

Abstract Submitted
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Mechanism of gene-regulating proteins diffusion along DNA: hopping vs. sliding YAN MEI WANG, Physics Department, Princeton University, EDWARD COX, Molecular Biology Department, Princeton University, ROBERT AUSTIN, Physics Department, Princeton University — It has been a long controversy as whether non-energy-driven proteins diffuse along DNA in the form of hopping or sliding. In the hopping model, the protein jumps on and off DNA frequently while diffusing, switching between 1D and 3D diffusions, and in the sliding model the protein diffuses along DNA basepair by basepair, staying in continuous contact with the DNA. We have investigated the diffusion mechanisms of LacI repressor protein along nonspecific sequences of DNA using single molecule imaging measurements. By studying the standard deviation (SD) of the diffusing LacIs point spread functions, we observed that the SD values in both the longitudinal and transverse directions to DNA elongation to be significantly higher than what can be accounted for by the sliding model. We will show that the large SD values agree with the hopping model.

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