

QUANTUM HOMOGENIZATION IN NON-MARKOVIAN COLLISIONAL MODEL



Professor

Sibasish Ghosh

The Institute of Mathematical
Sciences, Chennai

8th December, 2022
Seminar Hall
03:00 PM

Organized by

Physics & Applied
Mathematics Unit



ABSTRACT

Collisional models are a category of microscopic framework designed to study open quantum systems. The framework involves a system sequentially interacting with a bath comprised of identically prepared units. In this regard, quantum homogenization is a process where the system state approaches the identically prepared state of bath unit in the asymptotic limit. Here, we study the homogenization process for qubits in the non-Markovian collisional model framework generated via additional bath-bath interaction. With partial swap operation as both system-bath and bath-bath unitary, we show that homogenization is achieved irrespective of the initial states of the system or bath units. This is reminiscent of the Markovian scenario, where partial swap is the unique operation for a universal quantum homogenizer. On the other hand, we observe that the rate of homogenization is slower than its Markovian counterpart. Interestingly, a different choice of bath-bath unitary speeds up the homogenization process but loses the universality being dependent on the initial states of the bath units. In our process, we found a regime of transition of non-Markovian dynamics to Markovian dynamics (and vice-versa).



All are cordially invited to
attend