MAR14-2013-002867

Abstract for an Invited Paper
for the MAR14 Meeting of
the American Physical Society

Dynamics of large DNA confined to nanoslits

PATRICK DOYLE, MIT

Microfabricated platforms present a model system to study the conformation and dynamics of DNA in reduced geometries. Slit and tube-like geometries have been widely studied. Slits confine DNA to a quasi-2D or so-called Hele-Shaw geometry. The role of slit confinement on polymer dynamics is not straightforward due to the lack of an intrinsic hydrodynamic screening length. In this talk I will discuss our recent work in understanding DNA conformation and dynamics in slits. We make use of both single molecule experiments and large-scale molecular simulations. This aforementioned work was performed in a good solvent. I will next explore the role of confinement on the coil-globule transition. We show that for modestly poor solvents, the collapse process has two stages and that the duration of both stages is significantly affected by confinement. Our results suggest that the primary effect is not hydrodynamic in nature, but more related to a modification of the free energy landscape.