IFCAM Seminar

Prof. S. E. Barnes
(IFCAM & University of Miami)

Date： July 16 (Wed.) 14：00〜

Room：2nd floor, IMR Prefab Bldg

Spinons, holons and flux tubes in highly correlated electrons systems - reality or myth?

The so called slave boson scheme has separate particles to describe the spin and charges degrees of freedom. These are often referred to as spinons and holons respectively. When these particles correspond to independent degrees of freedom, there is said to be spin-charge separation. Such a separation has only been clearly demonstrated in one spatial dimension. However the slave boson scheme is very frequently used as a formulation in the context of two spatial dimensions for, e.g., the Hubbard or $t-J$-models in the context of high temperature superconductors and beyond. Recently a more rigorous formulation based upon the Jordan-Wigner transformation has been developed. In two dimensions unit flux tubes must be introduced in order to perform this transformation. Usually the spinons are fermions and the holons are hard core bosons, however, e.g., a hard core boson plus a unit flux tube is a fermion and this novel approach permits the coexistence of, e.g., fermionic *and* bosonic holes.

In this talk, the basic idea behind the slave boson plus Jordan-Wigner transformation will be explained at an elementary level. The experimental manifestation of the resulting physics will be briefly illustrated in the context of high temperature superconductivity and some speculations about future directions will be offered.

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