

Abstract Submitted
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Confinement-deconfinement transition in the algebraic RVB states JI-QUAN PEI, SHAO-KAI JIAN, HONG YAO, Institute for Advanced Study, Tsinghua University — Deconfined algebraic spin liquids are usually expected when Gutzwiller projecting the non-interacting wave function of half-filled electrons on the square lattice with staggered flux ϕ . However, our large-scale variational Monte Carlo simulations show that there is the confinement-deconfinement transition at $\phi = \phi_c$ where $\phi_c \sim 0.2$ is the critical flux. When $0 < \phi < \phi_c$, spinors are confined and the ground state develops an unexpected antiferromagnetic Neel ordering. From renormalization group analysis of anisotropic Dirac fermions coupled with U(1) compact gauge fields, we argue that the confinement of spinors in the Gutzwiller projected wave function might be due to the large anisotropy of Fermi velocity of Dirac fermions.

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