

Abstract Submitted
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Gel electrophoresis of partially denatured DNA: split-ends, bubbles, and squids DAVID SEAN, GARY W. SLATER, University of Ottawa — Gel electrophoresis separates partially denatured DNA fragments based on chemical sequence. Upon an increase in temperature, AT-rich regions melt into two strands which is thought to be the main contributor to the rapid reduction of the fragment's mobility. The reduction in mobility is often predicted from the average number of denatured bases regardless of their positions. We re-visit the theoretical basis of this approach and determine that the analysis only holds for denatured domains that occur at the ends. Langevin Dynamics simulations are used to study the effect that the placement of the melted regions has on the mobility by discriminating between denatured domains which occur in the middle of the fragment (bubbles) and at the ends (split-ends). It is found that the split-ends dominate the blocking mechanism. In addition, we find a novel conformation (the “squid”) which seems to be responsible for the blocking at high fields.

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