



Indian Institute of Space Science and Technology

Valiamala, Thiruvananthapuram - 695 547, Kerala

AN INVITED TALK ON

TIGHT-BINDING MODEL SUBJECT TO CONDITIONAL RESETS AT RANDOM TIMES

Prof. Shamik Gupta

Department of Theoretical Physics

Tata Institute of Fundamental Research (TIFR), Mumbai



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(THURSDAY)



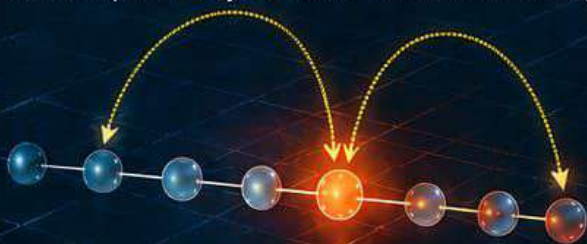
3:00 PM



C109
ID Block, IIST

THE TALK WILL DISCUSS ABOUT

the dynamics of a quantum system subjected to a time-dependent conditional resetting protocol, in which the system undergoes unitary evolution interrupted at random times by instantaneous resets to specified configurations. Using the one-dimensional tight-binding model, the talk will present analytical results for the probability distribution of a quantum particle over the lattice sites under both exponential and power-law resetting. It will highlight how exponential resetting leads to localization around the reset sites, while power-law resetting reveals that the existence of a stationary state depends crucially on whether the reset-time distribution has a finite or an infinite mean. The results provide new insights into the interplay between quantum dynamics and stochastic resetting.



ABOUT THE SPEAKER



Prof. Shamik Gupta is an Associate Professor in the Department of Theoretical Physics at the Tata Institute of Fundamental Research (TIFR), Mumbai. His research interests include nonequilibrium statistical mechanics, stochastic processes, stochastic resetting, quantum dynamics, synchronization, and long-range interacting systems.

Before joining TIFR, he held research positions at the Weizmann Institute of Science (Israel), École Normale Supérieure de Lyon (France), and LPTMS (France), and was a Visiting Scientist at the University of Florence (Italy) and the Max Planck Institute for the Physics of Complex Systems (Germany). He has also served as an Associate Professor in the Department of Physics of the Ramakrishna Mission Vivekananda Educational and Research Institute, Howrah.

He is the recipient of the Humboldt Research Fellowship, has been recognized as an IOP Emerging Talent, received the Journal of Physics A Best Paper Prize, and was named an IOP Trusted Reviewer 2025 by IOP Publishing, UK. He has made significant contributions to stochastic resetting, nonequilibrium statistical mechanics, and quantum many-body systems.