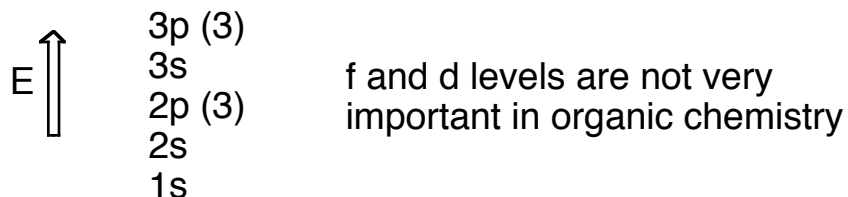


Review of Atomic Orbitals

- 1923 – Electron has the properties of a **particle** and a **wave** (constructive/destructive interference)
- 1926 – Quantum Mechanics
- Schrödinger solves a “wave equation” for the total energy of 1 electron and 1 proton.
 - A series of “wave functions” results. These correspond to the various states of an electron.

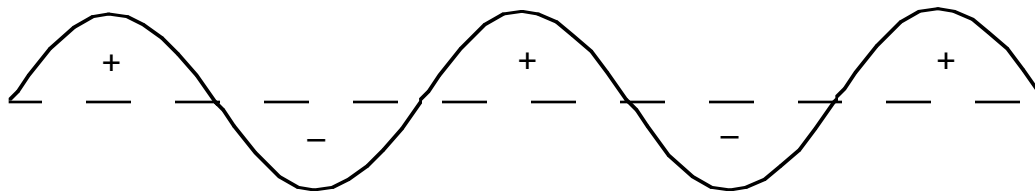
From wave functions (ψ), we get

- 1) The energy associated with an electronic state
- 2) The relative probability of finding an electron in a location in space (ψ^2)



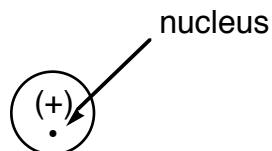
Shapes of Atomic Orbitals

a "wave"

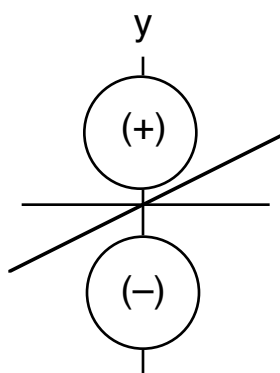
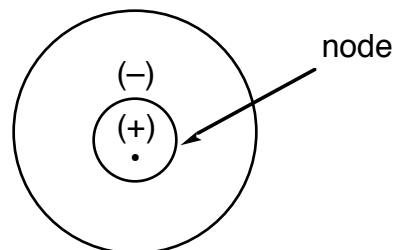


Signs are **not** related to electric charge or probability
-/-, +/+ interfere constructively, +/- interfere destructively

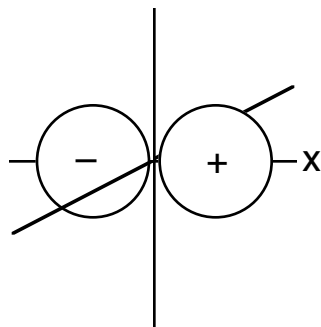
1s-orbital



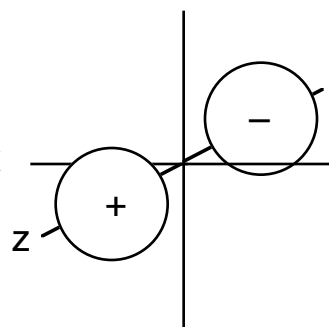
2s-orbital



2py-orbital



2px-orbital



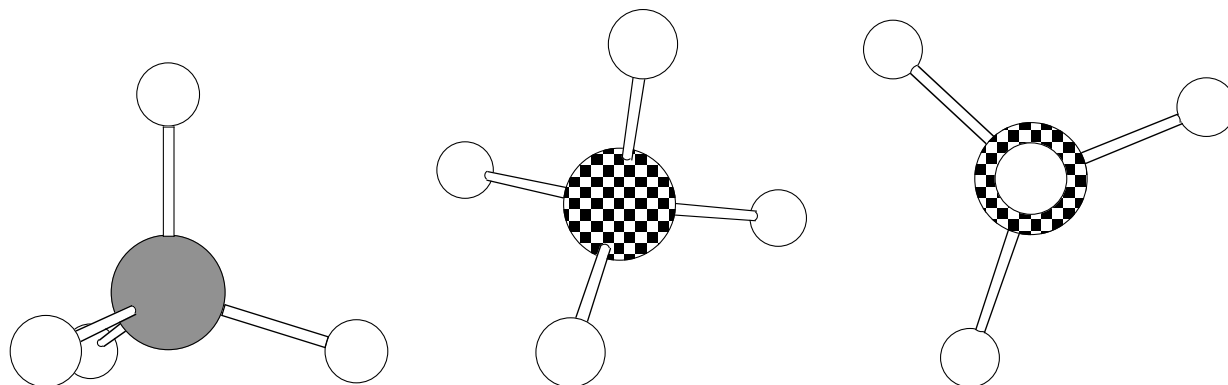
2pz-orbital

1s, no nodes; 2s & p, 1 node; 3 s & p, 2 nodes, etc....

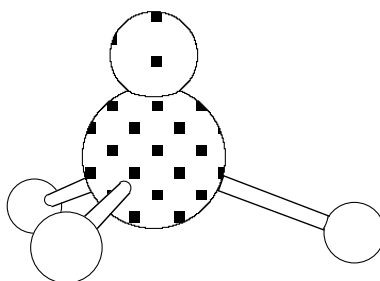
"Orbitals" are regions in space where the probability of finding an electron is high ($\psi^2 = 95\%$). Orbitals are not "real"!

Shapes of Molecules by VSEPR Theory

Methane



Ammonia



Boron Trifluoride

