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Nearest-neighbor inter-strand coupling effects on electron transport through DNA molecules SADEQ MALAKOOTI, ERIC HEDIN, YONG JOE, Department of Physics and Astronomy, Ball State University — In this research, an updated tight binding model including nearest-neighbor inter-strand hopping (NIH) strengths for quantum mechanical electron transport through double-stranded DNA molecules is proposed. The motivation for including these additional couplings is their similar hopping mechanism for electron tunneling in computations of DNA electron transport. Results are examined for a 30 base-pair, poly(G)–poly(C) DNA molecule which demonstrates the effects of NIH strengths on energy transmission and current-voltage (I-V) characteristics. It is found that enhancement of transmission spectra is observed with these couplings, and subsequent novel features are revealed on the I-V characteristics under various electrode-molecule contact conditions.

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