

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Stokesian flow around a slip-particle of an arbitrary shape

SERGEY SENCHENKO, HUAN J. KEH, National Taiwan University — The Stokes relations for a rigid slightly deformed sphere in an unbounded Stokesian flow are generalized to the case where the surrounding fluid may slip at the surface of the particle (e.g. aerosol particle). To the first order in the small parameter characterizing the deformation, explicit expressions are derived for the hydrodynamic force and torque on the particle. It is demonstrated that these expressions can be derived solely from a knowledge of the solutions of the Stokes equations for the cases where the sphere is held stationary in a flow field which is uniform or pure rotational, respectively. The resulting formulas and flow disturbances are compared with the classical results for a no-slip rigid spherical particle and an axisymmetrical slip – surface particle.

Sergey Senchenko
National Taiwan University

Date submitted: 09 Aug 2005

Electronic form version 1.4