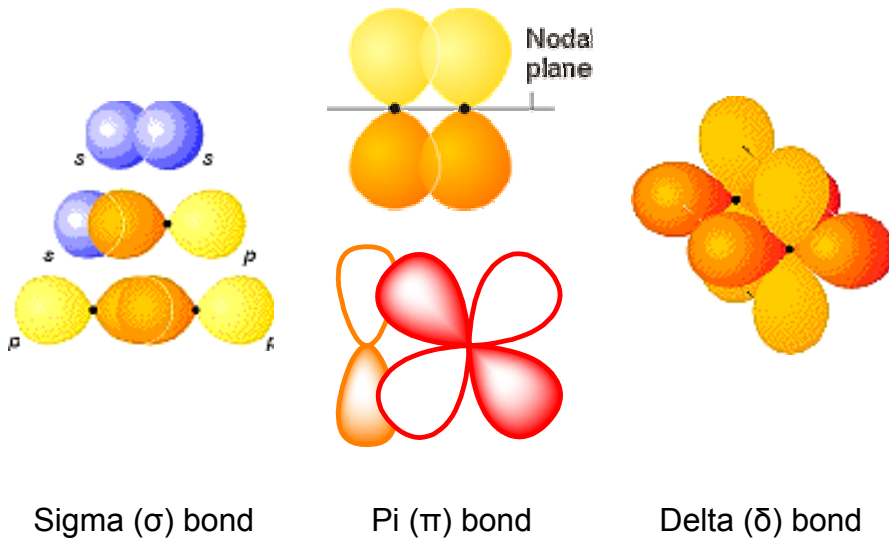


Bonding

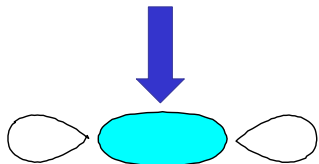
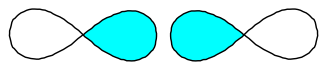
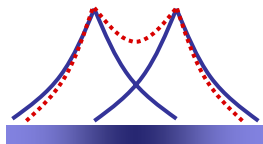


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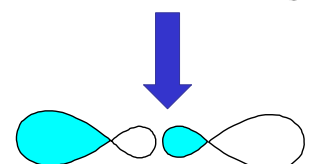
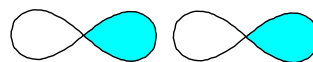
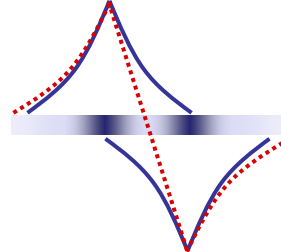
Bonding and Antibonding Orbitals

Constructive interference



Bonding orbital (σ)

Destructive interference

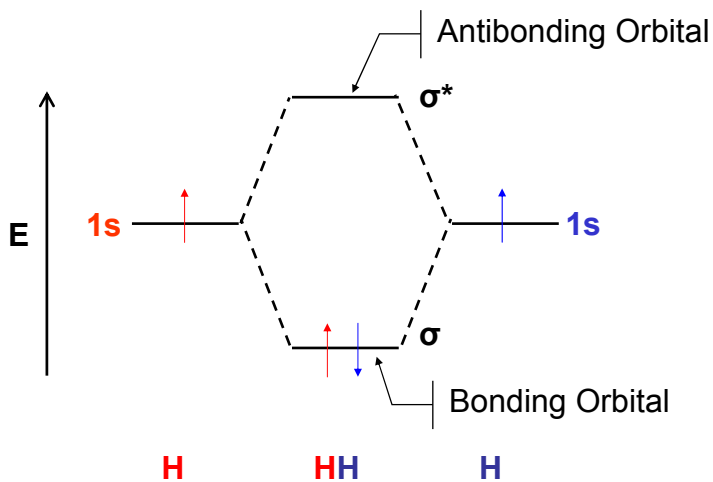


Antibonding orbital (σ^*)

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MO Energy Level Diagram: H₂

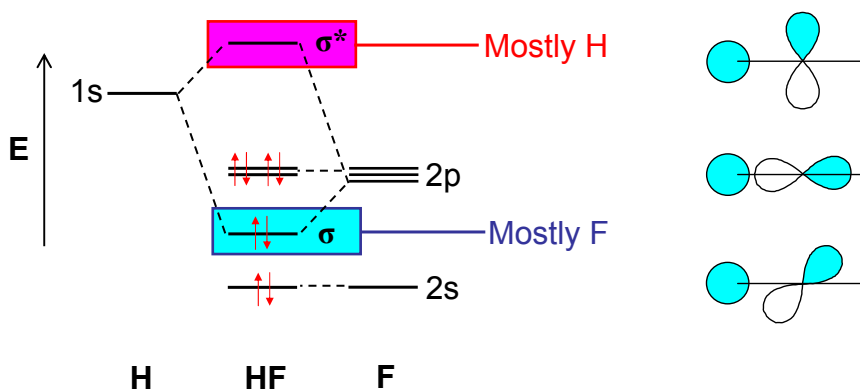


- Bond order = $\frac{1}{2}(\# \text{ e}^- \text{ in bonding MOs} - \# \text{ e}^- \text{ in antibonding MOs})$

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MO Energy Level Diagram: HF

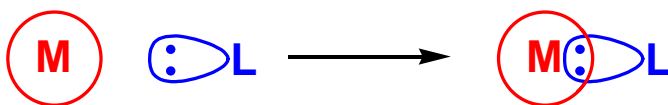


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MO Diagram of ML_6 : s-Orbital Interaction

- Metal acts as Lewis acid primarily through its empty valence s orbital
 - Valence s orbital *must be empty*.



- *ALL* metal complexes have an electronic configuration with zero electrons in the metal s orbital.
 - The configuration of Cr^{3+} in $[Cr(H_2O)_6]^{3+}$ is $[Ar]3d^34s^0$.
 - The configuration of Cr^0 in $Cr(CO)_6$ is $[Ar]3d^64s^0$.