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Sequence Dependent Charge Transport on Double Stranded DNA[1] EFTA YUDIARSAH, SERGIO E. ULLOA, Ohio University — The transport properties of different double-stranded DNA sequences are studied by transfer and scattering matrix methods. The DNA is described by a tight-binding model with realistic sequence-specific hopping integrals. Our results show that, in qualitative agreement with experimental results [1], even a single basis mismatch on the sequence can dramatically change the conductance of short DNA sequences. The change in conductance is larger if the mismatch is on the energetically favorable path of transmission: the path with the most bases with energy close to the Fermi energy of the contacts. This trend is independent on which strand is being connected to the electrodes, although similar sequences have drastically different conductance values. We also study the effect of structural "nicks" on the DNA conductance. In accordance with experimental results [2], the conductance is changed by several orders of magnitude in the presence of the nicks, depending on the position of the defect on the strand. As the conductance of a strand is found to be dependent on the sequence of bases, this suggests an electronic approach to sequencing [1]. [1] J. Hihath *et al.*, Proc. Natl. Acad. Sci.U. S. A **102**, 16979 (2005). [2] B. Hartzel *et al.*, Appl. Phys. Lett. **82**, 4800 (2003).

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