

Seminar

Particles on Demand: Kinetic Theory and Data Interpolation

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The lattice Boltzmann model (LBM) aims to construct the simplified kinetic picture on a lattice designed to capture the physics of macroscopic flow through simple local microscale operations. This highly efficient and easily parallelizable method is routinely used as an alternative numerical method for a wide range of applications. The entropic formulation of LBM ensures the numerical stability of a hydrodynamic solver by insisting on adherence to the second law of thermodynamics at the discrete time level.

I will briefly review this method in the context of discrete time and space kinetic theory. Finally, I will show that the problem of reconstructing a function from the discrete data-set is equivalent to obtaining thermodynamic description from the particle dynamics. This is the standard problem in the statistical mechanics. We will show that in the limit of the small system (a few numbers of particles) this problem is mapped to entropic lattice Boltzmann. We will use this analogy to propose a new class of solvers for partial differential equations.

Tuesday, May 7th 2019

4:00 PM (Tea/Coffee at 3:30 PM)

Auditorium, TIFR-H