The Effects of Disorder on a Quasi-2D System of Ultracold Atoms
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and Technology — 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 un-
dergoes 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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