



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

Colloquium

Through a Vortex Glass, Darkly

Gautam I Menon

**The Institute of Mathematical Sciences,
Chennai**

Abstract: Abrikosov's Nobel-prize winning theory of the mixed phase of type-II superconductors predicts that magnetic fields enter as vortex (or flux) lines in superconducting samples held between an upper and a lower critical magnetic field. Abrikosov predicted that these lines should form a lattice, but ignored the effects of disorder and thermal fluctuations. These are now known to alter Abrikosov's phase diagram completely, since the line lattice can melt into a liquid when thermal fluctuations are included and the liquid, in other regimes of parameter space, can become a glass, given disorder. We still know relatively little about vortex glasses and their theoretical description, despite many influential papers in this field. Muon-spin-rotation experiments provide a remarkable 'local' probe of structure in vortex systems, but interpreting the results of these experiments entails a complex inverse problem. I will describe a body of work, some in collaboration with experimentalists [e.g. PRL 2013], which describes how one can understand such results within a theoretical framework, enabling us to 'see through' a vortex glass. These ideas raise interesting questions for structural glasses and exploring the relationship with structural glasses might help to illuminate both fields of research. (The title of the talk is a riff on the title of an old Bergman film; the original version is from the Bible, where 'seeing through a glass darkly' refers to our understanding of God when we are alive; the view will only be clear when we die.)

Date: Friday, May 24th 2013

Time: 04:00 PM (Tea/Coffee at 03:30 PM)

Venue: Conference Hall, TCIS

All are cordially invited