

Aavishkar Patel's Talk Abstract

Despite much theoretical effort, there is no complete theory of the “strange” metal phase of the high temperature superconductors, and its linear-in-temperature resistivity. This phase is believed to be a strongly-interacting metallic phase of matter without fermionic quasiparticles, and is virtually impossible to model accurately using traditional perturbative field-theoretic techniques. Recently, progress has been made using large- N techniques based on the solvable Sachdev-Ye-Kitaev (SYK) model, which do not involve expanding about any weakly-coupled limit. I will describe constructions of solvable models of strange metals based on SYK-like large- N limits, which can reproduce some of the experimentally observed features of strange metals and adjoining phases. These models, and further extensions, could possibly pave the way to developing a controlled theoretical understanding of the essential building blocks of the electronic state in correlated-electron superconductors near optimal doping.