

Area Seminar

Title	Why do mean-field theories fail near the critical point and how does Wilson's renormalization group method go beyond that
Date and Time	31/12/2013 16:00:00
Speaker	Navinder Singh
Area	PRL
Venue	
Abstract	<p>Mean field theories are good qualitative descriptors of the phase transition behaviour. But all mean-field theories (including Landau's theory) fail at the critical point (the problem of large correlation length). The problems with large correlation length in quantum many-body systems are the hardest problems known in theoretical physics (both in condensed matter (like high T_c cuprates) and in particle physics (like QCD)). It was Ken Wilson's physical insights and his powerful mathematical skills that opened a way to the solution of such hard problems. With above in perspective, we will address the following questions: Why do all the mean-field theories fail near the critical point? How does Wilson's program go beyond all the mean-field theories? What are physical meanings of various kinds of fixed points? What is emergence and universality? And what is the origin of universality? (sequel of: Thermodynamical Phase transitions, the mean-field theories, and the renormalization (semi)group: A pedagogical introduction(*))</p> <p>(*) This presentation is our tribute to Ken Wilson (the pioneer of the renormalization group) who expired few months ago.</p>