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## **Electro-kinetic measurements on weakly to non-interacting suspensions of charged spheres**

We have measured the concentration dependence of the electrophoretic mobility of charged spheres suspended in deionized water in the volume fraction range of  $0.01 > \Phi > 10^{-4}$ . Upon dilution the initially fluid-like ordered suspension lost all order. We analyzed the power spectrum obtained in a low angle super-heterodyne Doppler velocimetric experiment. Use of low angles ensures the dominance of the polydispersity induced incoherent spectral contribution corresponding to the self-part of the van-Hove space time correlation function. Obtained signals therefore are independent of the suspension structure. Further we employed an integral measurement yielding the complete velocity distribution at mid height of a electro-kinetic tube cell with rectangular cross section. This allowed to evaluate for both electrophoretic velocities of the particles and electro-osmotic velocities of the solvent adjacent to the cell wall. Previous experiments had already shown a theoretically unexpected decrease of the particle mobility with decreasing particle concentration [1-4]. In our contribution we present new and more comprehensive data. From the comparison of the differences in the observed mobilities of particles and at the cell wall we infer that v. Smoluchowski's treatment of electrophoresis and electro-osmosis on equal footings does not hold in our case. Possible solutions for this behaviour are suggested. A full theoretical treatment, however is still desired.

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