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A DC electrophoresis method for determining electrophoretic mobility through the pressure driven negation of electro osmosis PASCAL KARAM, SUMITA PENNATHUR, University of California, Santa Barbara — Characterization of the electrophoretic mobility and zeta potential of micro and nanoparticles is important for assessing properties such as stability, charge and size. In electrophoretic techniques for such characterization, the bulk fluid motion due to the interaction between the fluid and the charged surface must be accounted for. Unlike current industrial systems which rely on DLS and oscillating potentials to mitigate electroosmotic flow (EOF), we propose a simple alternative electrophoretic method for optically determining electrophoretic mobility using a DC electric fields. Specifically, we create a system where an adverse pressure gradient counters EOF, and design the geometry of the channel so that the flow profile of the pressure driven flow matches that of the EOF in large regions of the channel (ie. where we observe particle flow). Our specific COMSOL-optimized geometry is two large cross sectional areas adjacent to a central, high aspect ratio channel. We show that this effectively removes EOF from a large region of the channel and allows for the accurate optical characterization of electrophoretic particle mobility, no matter the wall charge or particle size.

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