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Dynamics of field-driven colloids

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External electric fields modify inter-particle colloidal interactions and the resulting “electrorheological” structures are well documented [1]. However, the dynamics of colloids in the presence of these external fields is less studied [2].

In this work, the dynamics of colloids is reported in three regimes. At high frequencies, inter-particle dipolar interactions dominate. At intermediate frequencies, polarization charge effects are dominant. Finally, at very low frequencies, the primary interactions are electrophoretic. Regimes of both normal and anomalous diffusion are observed. A direct correlation can be made between the dynamics and the nature of the structures formed.

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