Meeting: 1002, Pittsburgh, Pennsylvania, SS 4A, Special Session on Partial Differential Equations and Applications

1002-35-246 **Irene M. Gamba*** (gamba@math.utexas.edu), Department of Mathematics, The University of Texas at Austin, Austin, Texas 78712. *High energy tails for energy dissipative Boltzmann equations.*

We have recently derived a sharper Povzner type estimates which essentially provides control of the gain operator for classical bilineal collisional integral forms for hard spheres with rather general differential cross sections. This estimate provides the tool, combined with recent maximum principle for this homogeneous Boltzmann type of equations and analysis of the Carleman representation of the gain operator, to obtain pointwise bounds smooth solutions of these type of Boltzmann equations by integrable functions with exponential decay slower than classical Gaussians distributions. The decay exponent depends only on the balance between the forced term and the loss operator corresponding to the problem under consideration. Our techniques work for a wide class of integral collisional forms for homogeneous transport equations heated by forces such as shear, random or homogeneous cooling states (self-similarity). In addition, we point out the differences in terms of high energy tail behavior between Maxwell molecules and variable hard spheres models for self-similar energy dissipative collisional flows. The former exhibit decay given by a power law, while the latter remains exponential.

This work reflects a series of recent developments in collaboration with Carlo Cercignani, Alexandre Bobylev, Vladislav Panferov, and Cedric Villani. (Received September 20, 2004)