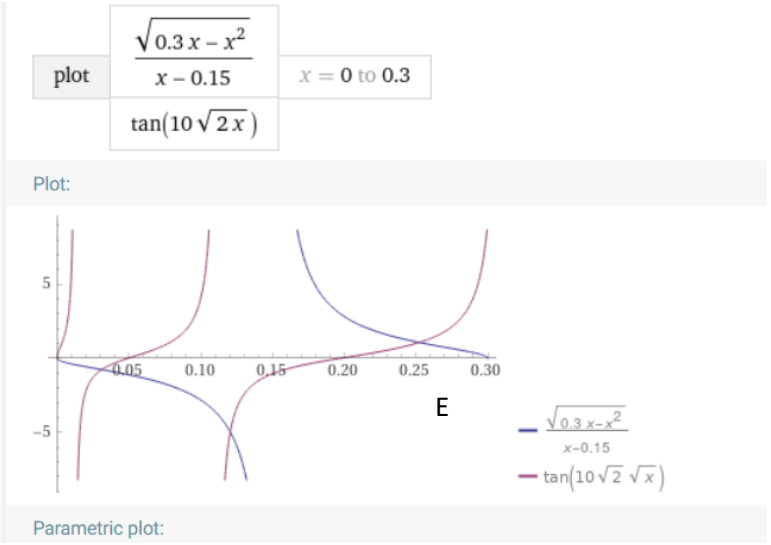
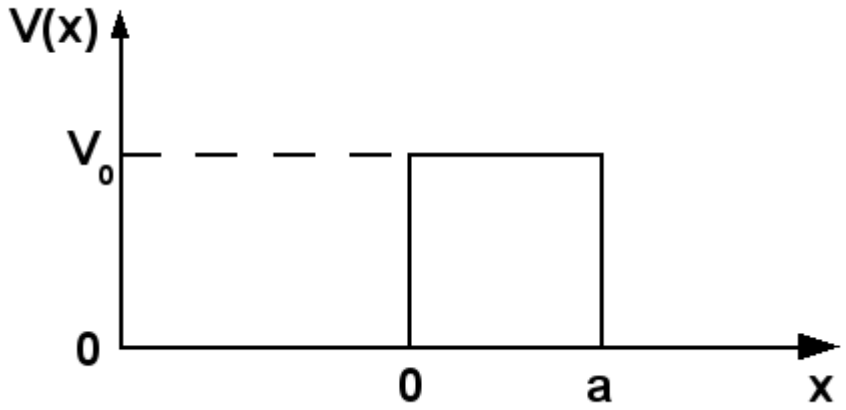
Electron in a finite box of length 10 a.u. (i.e., ~ 5 Å), with V0 = 0.3 a.u. (i.e., ~ 9 eV)



Rectangular barrier (figures from Wikepedia)



E > V0

$$t = \frac{4k_0k_1e^{-ia(k_0-k_1)}}{(k_0+k_1)^2 - e^{2iak_1}(k_0-k_1)^2}$$

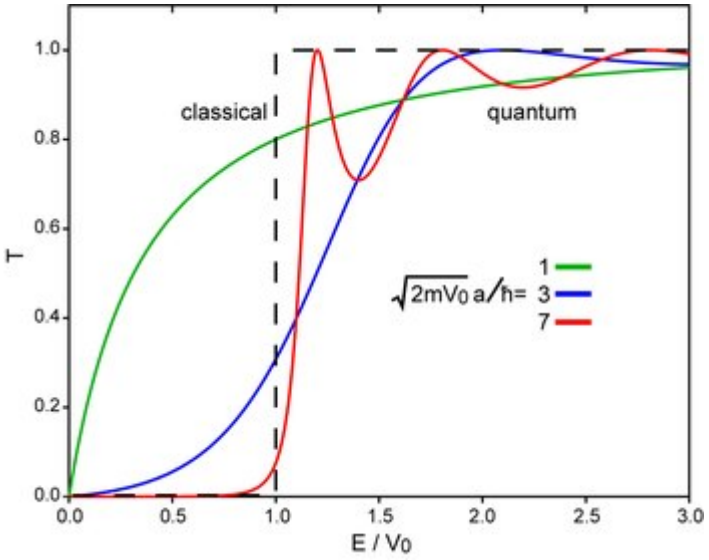
$$r = \frac{(k_0^2-k_1^2)\sin(ak_1)}{2ik_0k_1\cos(ak_1) + (k_0^2+k_1^2)\sin(ak_1)}.$$

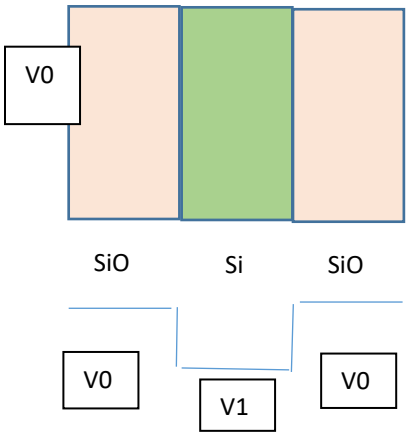
E < V0

$$T = |t|^2 = \frac{1}{1 + \frac{V_0^2 \sinh^2(k_1 a)}{4E(V_0 - E)}}$$

E = V0

$$T = \frac{1}{1 + ma^2 V_0 / 2\hbar^2}.$$





Example of how one could make a potential trap from semiconductor materials