Experimental Results of Electrothermal Vortex in Parallel ITO-glass With High Conductivity Medium and AC electric field and Laser

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In many previous works, diverse experiments about Electrothermal Vortex were done because ac dc electrokinetic manipulation of particles became an important research area and Electrothermal Vortex is a major part of the electrokinetics. Especially in this work, however, Electrothermal Vortex was observed in parallel two ITO-glass with high conductivity medium (the medium was potassium chloride (KCl)). Because of high conductivity of potassium chloride and micro characteristic length scale of ITO-glass, effect of joule heating is significant. Then, this influences on Electrothermal Vortex. In addition, the previous works were done by complicated form of electrodes in order to make non-uniform electric fields. Making theses electrode shape is too fastidious to do readily, while our work is very simple so that it is proper to any type of applications. According to Peak-to-Peak voltage, Frequency, and Laser power, we measured shape and velocity of Electrothermal Vortex, Basically, Electrothermal Vortex was not related with AC frequency, but was proportional to Peak-to-Peak voltage and Laser power.

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