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Suppression of superconductivity in the fully frustrated Josephson junction array with site dilution[1] BRUNA DE OLIVEIRA, University of Southern California, TOMMASO ROSCILDE, Ecole Normale Superieure de Lyon, STEPHAN HAAS, University of Southern California — We study the effects of geometric randomness on the ordered phases and phase transitions of frustrated classical Josephson junction (JJ) arrays. In particular, we consider a square lattice array with maximal frustration (one half flux quantum through each plaquette) and with site dilution. The homogeneous model is known to feature two phase transitions: an Ising transition for the ordering of vortices into a crystalline state, and a Kosterlitz-Thouless transition for the appearance of superconductivity. A detailed Monte Carlo study shows a strong effect of disorder on the separation of the ordering temperatures. In particular, superconductivity is completely suppressed well before one reaches the percolation threshold of the lattice. We hence suggest that diluted JJ arrays with magnetic frustration are strong candidates for the experimental observation of a vortex crystal in the normal state.

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