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Strongly-coupled Josephson junction array for simulation of frustrated one-dimensional spin models ZHENGWEI ZHOU, LIANGHUI DU, XINGXIANG ZHOU, YONGJIAN HAN, GUANGCAN GUO, Key Laboratory of Quantum Information, University of Science and Technology of China — We study the capacitance-coupled Josephson-junction array beyond the small-coupling limit. We find that, when the scale of the system is large, its Hamiltonian can be obtained without the small-coupling approximation and the system can be used to simulate strongly frustrated one-dimensional Ising spin problems. To engineer the system Hamiltonian for an ideal theoretical model, we apply a dynamical-decoupling technique to eliminate undesirable couplings in the system. Using a six-site junction array as an example, we numerically evaluate the system to show that it exhibits important characteristics of the frustrated spin model.

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