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Digitized adiabatic quantum computing with a superconducting circuit, part II: Experiment R. BARENDS, A. SHABANI, Google Inc., L. LAMATA, University of the Basque Country, Spain, J. KELLY, Google Inc., A. MEZZACAPO, U. LAS HERAS, University of the Basque Country, Spain, R. BABBUSH, A.G. FOWLER, Google Inc., B. CAMPBELL, UC Santa Barbara, Y. CHEN, Z. CHEN, Google Inc., B. CHIARO, A. DUNSWORTH, UC Santa Barbara, E. JEFFREY, E. LUCERO, A. MEGRANT, J. MUTUS, M. NEELEY, Google Inc., C. NEILL, P. O'MALLEY, C. QUINTANA, UC Santa Barbara, P. ROUSHAN, Google Inc., E. SOLANO, University of the Basque Country, Spain, H. NEVEN, J. MARTINIS, Google Inc. — A major challenge in quantum computing is to solve general problems with limited physical hardware. We implement digitized adiabatic quantum computing, combining the generality of the adiabatic algorithm with the universality of the digital approach, using a superconducting circuit with nine qubits. We probe the adiabatic evolutions, explore the scaling of errors with system size, and quantify the success of the algorithm for random spin problems. We find that the system can approximate the solutions to both frustrated Ising problems and non-stoquastic problem Hamiltonians with a performance that is comparable.

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