

Seminar

Renormalisation Group for out-of-equilibrium classical field theories

Dhrubaditya Mitra

NORDITA, Sweden

Field theories for out-of-equilibrium classical systems encompass a broad range of problems, including turbulence and neuroscience. Beginning with the pioneering work of Martin, Siggia, and Rose in the 1970s, renormalisation group (RG) techniques were adapted to study such systems. Despite the remarkable success of RG in equilibrium statistical mechanics, its application to turbulence stalled for several decades.

In recent years, however, these methods have experienced a revival. In the mathematics community, they have been employed to address aspects of Hilbert's Sixth Problem in the context of wave turbulence. At the same time, non-perturbative RG techniques have been successfully applied to a variety of non-equilibrium systems.

After a brief overview of the fundamental ideas underlying these techniques and their recent developments, I will present two problems in which we have made progress: one arising in neuroscience and the other in turbulence. I will end with present and future challenges.

Friday, Aug 21st 2026

14:30 Hrs (Tea / Coffee 14:15 Hrs)

Seminar Hall, TIFRH