Session 2: Non-equilibrium transport

Speaker: Andrei Pavlov

Affiliation: ICTP

Title: Quantum thermal transport in the Sachdev-Ye-Kitaev quantum dot

Abstract: A microscopic theory for quantum thermoelectric and heat transport in the conformal and Schwarzian regime of the Sachdev-Ye-Kitaev (SYK) model is presented. As a charged fermion realization of the SYK model in nanostructures we assume a setup based on Quantum Dot connected to the charge reservoirs through weak tunnel barriers. We analyze particle-hole symmetry breaking effects crucial for both Seebeck and Peltier coefficients. We show that the quantum charge and heat transport at low temperatures is defined by the interplay between elastic and inelastic processes such that the inelastic processes provide a leading contribution to the transport coefficients at the temperatures smaller compared to charging energy. We demonstrate that both electric and thermal conductance obey power law in temperature behavior while thermoelectric, Seebeck and Peltier coefficients are exponentially suppressed. This selective suppression of only non-diagonal transport coefficients have not been previously reported. We discuss validity of Kelvin formula in the presence of strong Coulomb blockade.
