SES12-2012-020014

Abstract for an Invited Paper
for the SES12 Meeting of
the American Physical Society

Measuring looping probability of short double-stranded DNA

HAROLD KIM, Georgia Institute of Technology

Bending of double-stranded DNA (dsDNA) is associated with fundamental biological processes such as genome packaging and gene regulation, and therefore studying sequence-dependent dsDNA bending is a key to understanding biological impact of DNA sequence beyond the genetic code. Average mechanical behavior of long dsDNA is well described by the wormlike chain model, but the behavior of dsDNA at length scales around or below its persistence length remains controversial. In this talk, I will explain how we can measure looping probability of dsDNA using a fluorescence technique called FRET (Förster Resonance Energy Transfer) and infer its elastic properties. I will also explain how we compare the experimental results against a discrete wormlike chain model which successfully explains the behavior of long dsDNA. I will show that the behavior of short dsDNA (<200 base pairs) cannot be described by the wormlike chain model, but demonstrates subelastic deformation mechanism.