Tata Institute of Fundamental Research
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Webinar

Strongly correlated phases in models with random interactions

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Strong interactions between electrons gives rise to many fascinating emergent phases of matter. In certain situations it may result in a complete breakdown of quasiparticle picture leading to anomalous behaviour and stark deviations from conventional theories. We will discuss how random models in the Sachdev-Ye-Kitaev (SYK) class have enhanced our understanding of such entangled phases of matter. As an important example, we will present a SYK-type random model of electrons for finite hole doping away from a Mott insulator. Using renormalisation-group technique I will show that it hosts a deconfined critical point accompanied with a sharp change in charge-carrier density. In this approach we can calculate some exponents exactly. This model successfully captures the key aspects of high-T_c cuprates. I will also briefly discuss other examples such as an anomalous metal found in disordered superconducting films.

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04:00 PM