Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Fluidic rectification due to asymmetric concentration polarization at nano-microfluidic interface JARROD SCHIFFBAUER, KATHLEEN RESCHKE, West Virginia University, BORIS ZALTZMAN, Ben Gurion Univerisity, BOYD EDWARDS, West Virginia University, ISAAK RUBINSTEIN, Ben Gurion Univerisity, WILL BOOTH, AARON TIMPERMAN, West Virginia University — A simple 1D locally electroneutral (LEN) electro-diffusive model explains steady-state fluidic rectification in terms of asymmetry in the diffusion layers flanking a charge-selective element such as a porous membrane or nano-pore. The selectivity in such systems is a function of the diffusion layer asymmetry and applied voltage. Rectification is experimentally demonstrated in a microfluidic system utilizing a charge selective membrane with symmetric nanopores where the asymmetry of the diffusion layers is attributed to the geometric asymmetry in the fluidic portion of the system. Results for devices with different cross-sections on either side of the membrane verify that increasing asymmetry in the geometry, hence diffusion layers, increases the strength of the observed rectification as predicted by the theory.

Jarrod Schiffbauer
West Virginia University

Date submitted: 24 Nov 2009 Electronic form version 1.4