Abstract Submitted
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Electrophoresis of DNA on a disordered two-dimensional substrate CYNTHIA J. OLSON REICHHARDT, CHARLES REICHHARDT, Theoretical Division, Los Alamos National Laboratory — We propose a method for electrophoretic separation of DNA in which adsorbed polymers are driven over a disordered two-dimensional substrate which contains attractive sites for the polymers. Using simulations of a model for long polymer chains, we show that the mobility increases with polymer length, in contrast to gel electrophoresis techniques, and that separation can be achieved for a range of length scales. We demonstrate that the separation relies on steric interactions between polymer segments, which prevent substrate disorder sites from trapping more than one DNA segment each. Since thermal activation does not play a significant role in determining the polymer mobility, band broadening due to diffusion can be avoided in our separation method. [1] Phys. Rev. E 74, 051908 (2006).

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