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Numerical Simulations of Two-Dimensional Arrays of Superconducting Quantum Interference Devices[1] STEVEN ANTON, SHANE CYBART, STEPHEN WU, JOHN CLARKE, R. C. DYNES, University of California, Berkeley, SQUID TEAM — We present a numerical model that simulates the voltage versus applied magnetic field (V-B) characteristics of a serial- parallel superconducting quantum interference device (SQUID) array. Our model incorporates resistively shunted Josephson junctions with inhomogeneous parameters as well as non- negligible loop inductances to solve self-consistently the Josephson relations for each junction in the array. Currents through the array are not artificially constrained, thus allowing the possibility of complex percolation paths. The model also allows one to monitor quantities that are difficult to observe experimentally, such as the time dependent current distributions, magnetic fluxes, and junction phase information within the array. In addition, time dependent bias currents and magnetic fields are easily incorporated into the simulation. We compare simulation V-B characteristics to recently- reported experimental data of large scale SQUID arrays with several complex area distributions. We find good agreement between simulation and experiment in arrays where the number of SQUIDs in parallel is not too large.

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