A.N. CLELAND, J.M. MARTINIS, UC Santa Barbara — A critical design consideration for quantum circuits is the coupling between constituent elements. Both capacitive and inductive coupling can be accurately calculated through numerical simulations with commercial software. However, this approach can be slow and obscures the underlying physics, motivating the development of an analytic theory. The case of coupling between electrodes embedded in a groundplane is particularly interesting to the planar superconducting qubit community. As circuits in this field become more complex, notably in the UCSB multi-Xmon experiments, it is essential to understand the nature of electrode interactions and calculate them rapidly and accurately. I will show how to calculate electrode couplings with a simple integral method and compare its predictions with experimental data and Sonnet software simulations of coupling in planar circuits used for quantum computing.

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