Einladung zum
Würzburger Mathematischen Kolloquium

Julius-Maximilians-Universität Würzburg • Fakultät für Mathematik und Informatik

Shi Jin

University of Wisconsin, Madison, USA *and* Shanghai Jiao Tong University, China

Uncertainty quantification for multiscale kinetic equations

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Raum SE 40, Mathematik Ost, Emil-Fischer-Str. 40, Campus Hubland-Nord

Inhaltsangabe:

In this talk we will study kinetic equations with multiple scales and random uncertainties from initial data and/or collision kernel. Here the multiple scales, characterized by the Knudsen number, will lead the kinetic equations to hydrodynamic (Euler, incompressible Navier-Stokes or diffusion) equations as the Knudsen number goes to zero. Asymptotic-preserving schemes, which mimic the asymptotic transitions from the microscopic to the macroscopic scales at the discrete level, have been shown to be effective to deal with multi-scale problems in the deterministic setting.

We first extend the paradigm of asymptotic-preserving schemes to the random kinetic equations, and show how it can be constructed in the setting of the stochastic Galerkin approximations. We then extend the hypocoercivity theory, developed for deterministic kinetic equations, to the random case, and establish in the random space regularity, long-time sensitivity analysis, and uniform (in Knudsen number) spectral convergence of the stochastic Galerkin methods, for general linear and nonlinear random kinetic equations in various asymptotic–including the diffusion, incompressible Navier-Stokes, high-field, and acoustic regimes.

www.mathematik.uni-wuerzburg.de/kolloquium.html

Zu diesem Vortrag laden wir Sie herzlich ein.
Im Anschluss an den Vortrag stehen Kaffee und Tee im Foyer vor dem SE 40 bereit.

Die Dozentinnen und Dozenten der Mathematik