



**TIFR Centre for Interdisciplinary Sciences,
Narsingi, Hyderabad 500075**

Seminar

**Classical and quantum phases of interacting
bosons in one dimension**

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Abstract: The most common phase of interacting bosons is the superfluid which can be understood in terms of a classical XY order parameter even though its microscopic origin is quantum. In this talk, I will describe various other zero temperature phases of interacting bosons in one dimensional optical lattices of different geometries and compare them to phases found in classical models. The "geometry" of the 1D lattices arises from the range and sign of hopping and interaction terms. In particular, I will show that in a frustrated one dimensional lattice, the superfluid and Mott phases can have chiral order analogous to a fully frustrated 2D classical XY model. In a system with nearest neighbour interactions, I will show that there exists a topologically ordered phase in addition to more conventional phases with classical order parameters. The phase transitions between the different phases will also be discussed.

Date: Friday, January 4th 2013

Time: 11:30AM (Tea/Coffee at 11:15AM)

Venue: Conference Hall, TCIS

All are cordially invited