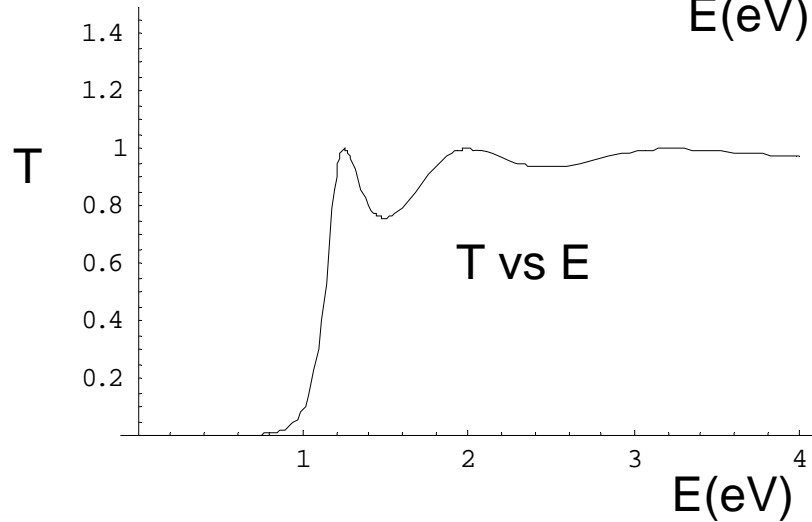
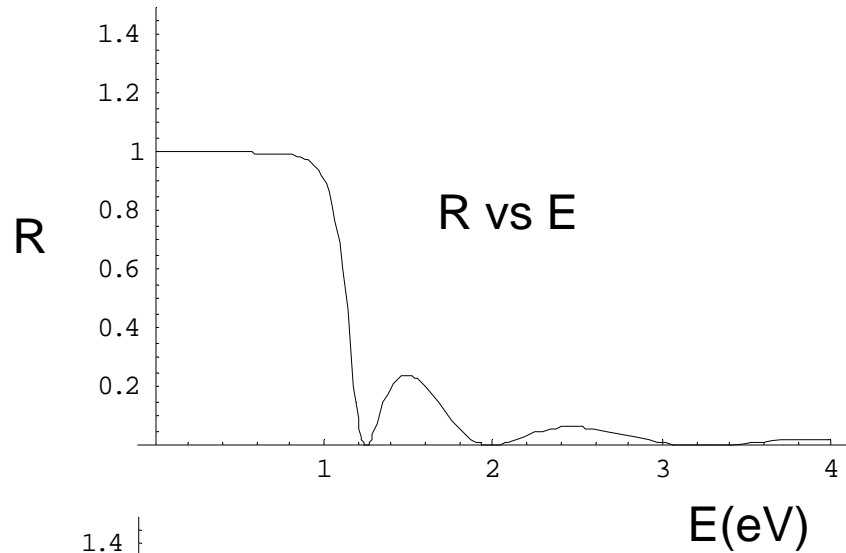
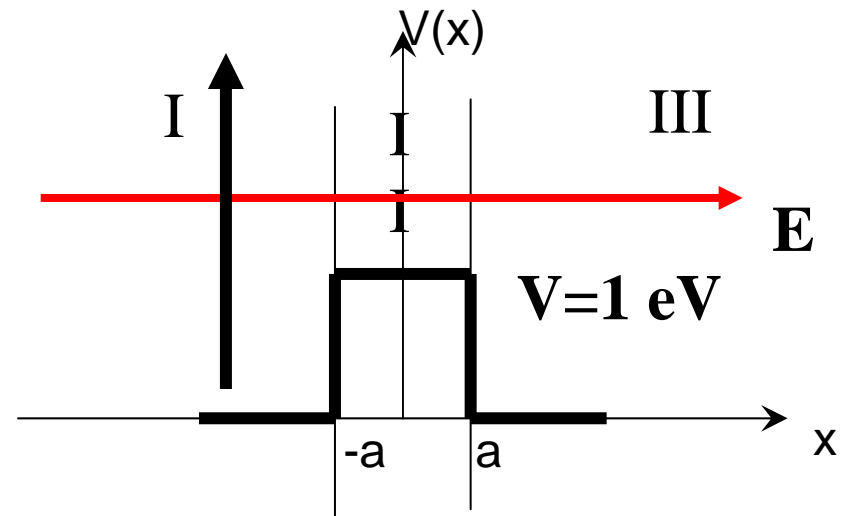


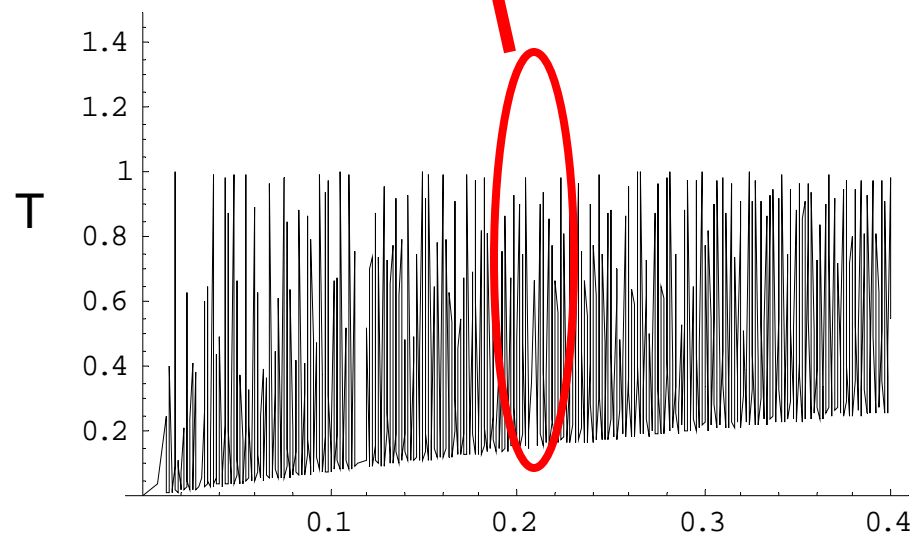
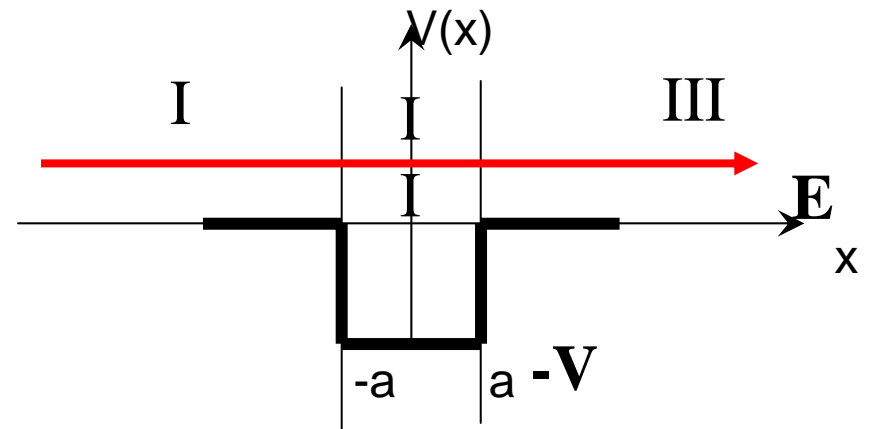
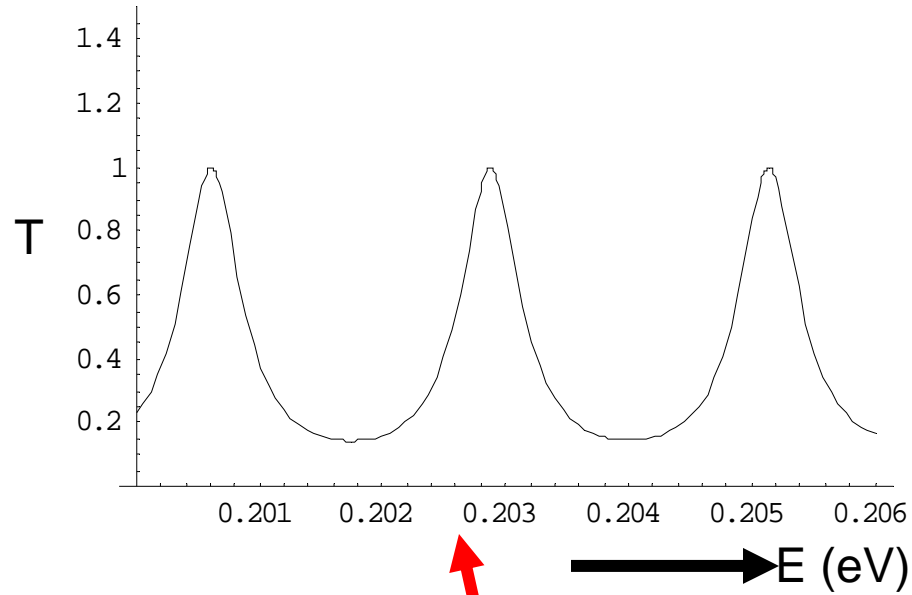
R and T



- Width of barrier 1 angstrom
- $V = 1 \text{ eV}$

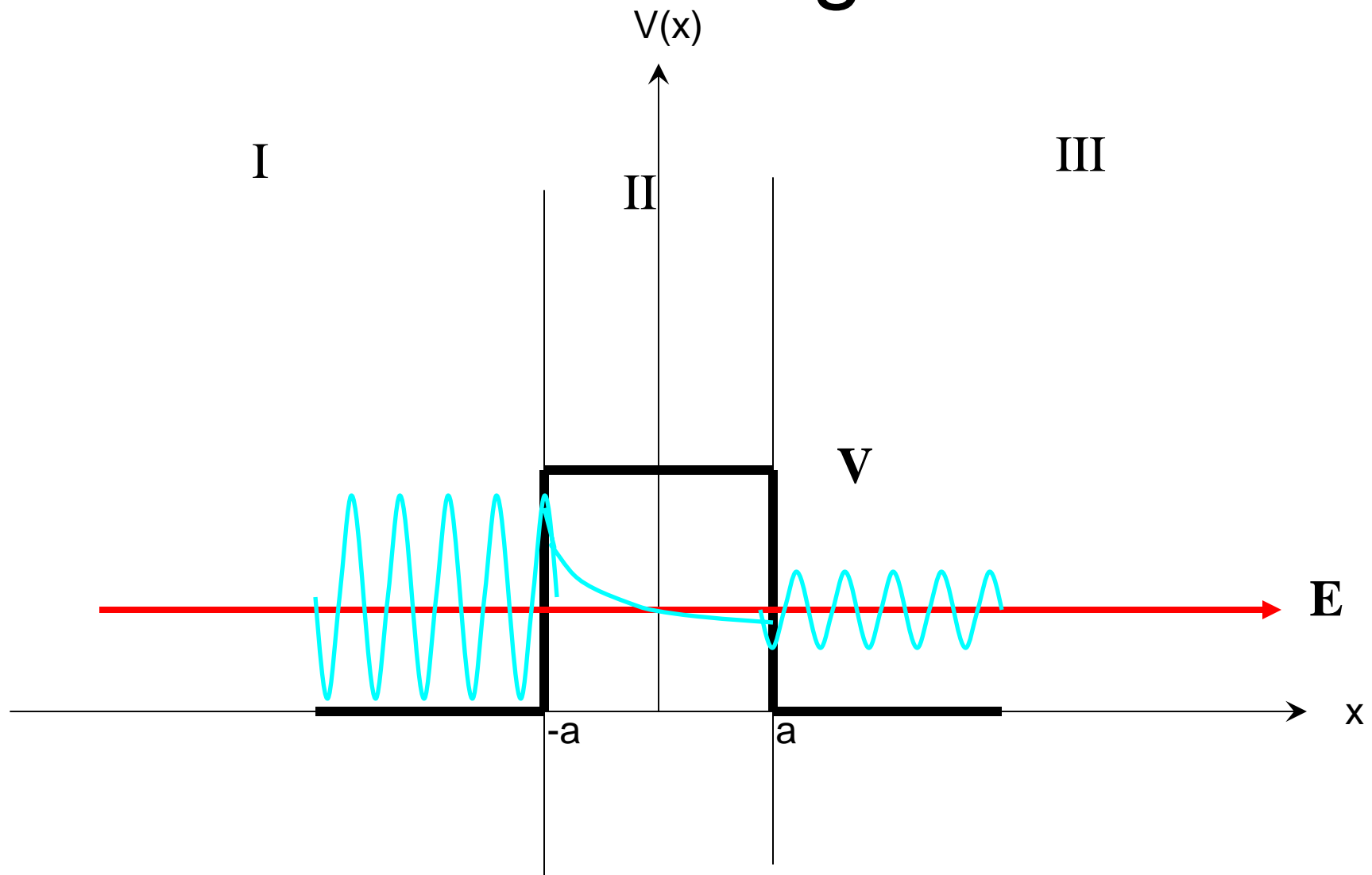


ramsauer

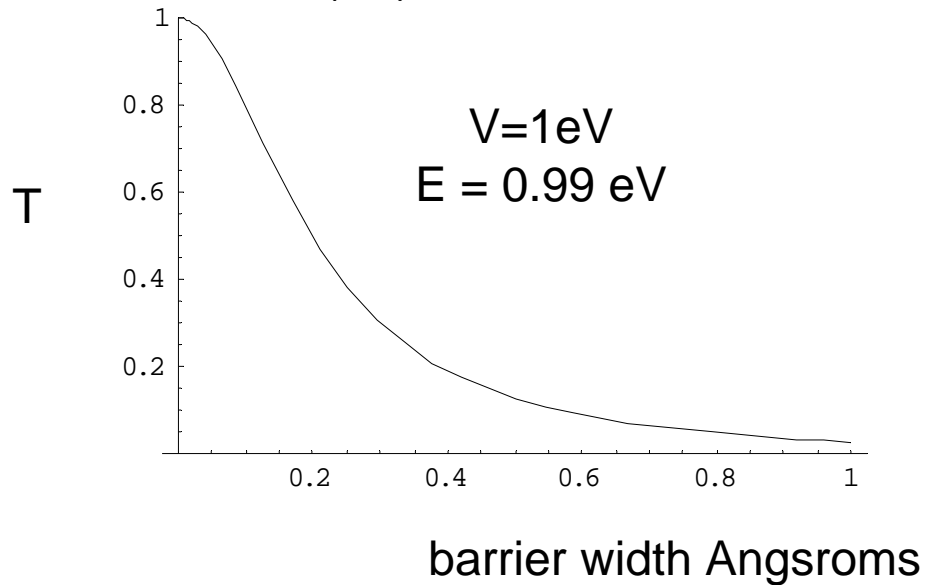
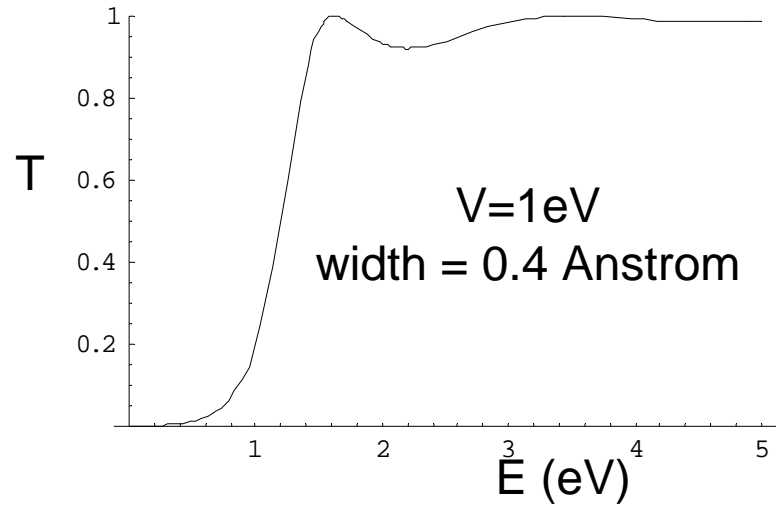
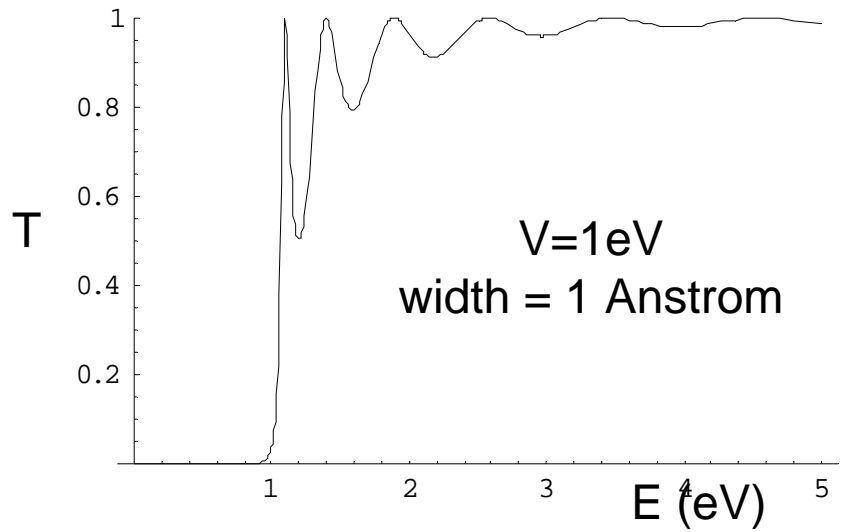


- $V = -5\text{eV}$
- width = 1000 Angstroms

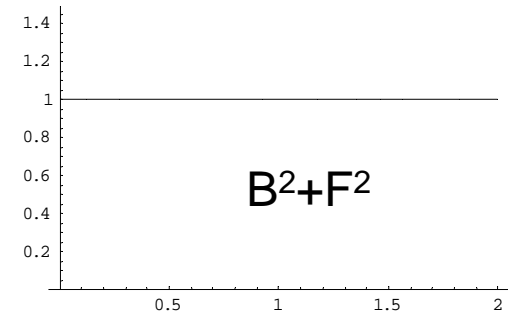
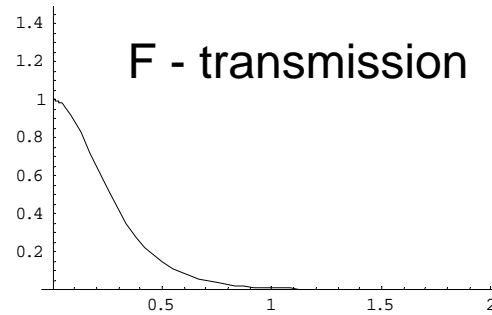
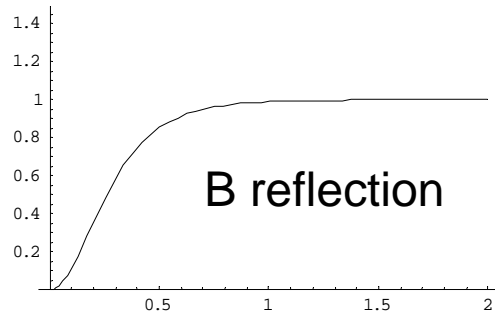
Tunneling



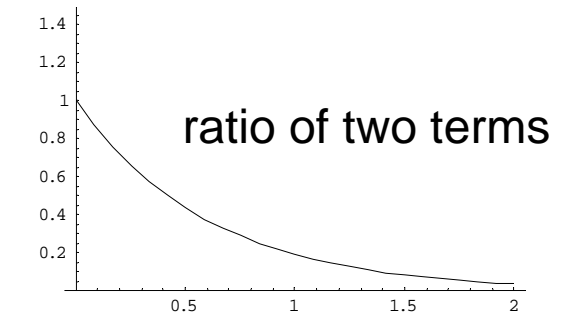
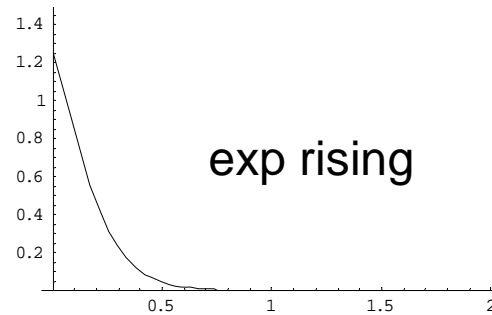
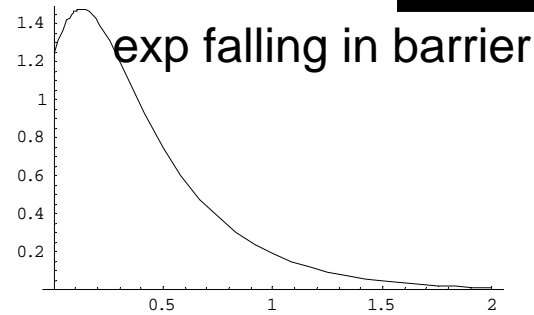
tunneling



Coefficients vs width of barrier



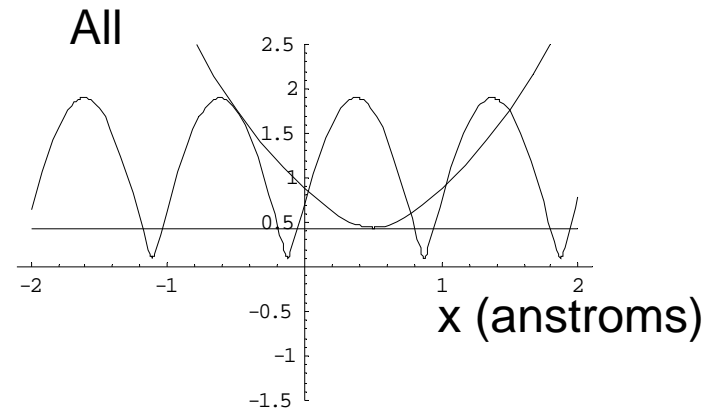
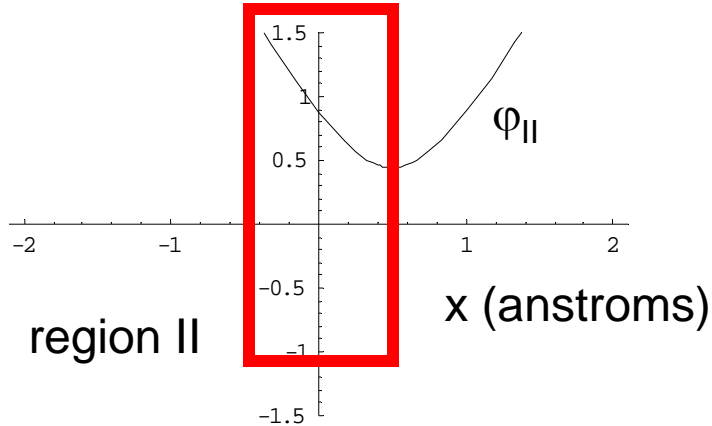
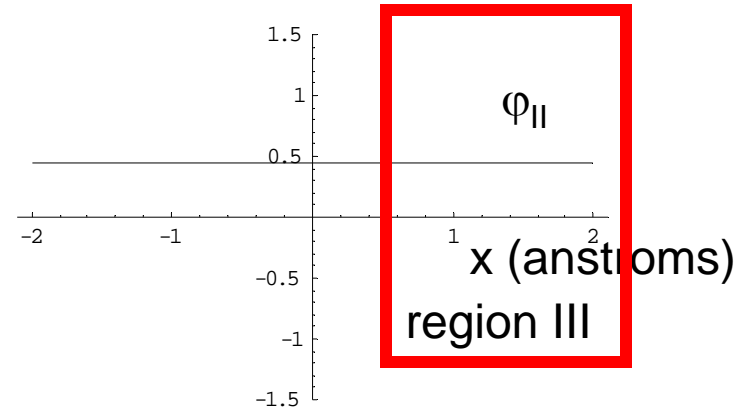
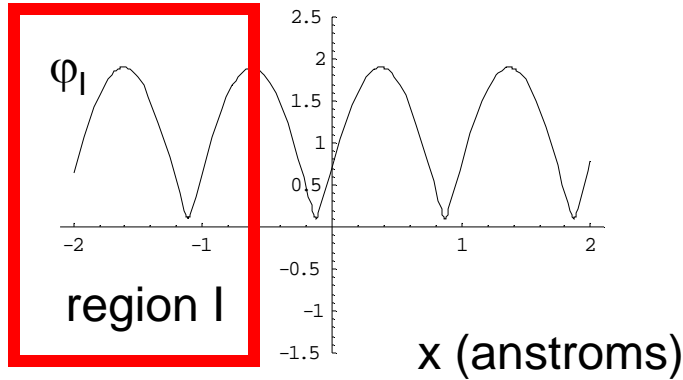
width of barrier in angstroms



- $E=0.8$ eV
- $V=1$ eV
- 1 electrons

- distances in angstroms
- $\varphi_I = Ae^{ikx} + Be^{-ikx}$ $A=1$
- $\varphi_{II} = Ce^{ikx} + De^{-ikx}$
- $\varphi_{III} = Fe^{ikx}$

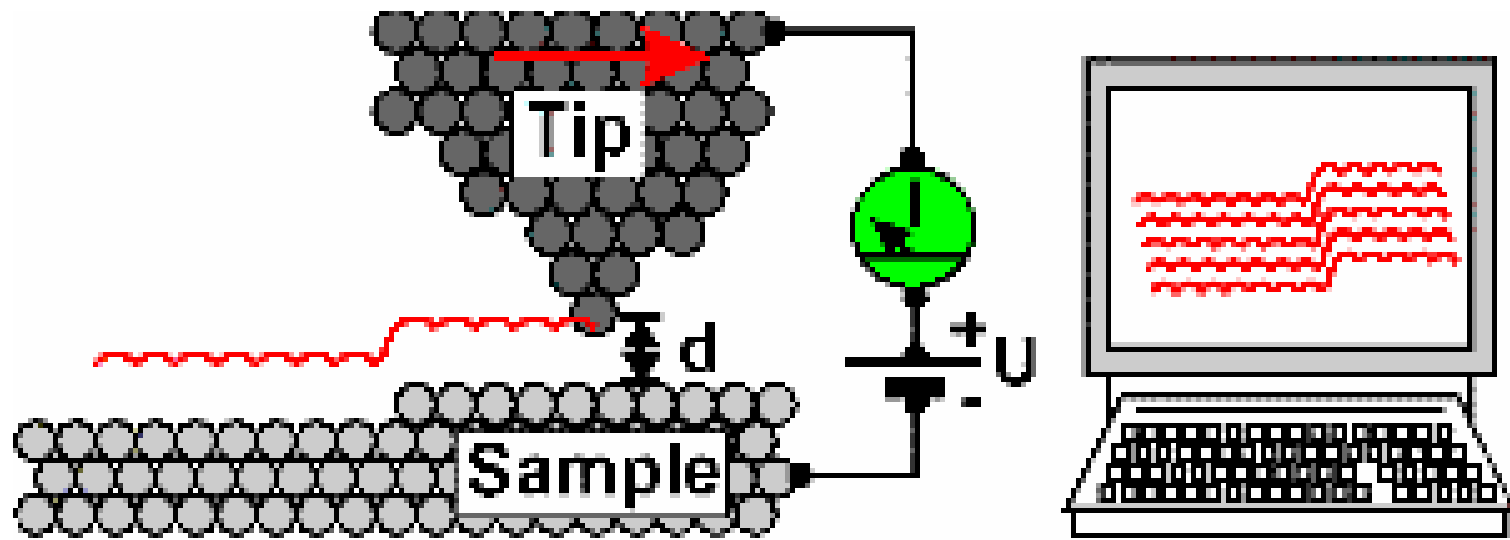
The wave function norms



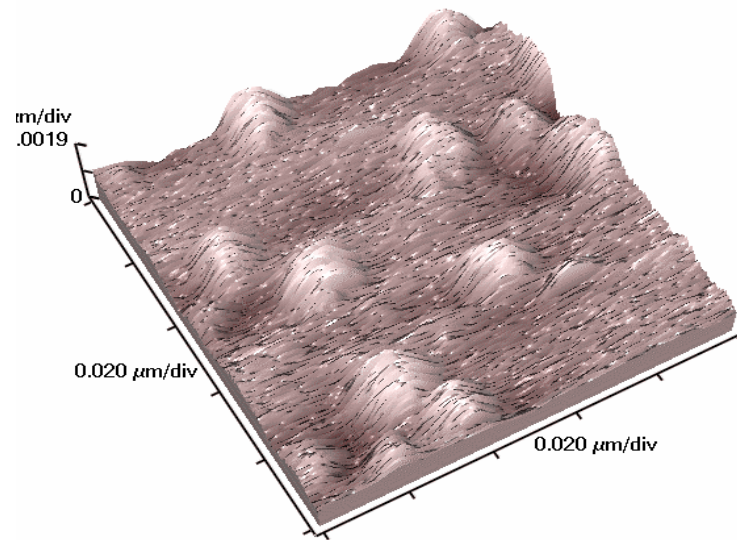
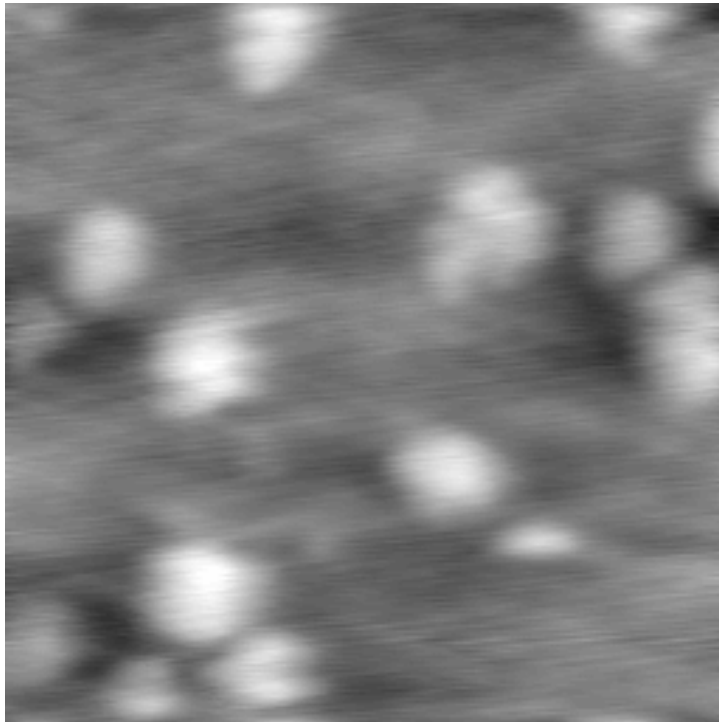
- $E=1\text{eV}$, $V=1.1\text{eV}$,
 $a=0.5$ anstroms

- note that at the boundaries (± 0.5 anstroms) the wave functions meet

Scanning Tunneling Microscope



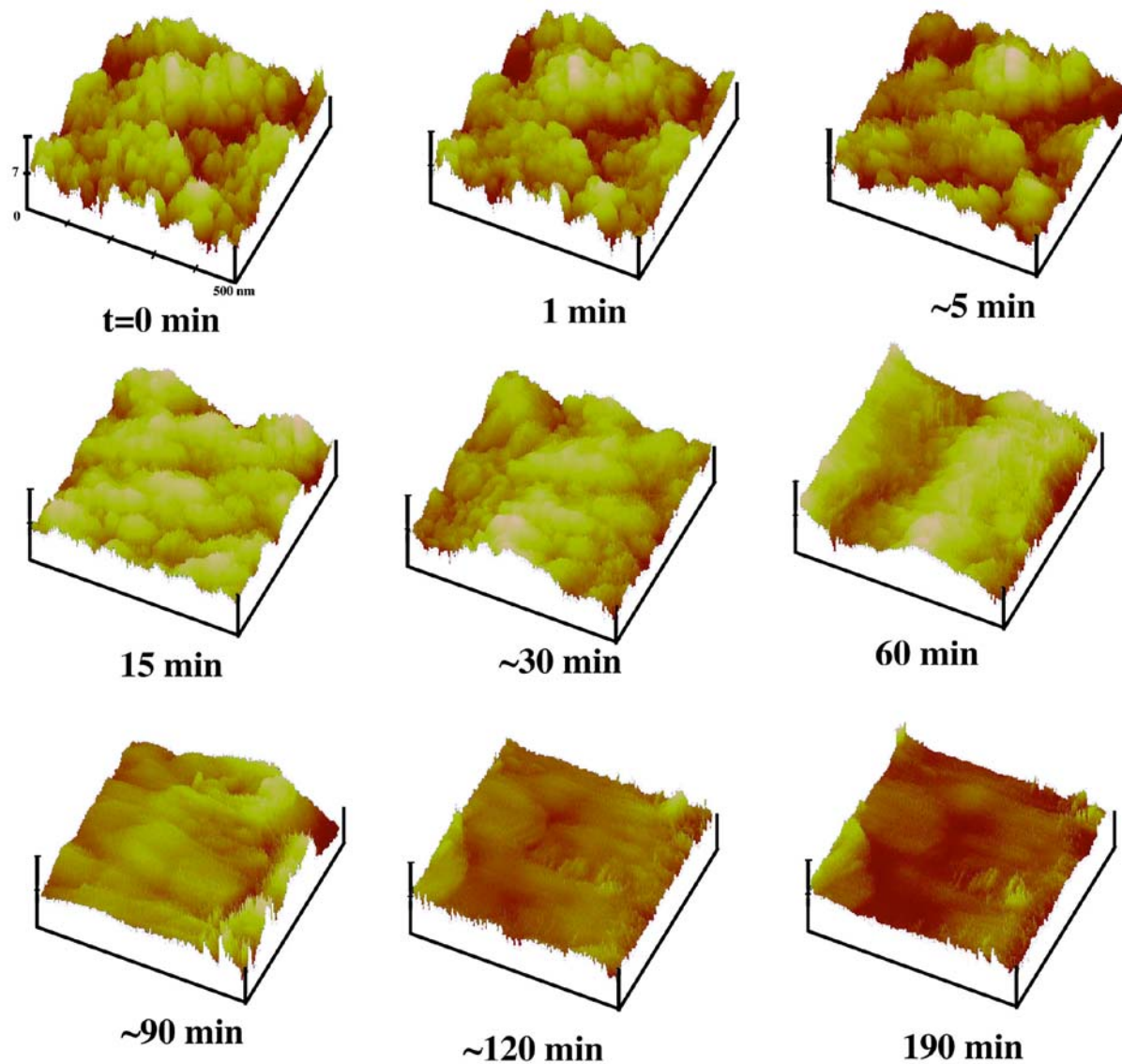
STM of Gold Nanoclusters in Ultra-High Vacuum



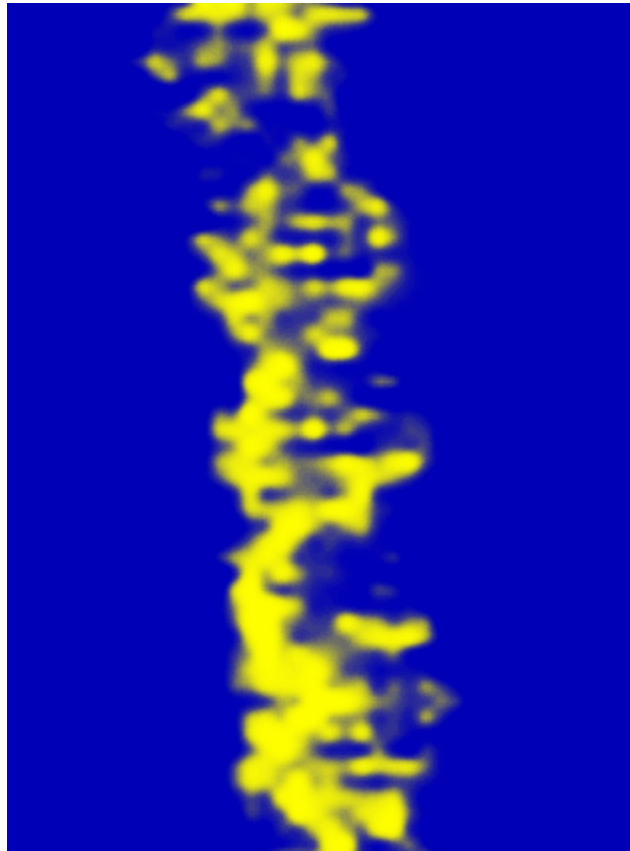
STM images ($100 \text{ nm} \times 100 \text{ nm}$) collected from Au nanoclusters on a $\text{TiO}_2(110)$ substrate. They were grown by depositing 1 ML of Au and annealing to 600° C .

STM of Iron foil in a Uranyl Nitrate Solution

The surface of an iron foil was monitored with *in situ* STM in a solution containing uranyl nitrate. The 500x500 nm images show the rough surface, characteristic of a native iron oxide, becoming smoother as the reaction proceeds.



DNA



Wolfgang Schonert
GSI