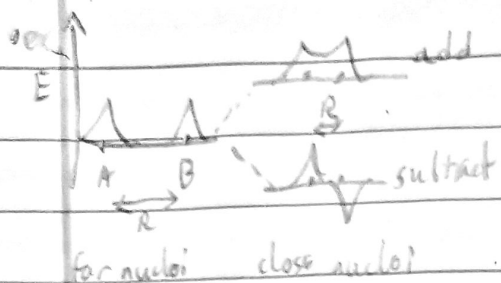


Lecture 14 Review: Bonds, antibonds, and potential surfaces

For 10^- , atomic wavefunctions (orbitals) can be combined (added/subtracted) leading to reinforcement (bonding) or cancellation (antibonding): "quantum interference!"

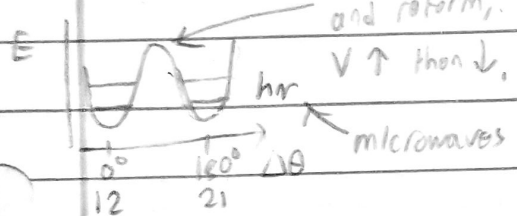
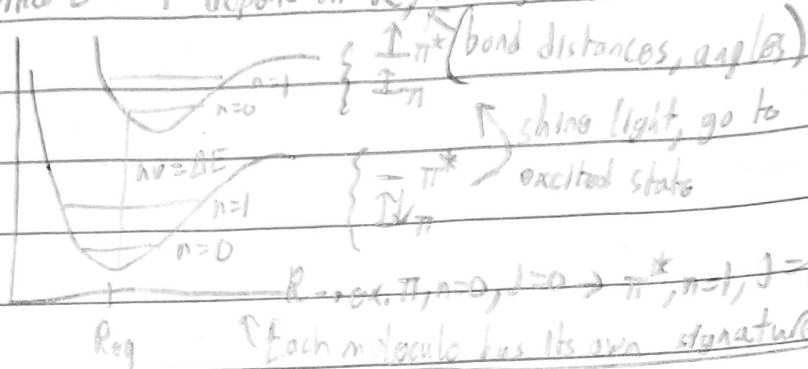
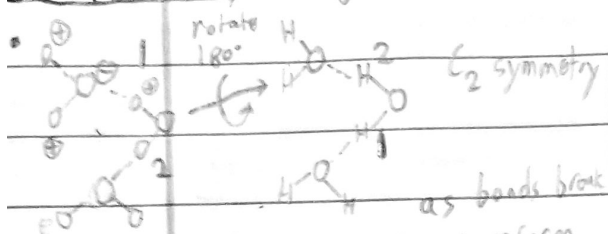


For many e^- , total wavefunction is antisymmetrical product over 10^- orbitals: $\Psi \propto \psi_1(x_1)\psi_2(x_2)\dots - \psi_1(x_2)\psi_2(x_1)\dots$

depends on R , since ψ_1, ψ_2, \dots depend on R .

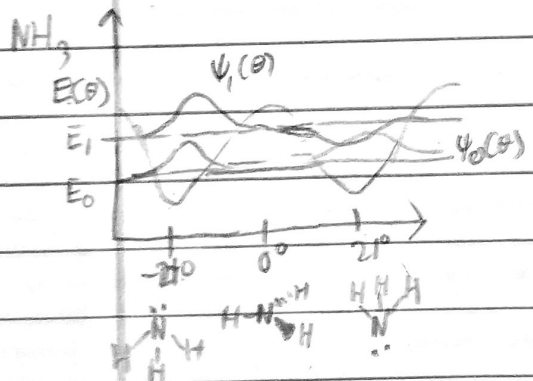
Since $E + \Psi$ depend on R , solving Schröd for a molecule:

Lecture 15: More about potential surfaces E(R), including Schrödinger Eq.



Earth diameter $d = 12000 \text{ km}$
 $d = c \cdot 60 \cdot 60 \cdot 2\pi \cdot 365 \cdot 10 = 9 \cdot 10^{16} \text{ m}$
 $\tan^{-1}\left(\frac{6,000,000 \text{ m}}{9 \cdot 10^{16} \text{ m}}\right) = 4 \cdot 10^{-9} \text{ degrees}$

Double well potentials & tunneling!



For ground state, equal probability of $\sim 20 \text{ km}$ apart (lock) of H's pointing up or down. by feedback correlation

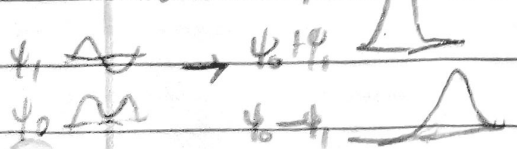


can tell that both places are occupied using double slit experiment

can use human eye to confirm this using buckyballs (C_{60}), with size difference of 0.1 nm .

$\nu = 30 \text{ GHz}$ to excite.

Adding $\psi_0 \pm \psi_1$



solve $H\psi = E\psi$

$\Delta E \approx 2.6 \text{ ps}$

to shift from one side to another,