

ABSTRACT

DISSERTATION/THESIS/RESEARCH PAPER/CREATIVE PROJECT: Electronic Properties of DNA Molecules under Different Electric Field Exposure Configurations

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In recent years, the electronic behavior of DNA molecules has received much interest ranging from interpreting experimental results to electronic based applications, including DNA sequencing and DNA-based nanotransistors. Here we study the electronic properties of poly(G)-poly(C) double stranded DNA molecules by means of the tight binding approximation to understand how the molecules act under different physical conditions. For instance, the effects of DNA tilting, stretching and compressing on the electronic properties are elucidated. Very interesting features such as a tunable energy band gap and a metal-semiconductor transition are disclosed for DNA under different conditions.