

Current Induction in Strongly Coupled Arrays of Small Josephson Junctions

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We present experimental results on current induction between long arrays of small Al/AIO_x/Al Josephson junctions. The arrays are capacitively coupled with each other via capacitances of a comparable magnitude with the junction capacitance (~ 1 fF). We observe that a small current is induced in the secondary array at zero bias voltage when a current flows in the primary array at a greater bias than the threshold for the Coulomb blockade. The polarity of the induced current is the same as that of the primary current in contrast to the case of arrays of small normal tunnel junctions¹, and it reverses when a magnetic field is applied perpendicular to the device and the superconducting gap is reduced.

These results suggest a substantially different mechanism of current induction in the case of Josephson-junction arrays from that in arrays of normal tunnel junctions².

¹M. Matters, J. J. Versluys, and J. E. Mooij, Phys. Rev. Lett. **78**, 2469 (1997).

²D. V. Averin, A. N. Korotkov, and Yu. V. Nazarov, Phys. Rev. Lett. **66**, 2818 (1991).