XIth International Symposium: Quantum Theory and Symmetries (QTS)
July 1-5, 2019
PLENARY LECTURE

Strange metals and black holes

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The 'strange metal', a state of matter formed by electrons in many modern materials, including the compounds which exhibit high temperature superconductivity. This is a state of variable electron density without quasiparticle excitations whose electrical resistivity is characterized by a scattering time close to the 'Planckian value' of (Planck's constant)/(absolute temperature). A theory of such a Planckian metal with a remnant Fermi surface will be presented, building upon the solvable Sachdev-Ye-Kitaev model. I will also discuss the low temperature quantum dynamics of charged black holes, and show that they are described by the same effective action which describes the SYK model.

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