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Measurements of Induced-Charge Electroosmotic Flow Around a Metallic Rod ALI BESKOK, CETIN CANPOLAT, Old Dominion University — A cylindrical gold-coated stainless steel rod was positioned at the center of a straight microchannel connecting two fluid reservoirs on either end. The microchannel was filled with 1 mM KCl containing 0.5 micron diameter carboxylate-modified spherical particles. Induced-charge electro-osmotic (ICEO) flow occurred around the metallic rod under a sinusoidal AC electric field applied using two platinum electrodes. The ICEO flows around the metallic rod were measured using micro particle image velocimetry (micro-PIV) technique as functions of the AC electric field strength and frequency. The present study provides experimental data about ICEO flow in the weakly nonlinear limit of thin double layers, in which, the charging dynamics of the double layer cannot be presented analytically. Flow around the rod is quadrupolar, driving liquid towards the rod along the electric field and forcing it away from the rod in the direction perpendicular to the imposed electric field. The measured ICEO flow velocity is proportional to the square of the electric field strength, and depends on the applied AC frequency.

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