Seminar/Talk

“Anomalous diffusive fluctuations in low-dimensional quantum systems”

Romain Vasseur
University of Geneva

Host: Maksym Serbyn

Starting from a pure initial state, the local properties of chaotic many-body quantum systems are expected to quickly thermalize under unitary dynamics. The remaining evolution from local to global equilibrium is described by the classical equations of hydrodynamics. However, the advent of quantum simulator platforms has made it possible to measure not only local expectation values, but also their full quantum statistics, fluctuations and space-time correlations. In this talk, I will discuss a theory of diffusive fluctuations in chaotic many-body quantum systems, and establish its validity in random unitary quantum circuits with charge conservation. I will also discuss exceptions to this conventional behavior in integrable quantum spin chains, as well as Dirac fluids as a result of Lorentz invariance and particle-hole symmetry. In particular, I will argue that charge noise in the hydrodynamic regime of Dirac fluids and of some two-component classical gases is parametrically enhanced relative to that in conventional diffusive metals.

Tuesday, March 11, 2025 11:00am - 12:00pm
Office Building West/Ground Floor/Heinzel Seminar Room

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.
Please find a schedule of the ISTA Shuttle on our webpage:
https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.