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Collective effects in the two-dimensional Josephson junction array VALERII VINOKOUR, IVAN SADOVSKYY, ALEXEY GALDA, Materials Science Division, Argonne National Laboratory, Argonne, Illinois 60439, USA — We study collective quantum effects in the two-dimensional Josephson junction arrays (JJA) in the vicinity of the superconductor-insulator transition (SIT). We find the contribution of the quantum coherent phase slips (QCPS) into the formation of thermodynamic properties of the JJA, including critical current, as a function of the magnetic field. We investigate the response of the 2D JJA to the external bias and the contribution from QCPS to this response.

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