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The Effects of Disorder on a Quasi-2D System of Ultra-Cold Atoms[1] M. BEELER, MATTHEW REED, TAO HONG, S.L. ROLSTON, Joint Quantum Institute, University of Maryland, College Park — An ultra-cold gas of atoms can be used to create many different model Hamiltonians. When tightly confined in one spatial dimension, the gas can become effectively two-dimensional. At low temperature, a quasi-2D Bose gas undergoes a Berezinskii-Kosterlitz-Thouless phase transition to a superfluid, mediated by the binding and unbinding of vortex pairs. As disorder affects vortex transport properties, a slight amount of fine-grain disorder in the potential energy may alter the properties of this phase transition. We will present experimental observations of a 2D Bose gas of rubidium atoms in the presence of disorder created by a laser speckle field.

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