# UNDERSTANDING PHYSICAL MIXING PROCESSES VIA TRANSFER OPERATOR APPROACH

YIWEI ZHANG

Industrial and chemical mixing processes of various kinds occur throughout nature and are vital in many technological applications.In the context of discrete dynamical systems, the transfer operator approach has been shown as a powerful tools from both theoretic and numerical viewpoint. In this talk, I will use a toy model (i.e., the one dimensional stretch and fold map) as an example to provide a brief introductionon the relationships between the spectral properties of the associated transfer operator and the estimations of the optimal mixing rate of the mixing process. Moreover, I will address how the optimal mixing rate varies according to the stretch and fold map has "cutting and shuffling" behaviour (i.e., composing with a permutation). If time permits, I will also talk about how to interpret this problem to the eigenvalue estimations for the Random bi-stochastic matrices (free probability theory) and the locations of poles of the dynamical zeta function.