

1. Calculate the transmission coefficient (up to 1eV energy) of the double barrier structure for the following three cases:

(a) $V_1=V_2=0.5$ eV, $L_1=L_2=4$ nm, $W=5$ nm .

(b) $V_1=0.6$ eV, $V_2=0.7$ eV, $L_1=L_2=4$ nm, $W=5$ nm .

(c) $V_1=0.6$ eV, $V_2=0.3$ eV, $L_1=4$ nm, $L_2=5$ nm, $W=5$ nm .

Notation: V_i is the height of the barriers, L_i describes the width of the barriers ($i=1$ for barrier 1, and $i=2$ for the second barrier) and W is the well width. Assume that the potential energy term $V(x)$ is zero in the source, well and detector regions. Assume that the effective electron mass equals to $m=6\times 10^{-32}$ kg .

2. Calculate the tunneling current for the above three cases by varying the cathode voltage and adding a voltage loop and summation over energy in the script provided to you.