

Seminar Schedule

Prof. J. A. Riera

(IFCAM, IMR, University of Rosario)

Date: Feb. 26, (Wed.) 16 : 00 ~

Room: Seminar room, 2nd floor, prefab bldg

“Numerical studies on antiferromagnetism and
superconductivity”

Numerical techniques, in particular zero temperature exact diagonalization, have been very successful in providing some of the most important results for models describing the strongly correlated electron physics of the Cu-O planes in high-Tc superconductors. However, it will be argued that the presence of finite antiferromagnetic domains and various kinds of inhomogeneities require numerical studies on larger clusters than the ones considered so far. Two attempts in this direction, the implementation of quantum Monte Carlo techniques and the derivation of effective models in which some degrees of freedom of the original Hamiltonians are projected out will be presented. Some preliminary results obtained along these lines will be discussed.

Outline of the talk:

- introduction
 - motivations: interplay holes \leftrightarrow magnetic environment in the presence of inhomogeneities
 - some previous results on AF \leftrightarrow holes
 - need for new approaches
- quantum Monte Carlo studies on 2d t - J models:
 - outline of the method; minus sign problem
 - AF cluster formation in the underdoped region
- effective models of hard-core boson pairs and triplets:
 - derivation from site-bond basis change
 - CORE technique
 - results on AF-SC exclusion

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