

Abstract Submitted  
for the DFD14 Meeting of  
The American Physical Society

**Generalized slip-flow theory and its related Knudsen-layer analysis for a slightly rarefied gas I**<sup>1</sup> MASANARI HATTORI, Department of Mechanical Engineering and Science, Kyoto University, Kyoto 615-8540, Japan, SHIGERU TAKATA, Department of Aeronautics and Astronautics & Advanced Research Institute of Fluid Science and Engineering, Kyoto University, Kyoto 615-8540, Japan — A systematic asymptotic analysis of the Boltzmann equation shows that the overall behavior of a gas can be described by fluid-dynamic-type equations with the appropriate slip/jump boundary condition when the Knudsen number is small [the generalized slip-flow theory (Sone, *Molecular Gas Dynamics*, 2007)]. Near the boundary, a non-fluid-dynamic correction (the Knudsen-layer correction) to the overall solution is required. Although the generalized slip-flow theory has been established up to the second order of the Knudsen number expansion, the data of those corrections have been completed only for the BGK model. Completing the corresponding data for the original Boltzmann equation has been demanded. In the present work, partial results of completing the data for a hard-sphere gas under the diffuse reflection condition are reported.

<sup>1</sup>The present work is supported by JSPS KAKENHI Grant Numbers 23360083 and 13J01011.

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Date submitted: 30 Jul 2014

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