

**EXPLOITING EXTREMELY LOW FREQUENCY
ALTERING CURRENTS FOR DIELECTROPHORESIS
PARTICLE FOCUSING PURPOSES**

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The crucial component for numerous microfluidic particle-handling devices is the ability to control and manipulate the particles within the microchannels for focusing purposes. The electric field is the method of choice in these devices because of precise transport and placement of particles via fluid electroosmosis and particle electrophoresis. Insulator-based dielectrophoresis devices have been exploited for the passive focusing of particles in ratchet microchannels via direct current. It has been demonstrated that increasing the number of insulators in such a device, will result in a better focusing, since the particle exposure to DEP force is increased. In this work, we explore the possibility of expanding this exposure via extremely low frequency (ELF) alternating current, instead of the conventional direct current. In other words, instead of increasing the number of insulators and hence the length of the channel, we use ELF to pass the particles through the same insulator multiple times. Moreover, various parameters and their effect of this technique have been investigated experimentally and numerically.

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