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Secondary Structure of Nucleic Acids near a Surface[1] JOAQUIN AMBIA-GARRIDO, B. MONTGOMERY PETTITT, University of Houston —
While the conformation of Nucleic Acids in the bulk has been widely studied, the influence of a surface on its secondary structure has been limited to some particular cases. Here we present a more general study of the influence of a surface with different conditions into the secondary structure of nucleic acids. The environment is an electrolyte and the salt concentration also plays an important roll. For this porpoise we work in the scope of mean field theory, namely Poisson-Boltzmann. A Monte-Carlo simulation was performed. The DNA strands were modeled by sphere chains. The analytic solution for the interaction energy of spheres is known and simple, which allows us to have multiple strands interacting with the surface and each other. The obtained results are in agreement with all atom simulations previously performed for single molecules and two molecules interacting. The multiple molecules results are unprecedented and give us new insights into these systems. The results are also in agreement with experimental data. The results are particularly interesting regarding the growing new technology of DNA nano-arrays; broadly used in the medial industry.

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