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Flow-regulated dielectrophoretic manipulation of submicron particles HSIEN-HUNG WEI, MENG-JUAN LEE, National Cheng Kung University — The motion of submicron particles under the condition of simultaneous flow and dielectrophoresis (DEP) is investigated experimentally using a microfluidic approach. Experiments are conducted within a PDMS microchannel integrated with arrays of castellated microelectrodes. Submicron latex particles are suspended in an electrolyte aqueous solution. The response of dielectrophoretic particle motion to the change in the dielectric properties is carried out using different electrolyte concentrations. Results show that particle aggregation patterns are different from those of conventional DEP. Various new patterns of particle aggregation are identified, depending on the flow rate, the frequency of an applied electric field and the electrolyte conductivity. A scaling analysis is devised to explain the effects at work in accordance with experimental observations. The study provides new strategies for manipulating submicron particles in a continuous manner. This research is supported by Grant NSC 94-2214-E-006-008 of the National Science Council of Taiwan.

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