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Drop pair dynamics in a uniform electric field¹ PETIA VLAHOVSKA, Northwestern University, CHIARA SORGENTONE, KTH, JEREMY KACH, ADITYA KHAIR, LYNN WALKER, Carnegie Mellon University — We present a theoretical study of drop pair-wise interactions in an applied uniform DC electric field based the leaky dielectric model. We develop three-dimensional numerical simulations using the boundary integral method and an analytical theory assuming small drop deformations. We apply the simulations and the theory to explore the electrohydrodynamic interactions between two identical drops with arbitrary orientation of the their line of centers relative to the applied field direction. Our results show complex dynamics depending on the conductivities and permittivities of the drops and suspending fluids, and the initial drop pair alignment with the applied electric field.

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