

## Electronic Supplementary Information

# Electrokinetic Deterministic Lateral Displacement for fractionation of vesicles and nano-particles

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## Parameters for the Clausius-Mossotti factor

Table S1. Parameters used for the calculations of the Clausius-Mossotti factor calculations.

Extruded Lipid Vesicles		
Parameter	Symbol	Value
Lipid membrane permittivity	$\epsilon_{mem}$	$10\epsilon_0$
Medium permittivity	$\epsilon_m$	$80\epsilon_0$
Internal diameter	$d_1$	160 nm
External diameter	$d_2$	164 nm
Medium conductivity	$\sigma_m$	105 mS/m    690 mS/m
Internal conductivity	$\sigma_{int}$	105 mS/m    690 mS/m
Membrane conductance	$K_s$	1 nS
Polystyrene Particles		
Parameter	Symbol	Value
Medium permittivity	$\epsilon_m$	$80\epsilon_0$
Medium conductivity	$\sigma_m$	105 mS/m    690 mS/m
Particle permittivity	$\epsilon_p$	$2.5\epsilon_0$
Particle conductance	$K_s$	1 nS
Particle radius	$a$	100 nm    200 nm    500 nm

Using the values shown in Table S1, we computed the CM factor using a model for solid dielectric spheres for the case of the polystyrene particles and a single shell model for the vesicles.

## Lateral displacement as a function of fluorescent intensity

The large polydispersity in the population of extruded lipid vesicles shown in Figure 3 explains the large particle distribution observed at the end of the channel as shown in Figure 7.

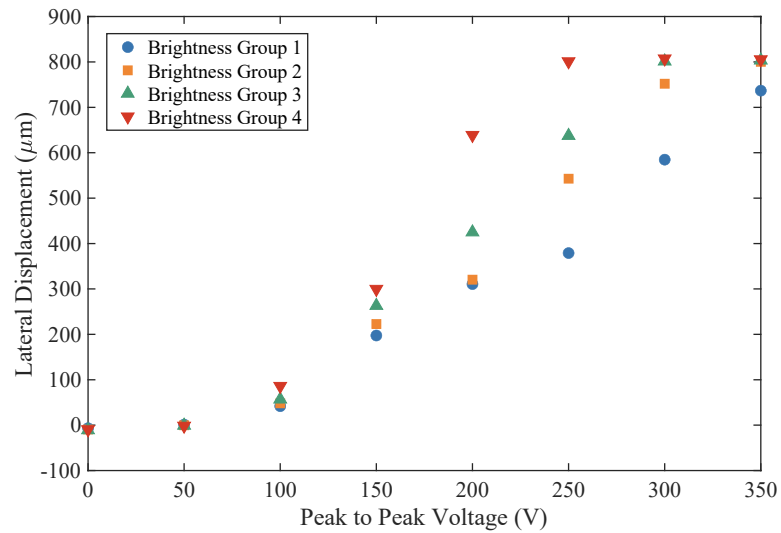


Figure S1. Median particle deflection as a function of the applied voltage when dividing the sample of 400 nm extruded lipid vesicles in four groups depending on their relative brightness. Each group contains the same population. As discussed in the main text, the fluorescent brightness of the particles should correlate with the actual particle size.

In order to correlate the degree of deflection at the end of the channel with the relative size of the vesicles, the normalised fluorescent intensity of each particle was assigned to one of four different bins. This assumes that the brighter particles have a larger diameter as explained in the main text. Each bin has the same number of particles. The result of the median particle deflection for the 400nm vesicles as a function of the applied voltage is shown in Figure S1.

The figure shows that the brightest groups have the greater deflection for the same voltage. They also start deflecting for lower applied voltages. This distribution in particles is in agreement with the size distribution shown in Figure 3 (main text), where the median of the distribution is around 400 nm.