

Abstract Submitted  
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**Velocity field measurements of electrokinetic flow past a conductive cylinder**<sup>1</sup> CETIN CANPOLAT, ALI BESKOK, Old Dominion University — Using the micro particle-image-velocimetry technique, electrokinetic (EK) flow past a conductive circular cylinder ( $D=0.67$  mm) is measured in a rectangular cross-section PDMS/glass microchannel ( $H=0.1$  mm,  $W=1.0$  mm and  $L=5.3$  mm). EK transport in such a system experiences electrophoresis (EP) of the PIV particles, electroosmotic flow (EOF) due to the channel walls, and induced charge electroosmotic (ICEO) flow due to the conductive cylinder. Experiments are conducted using 1xPBS buffer diluted in DI water, and the buffer pH is fixed at 2.05 using HCl solution. This pH value is shown to nearly eliminate the electrophoresis of 0.5 micron carboxylate modified spherical micro-particles used in the PIV studies. Suppression of EP enabled direct measurements of local ICEO flow and its interaction with the global EOF in the channel. By systematically varying the applied electric field from 5 V to 40 V, changes in the velocity field are recorded and correlated with the theoretical trends of EOF and ICEO flow.

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