

Abstract Submitted
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Charge-Spin Mutual Frustration in Hubbard Model and Quantum Phase Diagram LONG ZHANG, ZHENG-YU WENG, Institute for Advanced Study, Tsinghua University — The charge-spin mutual frustration shapes the electron and spin correlations in the moderate coupling regime of the Hubbard model. We propose that it can be captured by the mutual semion statistics between chargons and spinons, i.e., they view each other as $\pm\pi$ gauge fluxes. Gapless spin liquid phases emerge on a square lattice with a π -flux in each plaquette and an anisotropic triangular lattice, consistent with numerical simulations and experiments on the organic material $\text{EtMe}_3\text{Sb}[\text{Pd}(\text{dmit})_2]_2$. We find that the quasiparticle decoherence due to severe phase fluctuations can cause Mott transition without fully suppressing charge fluctuations, suggesting the concept of “weak Mott insulators.”

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