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Electron transport through asymmetric DNA molecules[1] SUNHEE LEE, ERIC HEDIN, YONG JOE, Ball State University — Stimulated by intriguing experiments of electrical charge transport through single DNA molecules which are trapped between two metal electrodes [1, 2], we investigate quantum mechanical electron transport along the long axis of the DNA molecule with five poly (dG) and poly (dC) base pairs. Using a quasi-one-dimensional tight-binding model, we calculate the electron transmission of one conduction channel of a modified DNA model for the variation of backbone onsite energy, the energy-dependent hopping strength, and the contact coupling between the leads and the DNA molecule. In this symmetry-breaking system, we find that two transmission mini-bands with a gap merge together and eventually disappear, and an extra resonance peak arises in the contour plots of the transmission. Finally, the current-voltage characteristics in a short asymmetric DNA molecule will also be presented.

[1] D. Porath *et al.*, Nature **403**, 635 (2000).
[2] H. Cohen *et al.*, Proc. Natl. Acad. Sci. **102**, 16979 (2005).

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