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The dimensionality of charge density waves in the presence of quenched disorder ADRIAN DEL MAESTRO, Department of Physics, Harvard University, BERND ROSENOW[1], Institut für Theoretische Physik, Universität zu Köln, SUBIR SACHDEV, Department of Physics, Harvard University — We present the effects of quenched disorder on a model of charge density wave (CDW) ordering on the square lattice. Our model may be applicable to the cuprate superconductors, where a random electrostatic potential exists in the CuO planes as a result of the presence of charged dopants. We argue that the presence of a random potential can affect the uni-directionality of the CDW order. Coupling to a uni-directional CDW, the random potential can lead to the formation of domains with 90 degree relative orientation, thus tending to restore the rotational symmetry of the underlying lattice. For a checkerboard CDW on the other hand, disorder generates spatial anisotropies on short length scales and thus some degree of uni-directionality. Using both numerical and analytical techniques, we quantify these disorder effects. Contact will be made with different experimental approaches on various materials that seem to observe both stripe and checkerboard charge ordering.

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