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Electrokinetic Traveling Waves in Non-Dilute Colloidal Dispersions[1] CARLOS PEREZ, Mechanical Engineering, Arizona State University, JONATHAN POSNER, Mechanical Engineering, Chemical Engineering, Arizona State University — The existence of electrokinetically-driven, traveling waves in colloidal dispersions is presented. A non-dilute colloidal dispersion of 2 micron polystyrene microspheres are exposed to an ac electric field. Traveling waves consist of alternating regions of compressed and rarefied particle volume fraction that propagate through the dispersion parallel to the applied field. Colloids under the application of these ac fields have no net displacement, yet the travelling waves propagate at speeds at a tenth of the RMS electrophoretic velocity of individual particles. The collective dynamics of the colloids are described by the one dimensional, inviscid Burgers' equation. The waves originate from the modification of the colloid velocity due to the mobility's dependence on the local volume fraction and the particle electrokinetic polarization dipole interactions. The Burgers' equation analysis is used to predict the wave speed of the traveling waves.

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