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Erratum: "Cell size dependence of transport coefficients in stochastic particle algorithms"

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ERRATA

Erratum: ''Cell size dependence of transport coefficients in stochastic particle algorithms'' [Phys. Fluids 10, 1540 (1998)]

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Our original paper[1] uses Green–Kubo analysis to obtain the dependence of viscosity and thermal conductivity on cell size in stochastic particle algorithms such as direct simulation Monte Carlo (DSMC). Repeating the calculation of the integrals over collision angles, we find that $\langle(\Delta^c u_i)^2\rangle = \frac{4}{3}kT/m$ (this value was incorrectly given as $\frac{8}{9}kT/m$). This correction affects only two equations in Ref. 1, specifically Eq. (6) should read

$$\eta^P = \tfrac{1}{9} m\Gamma L_y^2$$

and Eq. (8) should read

$$\eta = \frac{5}{16\sigma^2}\sqrt{\frac{mkT}{\pi}}\left(1+\frac{16}{45\pi}\frac{L_y^2}{\lambda^2}\right).$$

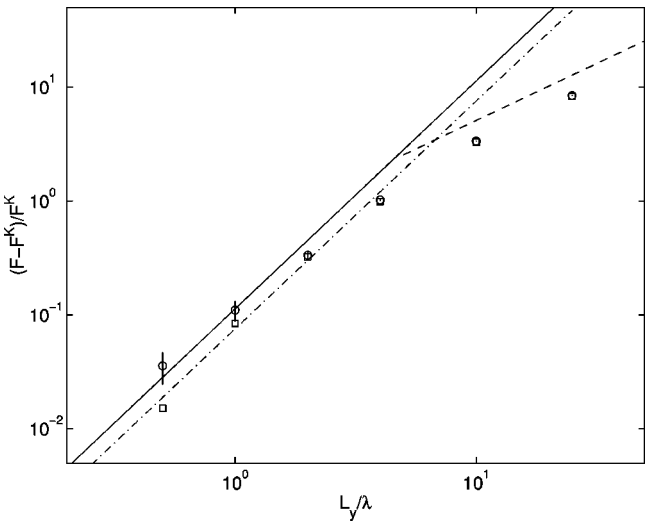

FIG. 1. Normalized transverse momentum flux versus cell size in Couette flow. The solid and dot-dashed lines are the corrected and original Green–Kubo expressions, respectively; the dashed line is the free-molecule limit. The circles and squares are from new and original DSMC simulation data, respectively.

Figure 1 shown here is similar to Fig. 1 in Ref. 1 but with both the original and corrected expressions. New DSMC simulations, similar to those described in Ref. 1, were performed. Compared with the original runs, the new simulations used five times as many particles, ran for four times as many time steps, and had half the applied shear (reducing the viscous heating by a factor of 4). Given that the error bars for the original data are about 50% larger than those shown for the new data, both sets of data are in good agreement with the Green–Kubo result.

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[1]F. J. Alexander, A. L. Garcia, and B. J. Alder, ''Cell size dependence of transport coefficients in stochastic particle algorithms,'' Phys. Fluids **10**, 1540 (1998).

