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Microscal Thermal Flow Field Fractionation of DNA by Size JENNIFER PEARCE, Department of Chemistry and Physics, Roger Williams University, FAIHAN ALFAHANI, School of Engineering, Computer Science, and Construction Management, Roger Williams University — We present results from a lattice-Boltzmann-base Brownian Dynamics simulation on the separation of DNA by length using thermal flow field fractionation in a microfluidic device. A temperature gradient in combination with fluid flow allows us to separate long and short strands of DNA. Shorter DNA fragments have higher Soret coefficients and therefore migrate more strongly in the temperature gradient than long strands. They are therefore closer to the channel walls and have a lower mean velocity than longer strands. The retention time in the channel for longer DNA chains is significantly shorter than for small chains. This technique has the advantage that long strands can be processed quickly, unlike traditional agarose gel techniques which require longer times for longer fragments.

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