

Abstract Submitted
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Ground state phases in the half-filled staggered π -flux Hubbard model on square lattices¹ CHIA-CHEN CHANG, RICHARD T. SCALETTAR, Department of Physics, University of California, Davis — Ground state phase diagram of the half-filled staggered π -flux Hubbard model on a square lattice are studied by means of constrained-path quantum Monte Carlo method. Charge and spin excitation gaps and magnetic order are calculated as a function of interaction strength U/t . Within our numerical scheme, it is found that the ground state phase is a semi-metal at $U/t < 5.6$, and a Mott insulator with long-range antiferromagnetic order at $U/t > 6.6$. In the window $5.6 < U/t < 6.6$, the system is an insulator in which both magnetic and dimer orders are absent. Spin excitation in the intermediate phase appears to be gapless, and the measured equal-time spin-spin correlation function shows a power-law dependence of relative distance. Our data suggests that the paramagnetic insulating intermediate phase might be a possible place to look for the putative algebraic spin liquid.

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