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Measuring colloidal charges in low polar media from statistics of particle trajectories DANIEL EVANS, ANDREW HOLLINGSWORTH, DAVID GRIER, Department of Physics and Center for Soft Matter Research, New York University — We present a method for characterizing the surface charge on a pair of interacting poly(methylmethacrylate) spheres suspended in low polar media. This system does not rely on charge-stabilizing agents such as the well-known AOT or OLOA dispersants. The spheres undergo an overdamped thermal motion measured at millisecond time intervals with blinking optical tweezers and a high-speed camera. By examining particle trajectory statistics with kernel density estimators, we can calculate the drift velocity, diffusivity and hence the force as a function of particle separation. This interaction exhibits the characteristics of a screened-Coulomb force on the piconewton scale. These measurements imply a particle charge distribution much broader than that observed in aqueous dispersions of monodisperse spheres. Implications of this polydispersity for charge-stabilized colloidal crystals will be discussed.

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