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The effects of temperature and magnetic flux on electron transport through a four-channel DNA model[1] SUNHEE LEE, ERIC HEDIN, YONG JOE, Ball State University — The temperature dependence of the conductivity of lambda phage DNA has been measured by Tran *et al* [1] experimentally, where the conductivity displayed strong (weak) temperature dependence above (below) a threshold temperature. In order to understand the temperature effects of electron transport theoretically, we study a two-dimensional and four-channel DNA model using a tight-binding (TB) Hamiltonian. The thermal effects within a TB model are incorporated into the hopping integral and the relative twist angle from its equilibrium value between base-pairs. Since these thermal structural fluctuations localize the electronic wave functions in DNA, we examine a temperature-dependent localization length, a temperature-driven transmission, and current-voltage characteristics in this system. In addition, we incorporate magnetic field effects into the analysis of the transmission through DNA in order to modulate the quantum interference between the electron paths that comprise the 4-channel structure. [1] P. Tran, B. Alavi, and G. Gruner, PRL **85**, 1564 (2000).

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