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Molecular dynamics modeling of nanoparticle dielectrophoresis EMPPU SALONEN, EMMA TERAMA, Lab of Physics and HIP, Helsinki Univ of Tech, Finland, ILPO VATTULAINEN, Lab of Physics and HIP, Helsinki Univ of Tech, Finland; Memphys-Center of Biomembrane Physics, SDU; Inst of Physics, Tampere Univ of Tech, Finland, MIKKO KARTTUNEN, Lab of Computat Engineering, Helsinki Univ of Tech, Finland; Dept of Applied Math, Univ of Western Ontario, Canada — We have used molecular dynamics simulations to study nanoparticle dielectrophoresis (DEP), i.e., motion induced by a coupling of the particle polarization to a non-uniform electric field. In the first simulations we have considered the case of a single spherical colloid in a non-conductive solvent [1]. This approach has given qualitative information on the limitations of DEP transport due to the thermal motion of the manipulated particles at different DEP coupling strengths. In addition, we have studied changes in the DEP transport efficiency due to particle aggregation. The results of the modeling are compared to analytical studies [2,3] as well as experiments.

[1] E. Salonen et al., Eur. Phys. J. E. 18 (2005) 133.

[2] J. P. Huang et al., Phys. Rev. E 67 (2003) 021403.

[3] J. P. Huang et al., Phys. Rev. E 69 (2004) 051402.

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