(18) **Today**

5.1 Formation of Molecular Orbitals

5.2 Homonuclear Diatomic Molecules

Next Class (19)

5.2 Homonuclear Diatomic Molecules

5.3 Heteronuclear Diatomic Molecules

(20) **Second Class from Today**

5.3 Heteronuclear Diatomic Molecules

5.4 Polyatomic Molecules

Third Class from Today (21)

5.3 Heteronuclear Diatomic Molecules

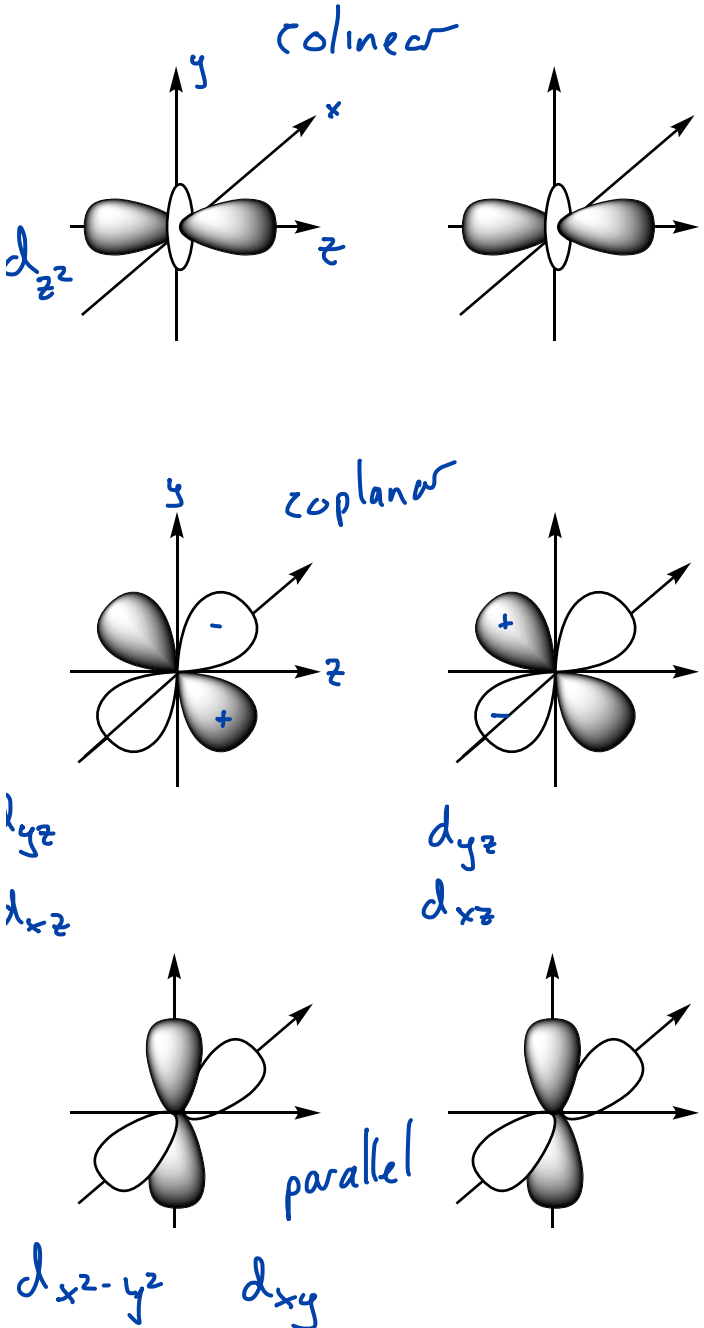
5.4 Polyatomic Molecules

Introduce MOs (s, p, d orbital interactions)

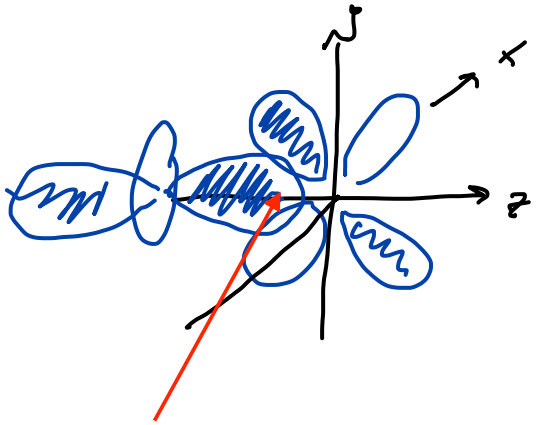
Diatomic Molecules and Orbital Mixing

Heteronuclear Diatomic Molecules

Polyatomic molecules



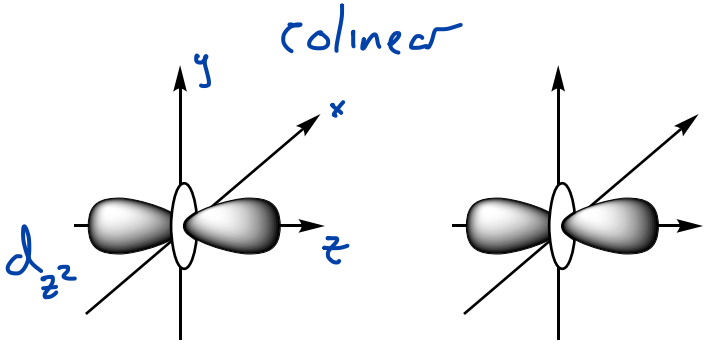
https://www.westfield.ma.edu/cmasi/advinorg/dorbs/dorbsp.html



symmetry mismatch

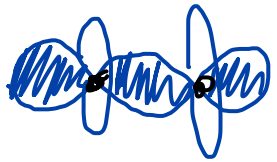
d orbital interactions

Section 5.1/2.1



σ_g

constructive interference

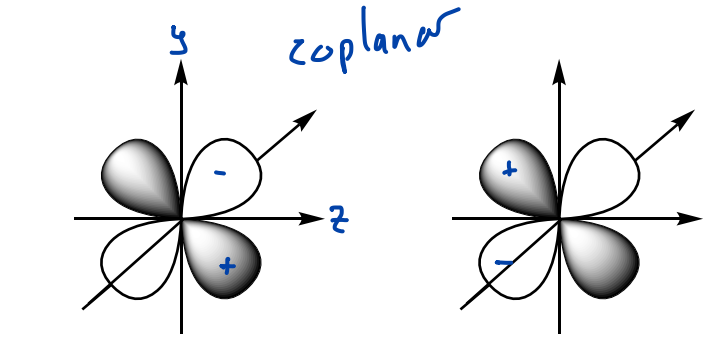


σ_u^*

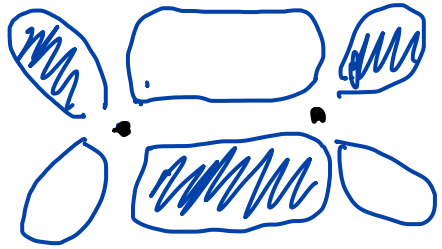
destructive interference

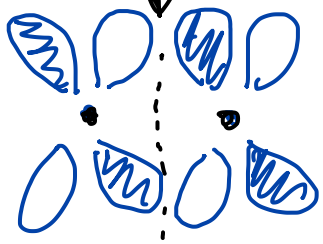
node formed between nuclei

e⁻'s between nuclei

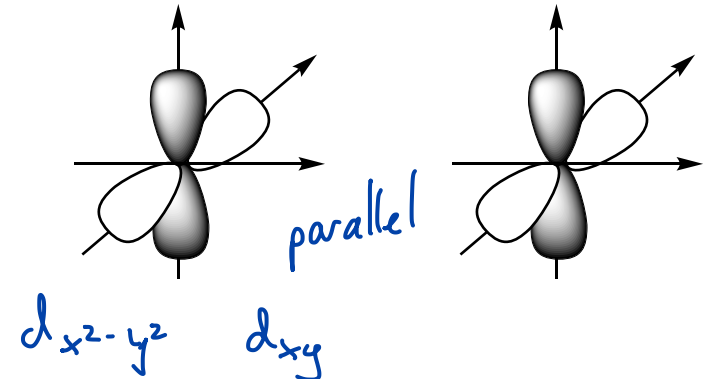


π_u



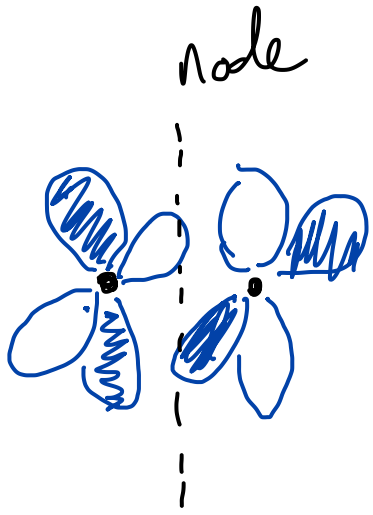


π_g^*



δ_g

node



δ_u^*

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Bonding – constructive interference

Lowers the energy of the e⁻'s because they have volume between the 2 nuclei where the e⁻'s can experience more ⊕ charge as compared to the e⁻ in the atom

Antibonding – destructive interference

Raises the E of the e⁻'s because a node is created and the e⁻ is excluded from the space near the nuclei where they could have been when part of the atom

Nonbonding

Neither stabilizes nor destabilizes the e⁻'s

- if there is an AO that doesn't have a symmetry match
- if there is an AO whose E isn't close to the E of an AO on the other Atom
  - more than 2 orbitals interact and create a nonbonding orbital

O_2