

DNA Electronics

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(ABSTRACT)

DNA is a potential component in molecular electronics. To explore this end, there has been an incredible amount of research on how well DNA conducts and by what mechanism. There has also been a tremendous amount of research to find new uses for it in nanoscale electronics. DNA's self-assembly and recognition properties have found a unique place in this area. We predict, using a tight-binding model, that spin-dependent transport can be observed in short DNA molecules sandwiched between ferromagnetic contacts. In particular, we show that a DNA spin-valve can be realized with magnetoresistance values of as much as 26% for Ni and 16% for Fe contacts. Spin-dependent transport can broaden the possible applications of DNA as a component in molecular electronics and shed new light into the transport properties of this important biological molecule.

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