Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Thermal transpiration of a rarefied gas between parallel plates with different accommodation coefficients TOSHIYUKI DOI, Department of Applied Mathematics and Physics, Tottori University — Thermal transpiration of a rarefied gas between parallel plates with different accommodation coefficients is studied on the basis of the linearized Boltzmann equation for a hard sphere molecular gas. The Boltzmann equation is solved numerically using a finite difference method. The macroscopic variables as well as the mass flow rate of the gas are studied over a wide range of the Knudsen number (the mean free path divided by the channel width) and the two accommodation coefficients. When the Knudsen number is not so small, the mass flow rate of the gas increases as the accommodation coefficients decrease. When the Knudsen number is sufficiently small, however, the tendency is opposite and the mass flow rate basically decreases as the accommodation coefficients decrease. The solution for infinitesimally small accommodation coefficients is also discussed.

Toshiyuki Doi
Department of Applied Mathematics and Physics, Tottori University

Date submitted: 02 Aug 2013 Electronic form version 1.4