

Abstract Submitted  
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**DC electrokinetic transport of a cylindrical particle in a rectangular microchannel**<sup>1</sup> YE AI, Department of Aerospace Engineering, Old Dominion University, SANG W. JOO, School of Mechanical Engineering, Yeungnam University, ALI BESKOK, SHIZHI QIAN, Department of Aerospace Engineering, Old Dominion University — Electrokinetic transport of a cylindrical microparticle in a straight microchannel under direct current (DC) electric fields is numerically and experimentally investigated. DC dielectrophoresis (DEP) is taken into account in the proposed mathematical model, which is composed of the Navier-Stokes equations for the flow field and the Laplace equation for the electric field solved in an arbitrary Lagrangian-Eulerian (ALE) framework. Cylindrical particles experience an oscillatory motion under low electric fields. As the electric field increases, the induced DEP force acting on the particle gradually diminishes the oscillatory motion. Once the electric field is larger than a certain threshold value, the particle only translates with its axis parallel to the applied electric field after a short oscillatory motion. The numerical predictions are in good agreement with the experimental results.

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