ESI Erwin Schrödinger International Institute for Mathematical Physics

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DVR 0065528

Lectures

Prof. Sauro Succi

IAC-CNR, Rome

A crash-course on lattice Boltzmann (in his own city!)

May 31 and June 3, 2013 / 10:30 - 12:00

at Boltzmann Lecture Hall

Abstract: The lattice Boltzmann equation (LBE) is a minimal form of Boltzmann kinetic equation, which is meant to simulate the dynamic behaviour of fluid flows without directly solving the equations of continuum fluid mechanics. Instead, macroscopic fluid behavior emerges from the underlying dynamics of a fictitious ensemble of particles, whose interactions are confined to a regular space-time lattice with sufficient symmetry to ensure the correct macroscopic conservation laws. Initially intended as an alternative to discretization of the Navier-Stokes equations of continuum fluid mechanics, in the last decade the LBE has demonstrated an amazing capability of straddling across a broad range of scales of fluid motion, ranging from fully developed turbulence, all the way down to nanoscopic flows of biological interest and, more recently, relativistic flows

In this series of lectures, we shall expound the basic notions behind LB theories, and, as time allows, also discuss selected applications, such as the the rheology of soft-glassy materials and multiscale hemodynamics.

”The Lattice Boltzmann Equation for Fluid Dynamics and Beyond”. Oxford University Press. ISBN 0198503989, (2001).

Joachim Schwermer

May 27, 2013