Seminar

Mode coupling theory for the weakly driven systems

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To study fluctuations in the interacting systems that are driven out of equilibrium by weak forces we develop a mesoscale mode coupling theory (MMCT) that allows for probing the crossover between different dynamical universality classes. After discussing the main assumptions underlying mode coupling for nonlinear fluctuating hydrodynamics we consider in detail the crossover from the super diffusive Kardar-Parisi-Zhang (KPZ) universality to the diffusive Edwards-Wilkinson (EW) universality class. At the crossover point the dynamical structure function depends on mesoscopic scale on two scaling variables and converges at macroscopic scale to the conventional mode coupling approximation of KPZ universality. This predicted fluctuation pattern confirms long-standing conjectures for $\kappa=1/2$ and is in agreement with mathematically rigorous results for $\kappa>1/2$ despite the numerous uncontrolled approximations on which mode coupling theory is based.

Friday, Dec 15th 2023

2:30 PM (Tea / Coffee 2.15 PM)

Seminar Hall, TIFR-H