

# Doped 2D frustrated quantum magnets: spin-charge separation and non-conventional superconductivity

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Dynamics of mobile holes in two-dimensional frustrated quantum magnets is investigated. Numerical evidences are provided for spin-charge separation under doping the Kagome lattice, a featureless spin liquid. On the contrary, in the checkerboard lattice, a candidate of broken-symmetry Valence Bond Crystal, a small quasi-particle weight exists for some crystal momenta, a finding interpreted as a restoration of weak holon-spinon confinement (1). Amplification of pairing occurs in this case (for  $t > 0$ ) due to a localisation process that blocks single hole tunneling between the plaquettes of the Valence Bond Solid while hole pairs can delocalize (2). This scenario can give rise to new singlet pairing channels with s-, d- or g-wave symmetries. I also argue that the formation of a spatially-extended region where the plaquette solid melts around the hole can lead to an effective correlated hopping responsible for the two hole boundstate.

(1) A. Läuchli and D. Poilblanc, Phys. Rev. Lett. **92**, 236404 (2004).

(2) D. Poilblanc, Phys. Rev. Lett. **93**, 197204 (2004).

13.4 cm

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9.7 cm