Separation of polydisperse charged microparticles in air in an electrodynamic linear trap

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The size separation of polydisperse mixture of solid particles is of particular interest in research. The identity of the particle size parameters of such mixtures can in some cases significantly improve the technology or create an entirely new process or substance. Since in vivo particles almost always have some charge, there is a steadily growing interest in new devices that allow size separation of large numbers of charged particles at atmospheric pressure in air. An electrodynamic Paul trap provides confinement for several thousand charged particles. The retention of particles in such a trap depends largely on the trap parameters, frequency and amplitude of the voltage at the electrodes, and the charge-to-mass ratio of the particles. The paper presents the results of separation of a polydisperse mixture of charged dielectric microparticles using a linear electrodynamic quadrupole trap in air at atmospheric pressure. The amplitude of the alternating voltage at the trap electrodes is chosen as a variable parameter. The separation of a polydisperse mixture of induction-charged aluminium oxide microparticles in air using a Paul linear quadrupole trap by varying the voltage on the linear electrodes is demonstrated experimentally.