11th World Congress on Computational Mechanics (WCCM XI)
5th European Conference on Computational Mechanics (ECCM V)
6th European Conference on Computational Fluid Dynamics (ECFD VI)
July 20 - 25, 2014, Barcelona, Spain

ELECTRO-HYDRODYNAMICS EFFECT ON DNA DYNAMICS DURING DNA TRANSPORT

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Key Words: *Electric Field, Immersed Boundary Method, Kirchhoff Rod, Thermal Fluctuation.*

We present computer simulations of DNA dynamics in electric field motivated by the experiments of Tang et al. [1] in which individual T4 DNA molecules were compressed into a compact form due to moderate electric field. Our simulations also show that DNA molecule in a fluid in the presence of counterions and electric field has a tendency to undergo compression. The amount of compression depends on the ionic strength and the electric field intensity. We have developed a stochastic version of the generalized immersed boundary method [2, 3] and applied this method to simulate the dynamics of a circular DNA with bend and twist together with electrostatic force and thermal force. This is a joint work with David Swigon (University of Pittsburgh, USA) and Yongsam Kim (Chung-Ang University, Korea).

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