A direct transition between a Neel ordered Mott insulator and a d_{x2-y2} superconductor on the square lattice YING RAN, ASHVIN VISHWANATH, DUNG-HAI LEE, UC Berkeley — In this paper we study a bandwidth-controlled direct, continuous, phase transition from a Mott insulator, with easy plane Neel order, to a fully gapped d_{x2-y2} superconductor with a doubled unit cell on the square lattice, a transition that is forbidden according to the Landau paradigm. This transition is made possible because the vortices of the antiferromagnet are charged and the vortices of the superconductor carry spins. These nontrivial vortex quantum numbers arise because the ordered phases are intimately related to a topological band insulator. We describe the lattice model as well as the effective field theory.

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