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The Influence of Asymmetric Rectified Electric Fields on Particle Aggregation Near Electrodes TIMOTHY HUI, S. M. H. HASHEMI AMREI, GREGORY H. MILLER, WILLIAM D. RISTENPART, University of California, Davis — Micron-scale particles near an electrode with an applied oscillatory field either aggregate or separate laterally, depending on the identity of the electrolyte. Although electrically induced fluid flows are believed to drive the aggregation, to date predictive models have failed to capture the behavior universally for a wide variety of electrolytes. Here, we assess the role of Asymmetric Rectified Electric Fields (AREFs), which are steady fields induced by an oscillatory potential that occur whenever there is mismatch in the electrolyte mobilities. We demonstrate that including the influence of AREFs on the electroosmotic flow induced on the particle and the electrode surface by the applied oscillatory potential yields a prediction for particle behavior that accords with experimental observations. The results suggest that AREFs play an important role in governing the electrokinetic behavior of systems with applied oscillatory fields.

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