



Department of
Theoretical Physics

THE QUANTUM SPACETIME SEMINAR SERIES

From operator statistics to wormholes

(Zoom Seminar)

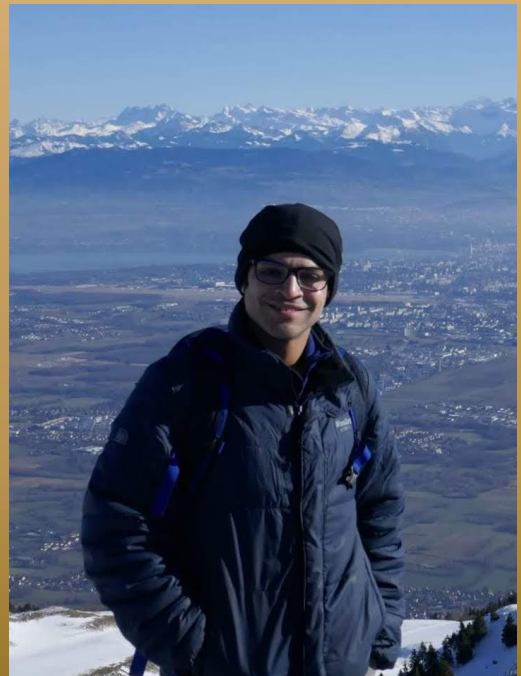
Pranjal Nayak

(U Geneva)

Date: July 26, 2021

Time: 2.30 pm IST

Zoom link shall be shared separately



For a generic quantum many-body system, the quantum ergodic regime is defined as the limit in which the spectrum of the system resembles that of a random matrix theory (RMT) in the corresponding symmetry class. In this talk I will discuss the time dependence of correlation functions of operators in the SYK model, in the ergodic limit as well as their approach to the ergodic limit which is controlled by non-universal massive modes. An effective field theory (EFT) corresponding to the causal symmetry and its breaking describes the ergodic phase. I will discuss the topological expansion of the resulting Goldstone-mode theory where the leading non-trivial topologies give rise to the universal ramp seen in correlation functions. Furthermore we analytically capture the plateau behaviour by taking into account the contribution of a second saddle point. These results explicitly establish the validity of the EFT description in the SYK-class of models, starting from their microscopic description. I will discuss the tower of massive modes above the Goldstone sector that govern how the ergodic EFT phase is approached and derive the relevant Thouless time scales.