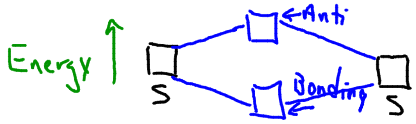
Ch 8 HW: See Axes 23,27,28,53,92,95
Sec 8.3
obj: Describe the molecular orbital theory of covalent bonding.

Molecular Orbital Theory (MO)

- When two atomic orbitals overlap to share valence electrons they form two molecular orbitals.
  1) bonding orbital (stable)
  2) Antibonding orbital (unstable)

- Best used to determine if an element will form a diatomic molecule.



* Molecular orbitals follow the same rules (principles) as the atomic orbitals.

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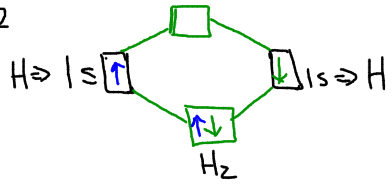
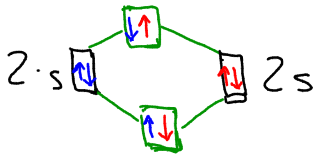
H_2



$2e^-$

Be



* If electrons exist in both the Bonding + Anti Bonding orbitals the element will not exist as a diatomic molecule.

- When atoms do share electrons they form a bond as a result of the bonding molecular orbital.

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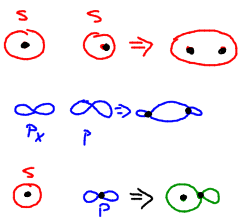
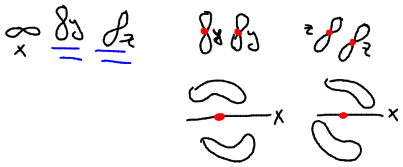
- The bonding orbital is a result of 2 atomic orbitals overlapping w/ each other.
  * Produces a bond btw atoms.
- 2 Types of Bonds btw the Atoms
  1) Sigma bond ⇒ when 2 s-orbitals overLap.
     ⇒ when 2 p-orbitals overLap if they are not vertical
     ⇒ when an s+p orbital overLap



  2) Pi bond ⇒ When 2 p orbitals overLap in the vertical direction.



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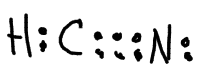
- In a molecule there will be several bonds btw atoms.
  * Type of bond depends on the type of Covalent bond produced.

Single Covalent ⇒ Sigma Bonds

Double Covalent ⇒ 1 Sigma + 1 pi

Triple Covalent ⇒ 1 Sigma + 2 pi



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