

Abstract Submitted
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Effect of the Double Layer on the Dielectrophoretic Motion of Particles T.N. SWAMINATHAN, HOWARD HU, University of Pennsylvania — Most suspensions involve the formation of ionic double layers next to the surface of particles. The double layer formed due to the induced-charge on the particle affects its motion even under sinusoidal electric fields through a phenomenon termed as induced-charge electro-osmosis. A method to numerically evaluate the effect of the double layer on the dielectrophoretic motion of particles has been developed. The technique, developed herein, involves a matched asymptotic expansion of the electric field near the particle surface, where the double layer is formed, and is written as a jump-boundary-condition for the electric potential when the thickness of the double layer is small compared to the size of the particle. The developed jump-boundary-condition is amenable to numerical evaluation and has been implemented in an Arbitrary Lagrangian Eulerian based finite element scheme using a discontinuous Galerkin method which naturally permits for such discontinuous boundary conditions in its formulation. The effect of the induced-charge electro-osmosis on the dielectrophoretic motion of particles has been observed using this technique.

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