Exercise: Resonant Tunneling Diode

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Calculate the transmission coefficient of the double barrier structure for the following three cases:

(a) $V_1=V_2=0.4$ eV, $L_1=L_2=4$ nm, $W=5$ nm .

(b) $V_1=0.6$ eV, $V_2=0.4$ 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 $m=0.065\times9.1\times10^{-32}$ kg . Comment on the nature of the resonances with respect to the symmetry and the widths and the heights of the two potential barriers.