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Transport Properties of DNA Bases Placed in Graphene Nanogap[1] CHRISTIAN WOLOWIEC, NICK KIOUSSIS, Department of Physics and Astronomy, California State University, Northridge, CA 91330, DMITRI NOVIKOV, Atomistix, Chief Technology Officer, Santa Clara, CA 95054 — There has been significant demand and research activity for the development of new DNA sequencing technologies employing transverse transport techniques. We present systematic first principles studies based on Density Functional Theory of the transport properties and current-voltage characteristics of nucleotide molecules of the DNA bases, placed in 1.2 nm gap formed between the zigzag edges of graphene nano-electrodes. The linear dispersion of the graphene electrons and the local spin-polarization associated with the zigzag edges allow the exploration of both the charge- and spin-current signatures of the DNA bases to sequence DNA. We will present results in the tunneling regime of the charge- and spin-transport properties as the geometrical conformation of the bases is varied. Such signatures may be used experimentally for developing an efficient means of sequencing larger strands of DNA.

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