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Drag coefficient of an electrophoretic colloidal particle KATHRYN REDDY, Fordham University, MING-TZO WEI, Lehigh University, JOEL A. COHEN, University of the Pacific, H. DANIEL OU-YANG, Lehigh University — Electrophoretic mobility is a measure to determine the electric charges on a colloidal particle. Zeta potential, a concept originated by Smoluchowski, has been a standard for quantifying the surface charge density for the electric double-layers that are thin compared to the particle radius. Various models have been suggested to improve Smoluchowski's theory for systems with Debye length not thin compared to the particle radius. Central to the issue is that the fluid flow due to the external field-induced counter-ion motion is unknown. Using optical tweezers to trap a colloidal particle in a low-frequency electric field, we found the drag coefficient of the particle in the field to be non-Stokes. We discuss how the non-Stokes' drag coefficient as a function of salt concentration and particle size may be useful for interpreting different models of Zeta potential.

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