

Stefan and Adele Bergman Memorial Lecture

Tuesday, April 23th 4:30 – 5:30 p.m.

Math Department Sloan Hall, Room 380F



“Kinetic multi-component gas system models”

Professor Irene Gamba, University of Texas at Austin

The lecture will focus on the mathematics of particle systems for mixtures of monoatomic gases with different masses, derived from a statistical flows framework known as kinetic theory of gases.

Single component elastic gas models were introduced by L. Boltzmann and J.C. Maxwell in the last quarter of the nineteenth century giving rise to the mathematical physics theory of thermodynamics by means of statistical mechanics.

Nowadays, the Boltzmann model for the irreversible evolution of probability distribution densities has become a benchmark that can handle random particle interactions modeled by nonlocal multilinear forms modeling ‘mixing’ of their states.

The collision or interaction law, as much as the modeling of the transition probability rates modeled by a quantification of differential cross section for pairwise interactions are crucial components in the dynamics.

We will present some recent rigorous properties developed for the multi-component gas system described by coupled Boltzmann equations corresponding to the dynamics of elastic mixing of particles characterized by their identical shapes (spheres) but different masses.