1058-65-295 **Alexander Alekseenko*** (alexander.alekseenko@csun.edu), Department of Mathematics, Cal. State University Nortridge, 18111 Nordhoff St., Northridge, CA 91330. *Application of Discontinuous Galerkin Methods to Kinetic Problems with Gas-Surface Interaction.* Preliminary report.

Gas flows in micro and nano-devices, high-speed flows and high-altitude flight, are known to deviate from thermodynamic equilibrium, that is the distributions of molecular velocities in these flows differ significantly from the Maxwellian distribution. Non-equilibrium flows exhibit many peculiar gas-surface interaction features, including velocity slip, temperature jump, thermal creep, and viscous heating. These features are often undesirable as they may interfere with device operation, and their inaccurate estimation may lead to unexpected device failures. In some instances, however, the principle of operation of a novel device may be based on non-equilibrium effects. For example, the action of a Knudsen compressor is based on the effect of thermal creep. Accurate modeling of gas-surface interaction is difficult. Numerical methods often lose of accuracy when surface effects are strong. The difficulty seems to be the weak regularity of the solution in the so-called Knudsen layer next to the surface. We are interested in the design of methods that can capture the discontinuity in the solution without losing high order convergence. We consider applications of discontinuous Galerkin methods to the solution of problems with gas-surface interactions. (Received February 17, 2010)