Abstract Submitted for the DFD07 Meeting of The American Physical Society

Convergence Behavior of Bird's Sophisticated DSMC Algorithm M.A. GALLIS, J.R. TORCZYNSKI, D.J. RADER, Sandia National Laboratories — Bird's standard Direct Simulation Monte Carlo (DSMC) algorithm has remained almost unchanged since the mid-1970s. Recently, Bird developed a new DSMC algorithm, termed "sophisticated DSMC", which significantly modifies the way molecules both move and collide. The sophisticated DSMC algorithm is implemented in a one-dimensional DSMC code, and its convergence behavior is investigated for onedimensional Fourier flow, where an argon-like hard-sphere gas is confined between two parallel, motionless, fully accommodating walls with unequal temperatures. As in previous work, the primary convergence metric is the ratio of the DSMCcalculated thermal conductivity to the theoretical value. The convergence behavior of sophisticated DSMC is compared to that of standard DSMC and to the predictions of Green-Kubo theory. The sophisticated algorithm significantly reduces the computational resources needed to maintain a fixed level of accuracy. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Date submitted: 06 Jul 2007

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