（16:50-17:20）絶縁体からの超伝導　　　　　　　　　　　高田　康民（東大・物性研）

（17:20-17:50）Spectrum and the Quantum Hall Effect on the Square Lattice with Next-
Nearest-Neighbor Hopping　　　　　　　　　甲元　眞人（東大・物性研）

Long Range Order in Flux Phases

ETH　T.M.Rice

There are many possible ways to generalize the Affleck-Marston flux phase to densities away from half-filling. One way proposed by Anderson et al[1] is to consider a uniform flux phase where the flux per plaquette is equal to the electron density per site and spin. Such a commensurate generalization was considered by Lederer et al[2] using a renormalized mean field theory. The exchange term in a t-J model was shown to favor this commensurate flux phase(CFP) because of the stability of flux states in two dimensional lattices found by Hasegawa et al.[3] The density matrix is complex however which leads to a reduction of the kinetic energy. Another consequence of the complex value of the density matrix is the occurence of orbital currents whose size and form depends on the exact commensurability. Thus the CFP are characterized by an orbital current long range order[4] in addition to uniform spin chirality and to a modified form of off diagonal long range order (ODLRO) related to the Girvin-Mac Donald-Read order in quantum Hall states. Recently modifications have been proposed[5] of the CFP in which the density matrix is real so that there is no orbital current pattern in these new states. Such states, in contrast to CFP, involve a separation of spin and charge. When written as variational wavefunctions, they include additional factors which explicitly depend on the hole positions. These new wave functions have a uniform spin chirality and a modified ODLRO similar to the CFP. Also the balance between kinetic and magnetic energies is similar.

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2) P.Lederer, D.Poiblanc and T.M.Rice, Phys. Rev. Lett. 63, 1519 (1989).

3) Y.Hasegawa, P.Lederer, T.M.Ricc and P.B.Wiegmann, Phys. Rev. Lett. 63, 907 (1989).

4) P.Lederer, D.Poiblanc and T.M.Rice, Phys. Rev. B (in press)

5) M.Ogata, B.Dougot and T.M.Rice, to be published