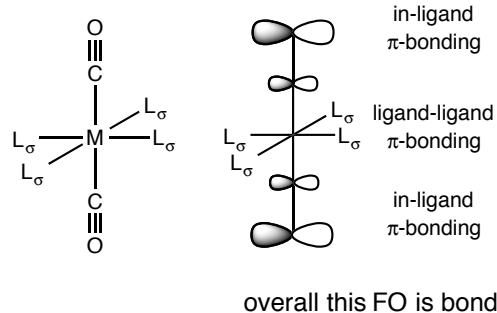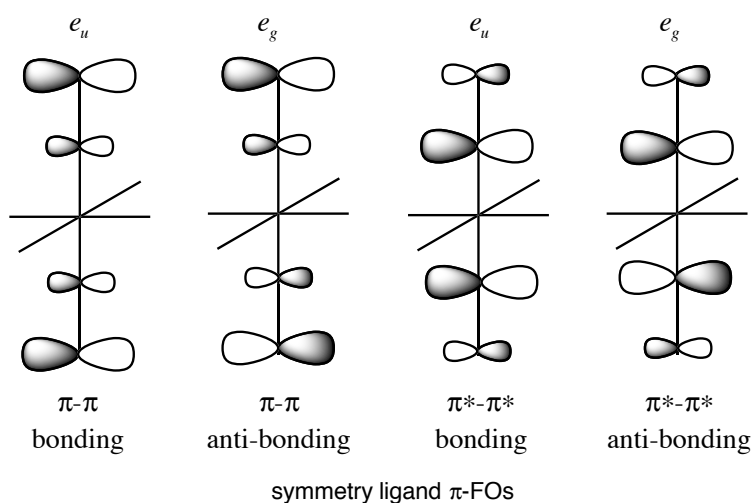## In Class Activity

- draw and annotate bonding and antibonding FOs for the π and π^* orbitals of trans-$M(L_\sigma)_4(CO)_2$, the first one shown in **Figure 1**
    - remember to keep each ligand FO "together" ie as the π or the π^* FO
    - then take the π FOs and form the bonding and antibonding pair
    - then take the π^* FOs and form the bonding and antibonding pair

don't forget there will be an equivalent set of ligand FOs orientated along the y-axis, so that we will have two bonding π-π FOs, two anti-bonding π-π FOs, two bonding π^*-π^* FOs, and two anti bonding π^*-π^* FOs

overall this FO is bonding

Figure 1 trans-$M(L_\sigma)_4(CO)_2$ and one of the ligand π-FO combinations

e_u	e_g	e_u	e_g
π-π	π-π	π^*-π^*	π^*-π^*
bonding	anti-bonding	bonding	anti-bonding

symmetry ligand π-FOs

Figure 2 π and π^* ligand FOs

- check the symmetry guess for the new p_π-FOs, I will do one as an example
    - the π^*-π^* set are degenerate (aligned along p_x and p_y axis)
    - the only options are e_u and e_g
    - for u both orbitals must change sign under inversion
    - for g both orbitals must remain unchanged under inversion
    - the π^*-π^* set must be e_g

1