

Abstract Submitted  
for the DFD09 Meeting of  
The American Physical Society

**Modeling Electrophoresis of Microtubules in Microchannels** XIAN LUO, Brown University, ALI BESKOK, Old Dominion University, GEORGE KARNIADAKIS, Brown University — We simulate the electrophoretic motion of individual microtubules in microchannels in order to obtain their anisotropic mobility and compare with recent experimental results (van den Heuvel et al., PNAS, 2007). We include for comparison simulation results for a circular cylinder with a similar “effective” radius, in order to examine how the surface roughness of microtubules affects the electrical double layer, the externally applied field, and hence the electrophoretic mobility. The simulation method is based on the smoothed profile method (SPM) – an immersive-boundary-like method – and spectral element discretization. The new method allows for arbitrary differences in the electrical conductivities between the charged surfaces and the ionized solution.

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Date submitted: 27 Jul 2009

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