

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Instabilities of the Sachdev-Ye-Kitaev Model"

Zhen Bi, Massachusetts Institute of Technology

Abstract: The Sachdev-Ye-Kitaev (SYK) model is an intriguing 0+1d strongly interacting disordered model of non-Fermi liquid states with exact solution and possible holographic duality. In this talk, I will consider a series of perturbations on the SYK model. We show that the maximal chaotic non-Fermi-liquid phase described by the ordinary SYK model has marginally relevant or irrelevant (depending on the sign of the coupling constants) four-fermion perturbations allowed by symmetry. Changing the sign of one of these four-fermion perturbations leads to a continuous chaotic-nonchaotic quantum phase transition of the system accompanied by a spontaneous time-reversal symmetry breaking. We also studied a generalized 0+1d interacting disordered fermion model which has a series of new fixed points with continuously varying exponents. If time permits, I will talk about a 1+1d model built out of SYK clusters, which exhibits a continuous transition between thermal metal and insulator phase at low temperature.

12:00pm
Tuesday, December 12, 2017
Duboc Room (4-331)

Host: Itamar Kimchi