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Coupled Qubits for Next Generation Quantum Annealing: Novel
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tronics, Massachusetts Institute of Technology, ANDREW J. KERMAN, MIT Lin-
coln Laboratory — While the first generation of quantum annealers based on Joseph-
son junction technology have been successfully engineered to represent arrays of spins
in the quantum transverse-field Ising model, no circuit architecture to date has suc-
ceded in emulating the more complicated non-stoquastic Hamiltonians of interest
for next generation quantum annealing. Here, we present our recent results for tun-
able ZZ- and XX-coupling between high coherence superconducting flux qubits. We
discuss the larger architectures these coupled two-qubit building blocks will enable,
as well as comment on the limitations of such architectures. This research was funded
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