Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Long-Rang Mutual Information and Topological Uncertainty Principle"

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Abstract: Ordered phases in Landau paradigm can be diagnosed by a local order parameter, whereas topologically ordered phases cannot be detected in such a way. non-local order parameters have been proposed in some particular TO's such as Laughlin state and Z_2 spin liquid, much less is known about such order parameters in general TO's. In this talk, we will propose the long-range mutual information(LRMI) as a unified diagnostic for both conventional long-range order and topological order. Using the LRMI, we characterize orders in $n+1$D gapped systems as m-membrane condensates with $0 \le m \le n-1$. The familiar conventional order and 2+1D topological orders are respectively identified as 0-membrane and 1-membrane condensates. We propose and study the topological uncertainty principle, which describes the non-commuting nature of non-local order parameters in topological orders.

11:00am
Tuesday, November 17, 2015
Low Room (6C-333)

Host: Liang Fu