Introduction to spintronics – spin transistor
Results

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1 Spin precession in external magnetic field

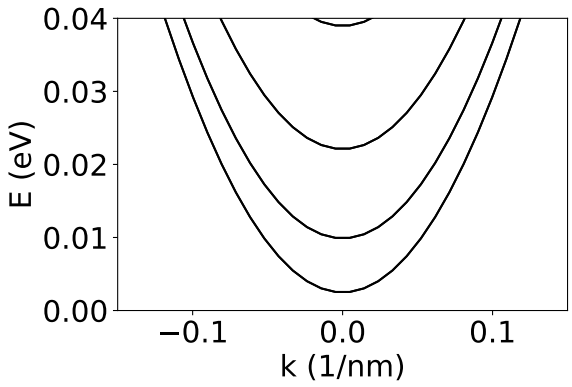

Figure 1: Dispersion relation $E(k)$ for $\mathbf{B} = 0$.

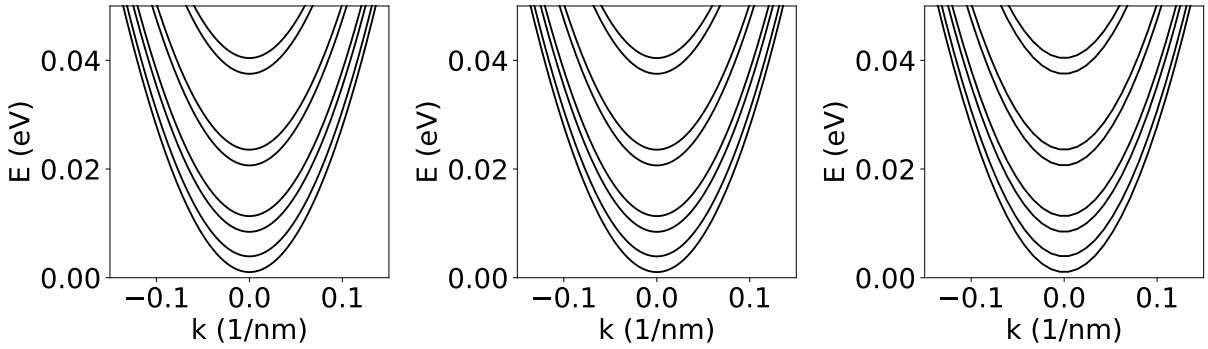

Figure 2: Dispersion relation $E(k)$ for (from the left) $\mathbf{B} = (B, 0, 0)$, $\mathbf{B} = (0, B, 0)$, $\mathbf{B} = (0, 0, B)$, with $B = 1$ T.

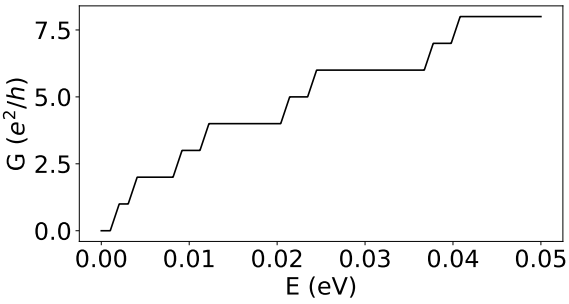

Figure 3: Conductance as a function of energy at $B_z = 1$ T.

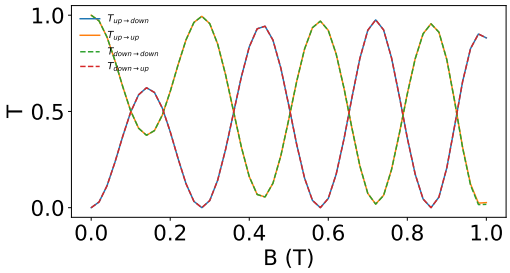

Figure 4: Spin dependent transmission coefficients as a function of magnetic field B_y, at $B_z = 1$ T and $E = 0.005$ eV.

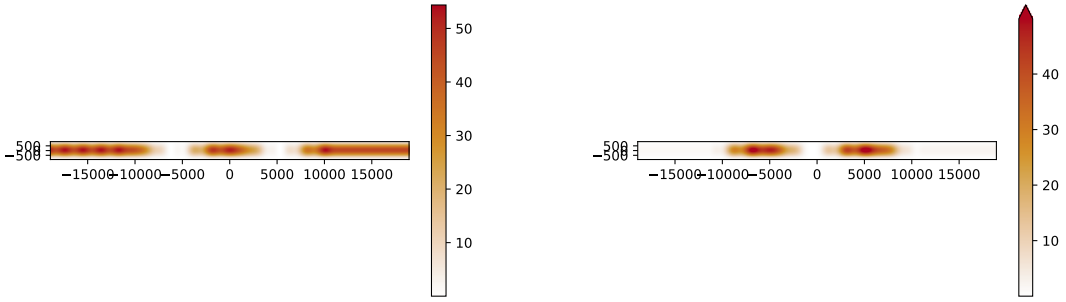

Figure 5: Spin up and spin down electron density in the nanowire at $B_y = 0.6$ T, $B_z = 0.1$ T, and $E = 0.005$ eV.

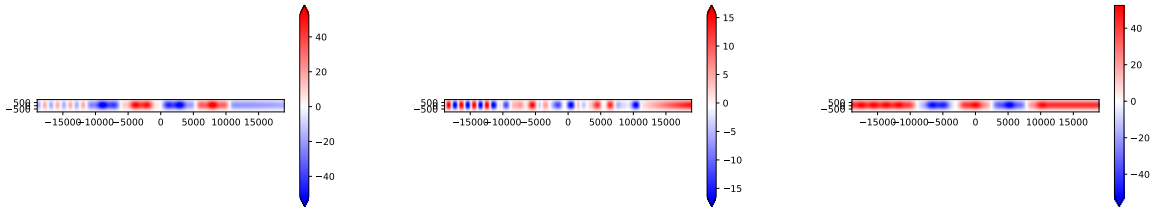

Figure 6: Spin s_z, s_y, and s_z distribution in the nanowire at $B_y = 0.6$ T, $B_z = 0.1$ T, and $E = 0.005$ eV.

2 Spin transistor based on the spin-orbit coupling

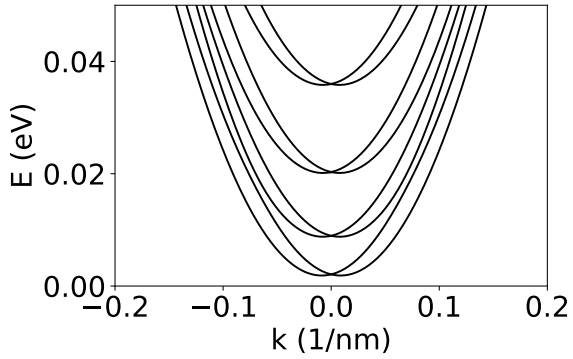

Figure 7: Dispersion relation $E(k)$ in the channel with spin-orbit coupling ($\alpha = 50$ meVnm).

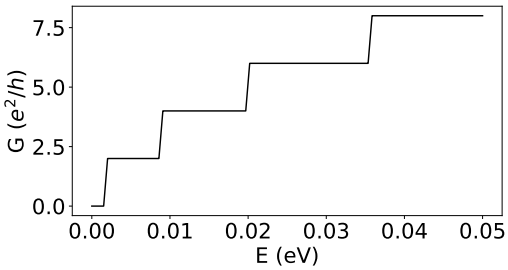

Figure 8: Conductance as a function of incident electron energy with spin-orbit coupling present.

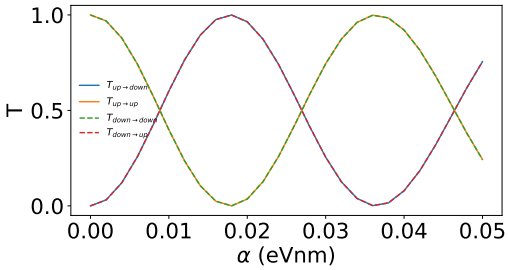

Figure 9: Spin dependent transmission coefficients as a function of the α parameter at $E = 0.005$ eV.

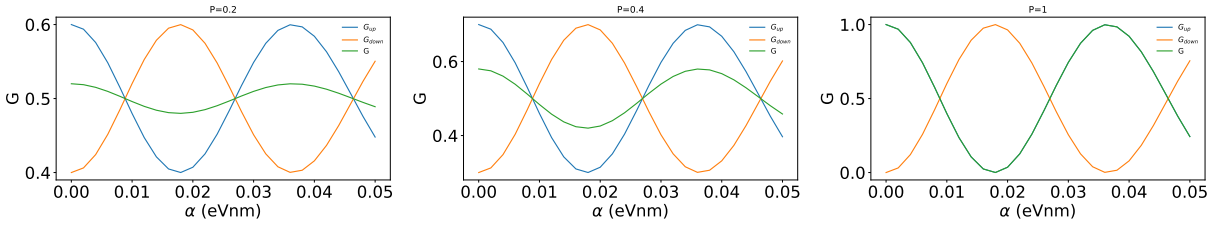

Figure 10: Spin dependent conductance and the total conductance as a function of the α parameter at $E = 0.005$ eV and (from the left) $P = 0.2$, $P = 0.4$, and $P = 1$.

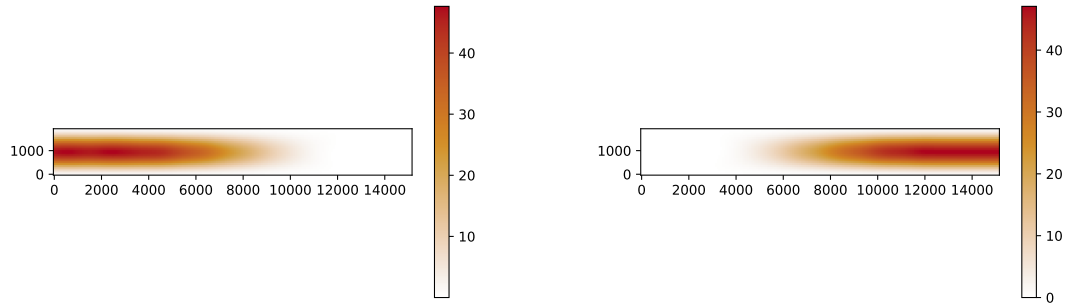

Figure 11: Spin up and spin down electron density in the nanowire at $\alpha = 18$ meVnm and $E = 0.005$ eV.

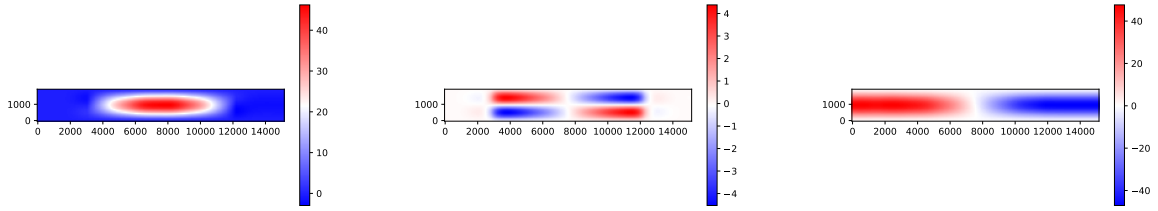

Figure 12: Spin s_z, s_y, and s_z distribution in the nanowire at $\alpha = 18$ meVnm and $E = 0.005$ eV.