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Slow viscous flow of two particles in a cylindrical tube XIN YAO, TECK NENG WONG, - MARCOS, Nanyang Technological University — The slow viscous flow around two particles in a cylindrical tube is obtained theoretically. We employ the Lamb's general solution based on spherical harmonics and cylindrical harmonics to solve the flow field around the particles and the flow within the tube, respectively. We compute the drag and torque coefficients of the particles which are dependent on the distance among the cylinder wall and the two particles. The hydrodynamic forces are also a function of particle velocities and background velocity. Our results are in agreement with the existing theory of a single particle traveling in the tube when the distance between the two particles increases. We found that particle-particle interactions can be neglected when the separation distance is three times larger than the sum of particles radii. Furthermore, such analysis can give us insights to understand the mechanisms of collision and aggregation of particles.

Xin Yao
Nanyang Technological University

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