Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Effects of ionic strength on nonlinear electrophoretic mobility of fd virus in solid-state nanopore[1] WANG MIAO, Brown University, LIPING LIU, Brown University and Southeast University (Nanjing, China), ANNA LU, Brown University and Yale University, HONGWEN WU, Brown University and Southeast University (Nanjing, China), PRERNA SHARMA, ZVONIMIR DOGIC, Brandeis University, XINSHENG LING, Brown University — We report an experimental study of electrophoretic mobility of rod-like *fd* virus in solid-state nanopores. It is found that the velocity v is a nonlinear function of the electric filed E, and can be described by $v = \mu^{(1)}\mathrm{E} + \mu^{(3)}\mathrm{E}^3$. In addition to the linear Smoluchowski term, there is a second term with cubic dependence on E which has been described as a Stotz-Wien effect caused by the polarization of the Debye counter ion cloud. Here we report a study of this nonlinear electrophoresis effect under different salt concentrations. We found that at low ionic strength, the cubic mobility term becomes less pronounced. The origin of this observation will be discussed.

[1]We wish to thank May Yang and George Lu for their generous support.

Xinsheng Ling
Brown University

Date submitted: 15 Nov 2013 Electronic form version 1.4