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DK Seminar

December 3, 2014, 13:45 - 15:00

TU Wien, Freihaus, green area, 4th floor, SEM 101C

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Hypocoercivity for a linearized multi-species Boltzmann system

In this talk I will present our recent work concerning the evolution of an ideal gas mixture of chemically non-reacting mono-atomic multi-species particles, which can be modeled by a system of linearized Boltzmann equations. For this system we proved exponential convergence towards global equilibrium with explicit rate in the case of hard or Maxwellian potentials with Grad's angular cut-off assumption. This convergence is achieved by an interplay between dissipative collision operator versus conservative transport operator by using the hypocoercivity method of Mouhot and Neumann [1].

Starting from the homogeneous linearized Boltzmann equation for a single-species gas I will show step-by-step how spectral gap estimates and hypocoercivity techniques can be used to prove exponential decay. Finally I will discuss the essential problems in the case of multi-species mixtures and how to overcome these problems.

[1] C. Mouhot and L. Neumann. Quantitative perturbative study of convergence to equilibrium for collisional kinetic models in the torus. *Nonlinearity* 19 (2006), 969-998.