

1123-76-35

Rafail V Abramov* (abramov@math.uic.edu), 322 Science and Engineering Offices (M/C 249),
851 S. Morgan st., Chicago, IL 60607. *Diffusive Boltzmann equation and its fluid dynamics.*

We develop a diffusive modification of the Boltzmann equation. The corresponding diffusive fluid dynamics equations are then obtained in a standard way by closing the hierarchy of the moment equations using either the Euler, Navier-Stokes, or the Grad closure. In the numerical experiments with the Couette flow, we discover that the diffusive fluid dynamics equations may exhibit Knudsen-like velocity boundary layers. Additionally, we find that the diffusive Grad equations capture the heat flux component parallel to the direction of the flow, which is missing in the conventional fluid dynamics equations. We compare the simulations with the corresponding Direct Simulation Monte Carlo (DSMC) results. (Received August 04, 2016)