

Department of Mathematics

University of Houston

Scientific Computing Seminar

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The University of Texas at Austin

Conservative spectral methods for solving the Boltzmann transport equation, and the grazing limit from Boltzmann to Fokker-Planck-Landau

Thursday, April 18, 2013

3:00 PM- 4:00 PM

Room 646 PGH

Abstract:

The Boltzmann transport equation models the dynamics of a dilute gas of particles that are not in thermodynamic equilibrium. The main difficulty in numerically simulating this equation is the collisional term, which takes the form of a high-dimensional, nonlinear, nonlocal integral operator. Recent developments working with the Fourier representation of the operator can compute this term to high accuracy while reducing the computational cost to a manageable amount of time. In addition, this formulation is very suitable for parallelization, and I will present results investigating the scaling of the method to massively parallel systems. I will also present new numerical and analytical results studying the rate of convergence of the grazing collisions (Landau-Fokker-Planck) limit of plasma physics.

* This is joint work with Irene Gamba (Texas) and Thierry Magin and Alessandro Munafò (Von Karman Institute).

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.