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Topological Dependence of ds-DNA Confined in Nanoslits PO-KENG LIN, Institute of Atomic and Molecular Science, Academia Sinica, JEN-FANG CHANG, Institute of physics, Academia Sinica, CHENG-HUNG WEI, PEI-KUEN WEI, Research Center for Applied Sciences, Academia Sinica, Y.-L. CHEN, Institute of physics, Academia Sinica — Topological constraints are important for the DNA condensation in confinement, such as chromosome in the cell and bacteriophage DNA packaging. We investigated the topological dependence of the size, shape and diffusivity of λ -DNA confined in a nanoslit with height $h = 780$ nm (\approx bulk radius of gyration of λ -DNA) to strong confinement ($h = 20$ nm \ll persistence length p) are systematically investigated. Shape asphericity of both linear and circular DNA increases with decreasing h , which indicate the DNA become more anisotropic. Furthermore, we observed the transition from de Gennes to Odijk scaling in the measured extension and diffusivity when $h =$ Kuhn length L_k . Interestingly, the diffusivity of circular DNA is larger than linear DNA in the blob regime, but they are nearly equal in slits with $h \ll L_k$.

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