

Abstract Submitted
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Confinement-deconfinement interplay in quantum phases of doped Mott insulators PENG YE, Institute for Advanced Study, Tsinghua University, Beijing, 100084, P. R. China, CHU-SHUN TIAN, Institute of Theoretical Physics, Cologne University, D-50937 Cologne, Germany, XIAO-LIANG QI, Department of Physics, Stanford University, Stanford, CA 94305, USA, ZHENG-YU WENG, Institute for Advanced Study, Tsinghua University, Beijing, 100084, P. R. China — It is generally accepted that doped Mott insulators can be well described by the t-J model. In the latter, the electron fractionalization is dictated by the phase string effect. We found that in underdoped regime, the antiferromagnetic and superconducting phases are dual: in the former, holons are confined while spinons are deconfined, and vice versa in the latter. These two phases are separated by a novel phase, the so-called Bose-insulating phase, where both holons and spinons are deconfined. A pair of Wilson loops was found to constitute a complete set of order parameters determining this zero-temperature phase diagram. The quantum transitions between these phases are suggested to be of non-Landau-Ginzburg-Wilson type.

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