

Abstract Submitted
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Modelling nanofluidic field amplified sample stacking with inhomogeneous surface charge CHRISTOPHER MCCALLUM, SUMITA PENNATHUR, Univ of California - Santa Barbara — Nanofluidic technology has exceptional applications as a platform for biological sample preconcentration, which will allow for an effective electronic detection method of low concentration analytes. One such preconcentration method is field amplified sample stacking, a capillary electrophoresis technique that utilizes large concentration differences to generate high electric field gradients, causing the sample of interest to form a narrow, concentrated band. Field amplified sample stacking has been shown to work well at the microscale, with models and experiments confirming expected behavior [1]. However, nanofluidics allows for further concentration enhancement due to focusing of the sample ions toward the channel center by the electric double layer [2]. We have developed a two-dimensional model that can be used for both micro- and nanofluidics, fully accounting for the electric double layer. This model has been used to investigate even more complex physics such as the role of inhomogeneous surface charge.

[1] Bharadwaj, R., & Santiago, J. G. (2005). *J. of Fluid Mech.*, 543, 57–92

[2] Sustarich, J. M., Storey, B. D., & Pennathur, S. (2010). *Phys. of Fluids*, 22(11), 112003

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