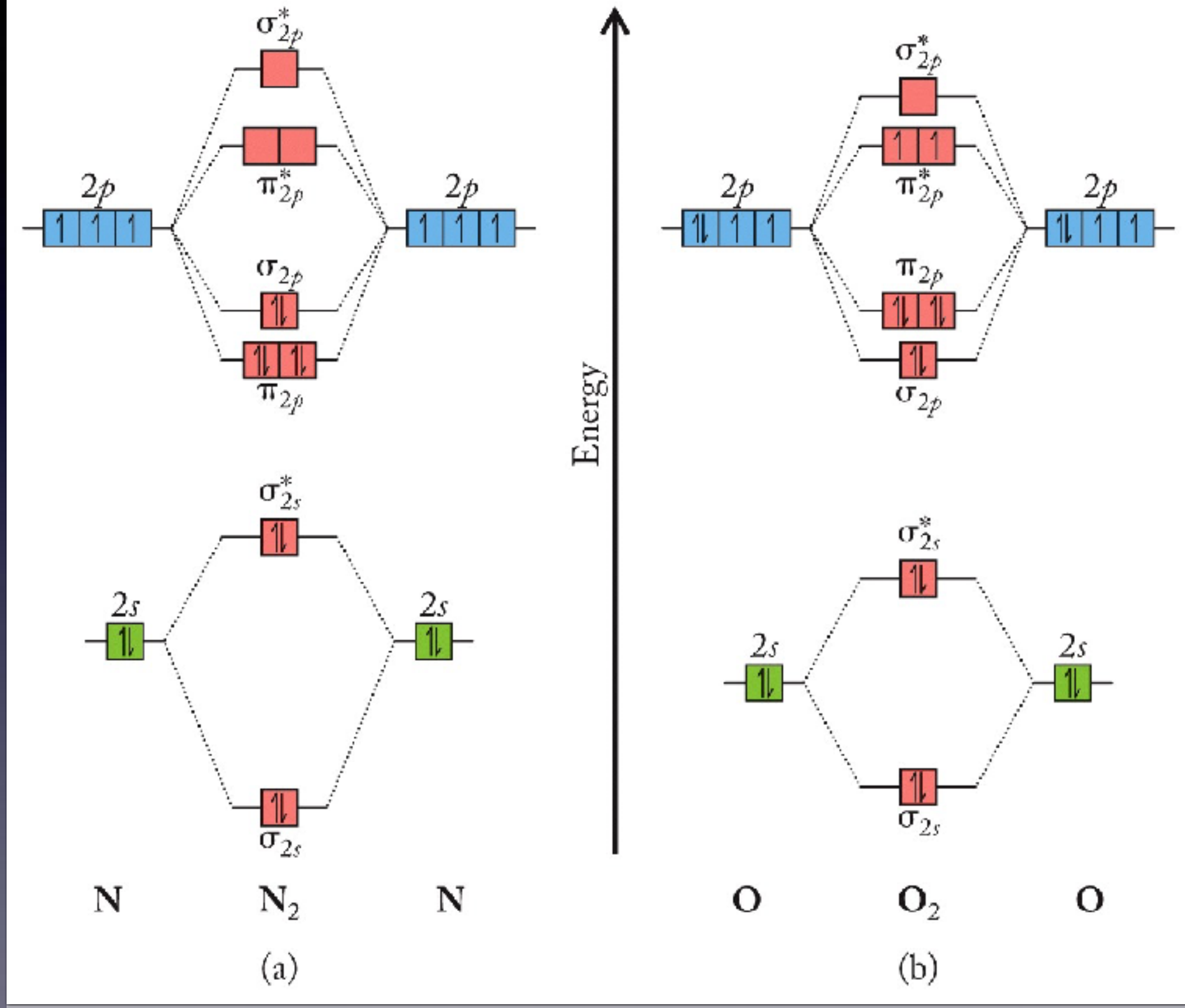
Previously in Molecularity…

GKF 5.46


σ^*_{2p}
π^*_{2p}
$2p$
$2p$
σ_{2p}
π_{2p}
σ^*_{2s}
$2s$
$2s$
σ_{2s}
N
N_2
N
(a)
Energy
σ^*_{2p}
π^*_{2p}
$2p$
$2p$
π_{2p}
σ_{2p}
σ^*_{2s}
$2s$
$2s$
σ_{2s}
O
O_2
O
(b)

For practice

- Draw the Lewis dot structure of bromine chloride

- Draw and populate an MO diagram of bromine chloride
  What is the bond order?
  Does the MO bond order agree with Lewis?
  What parts of this disagree with Lewis?

Where are we going today?

Ch1010-A17-A03 Lecture 22

- §6.4-6.5 Morelecular orbitals

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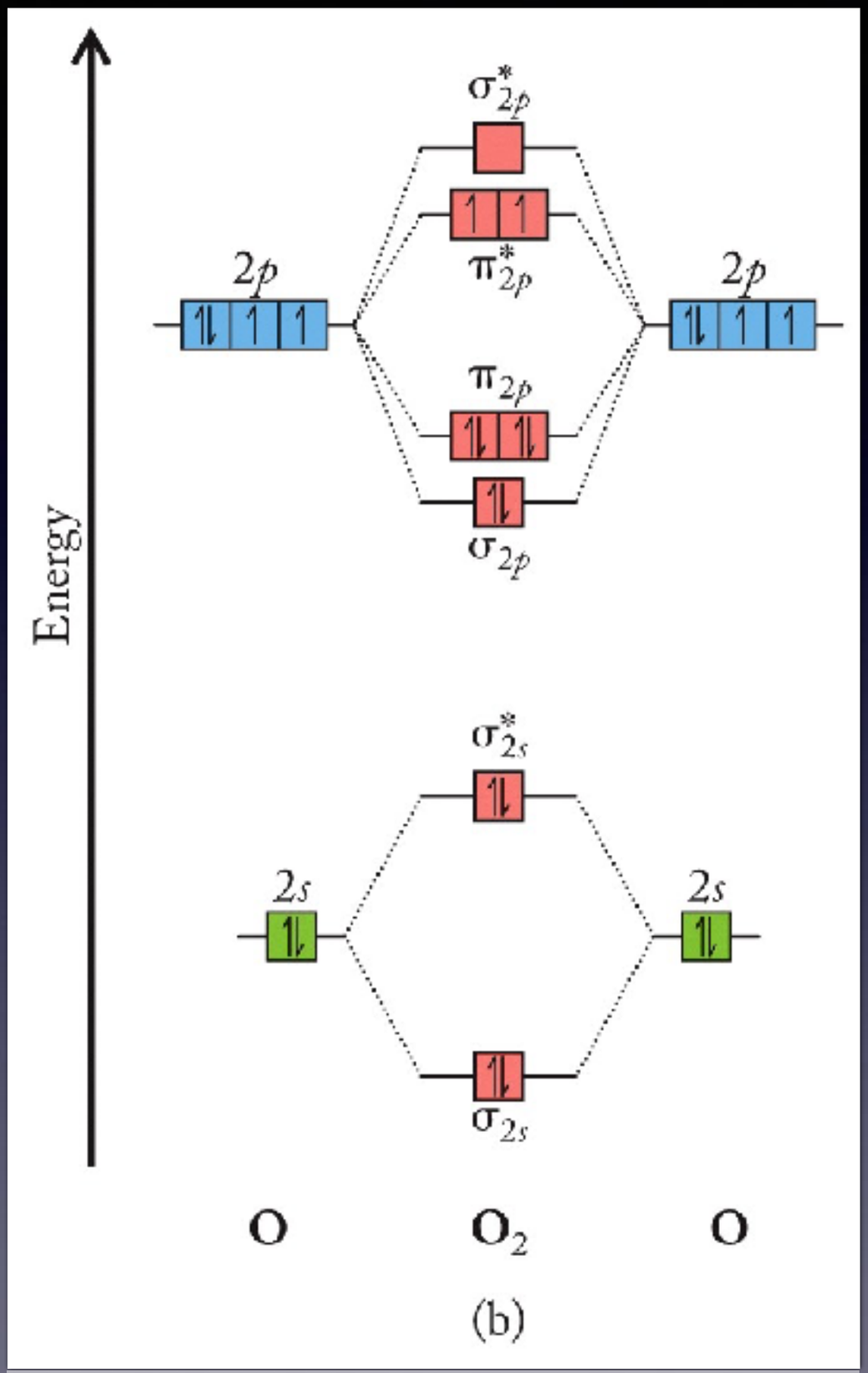
GKF 5.46

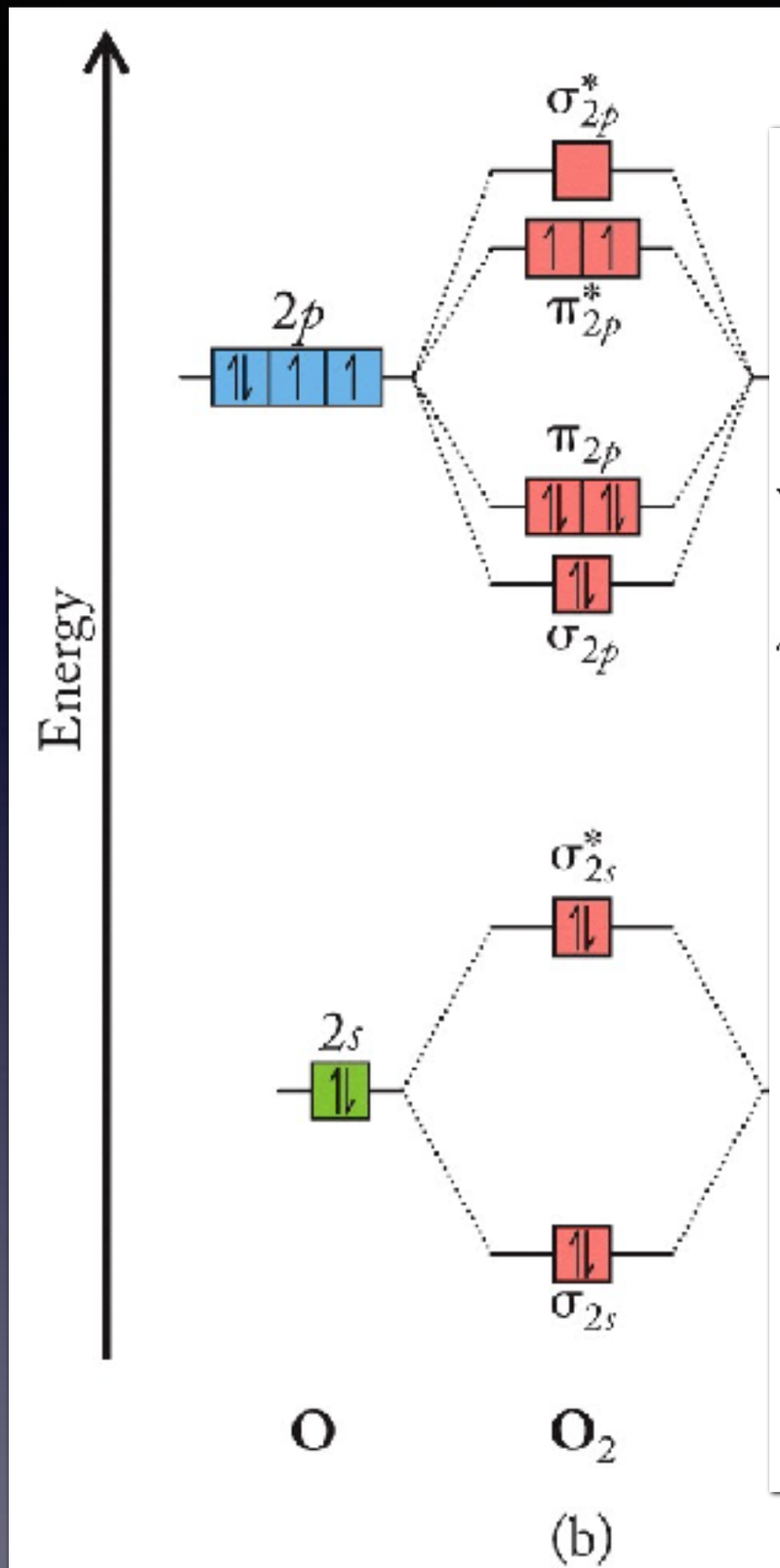


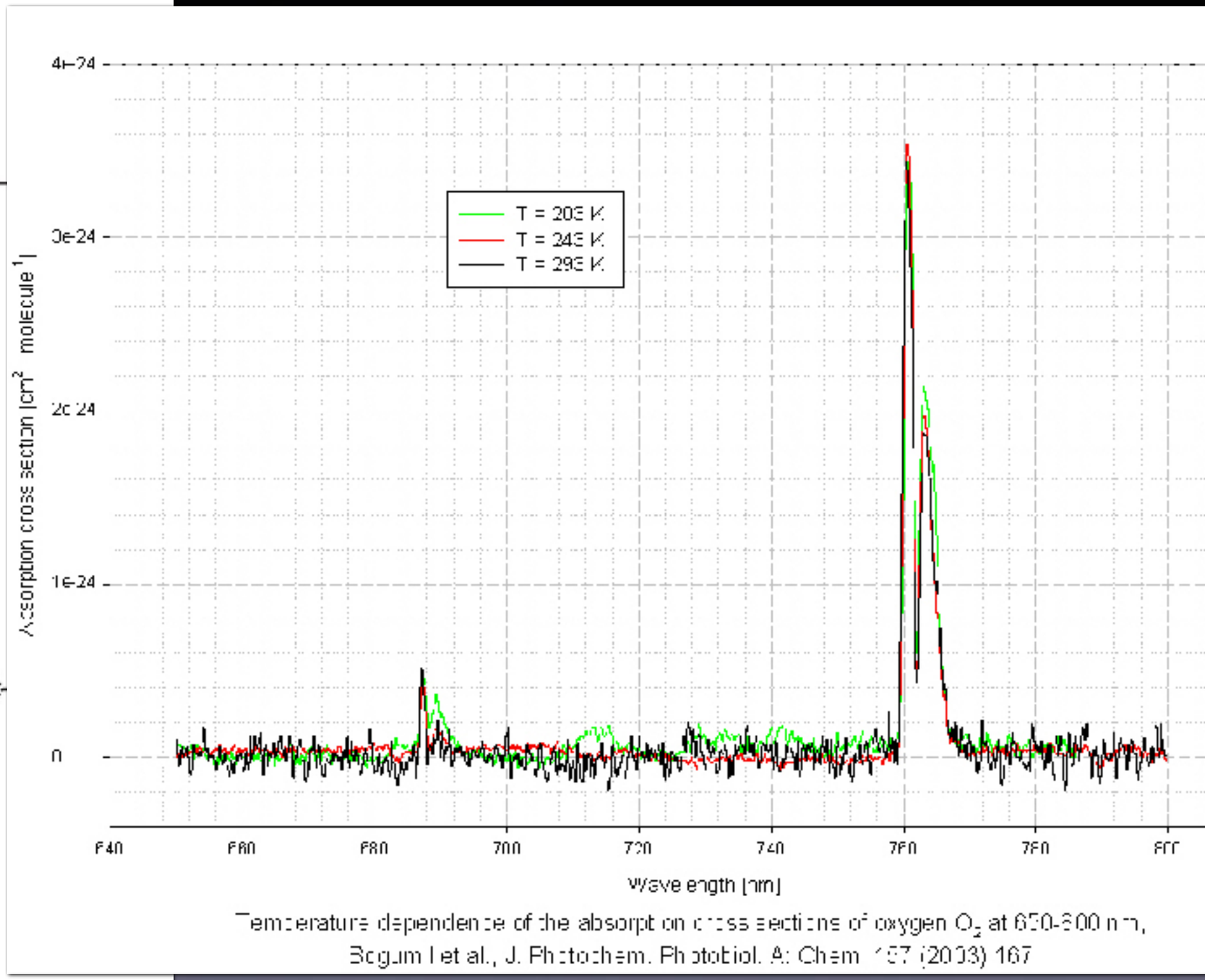
Spectroscopy

- What can spectroscopic features tell us about energy levels?

GKF 5.46

π^*_{2p} to σ^*_{2p}



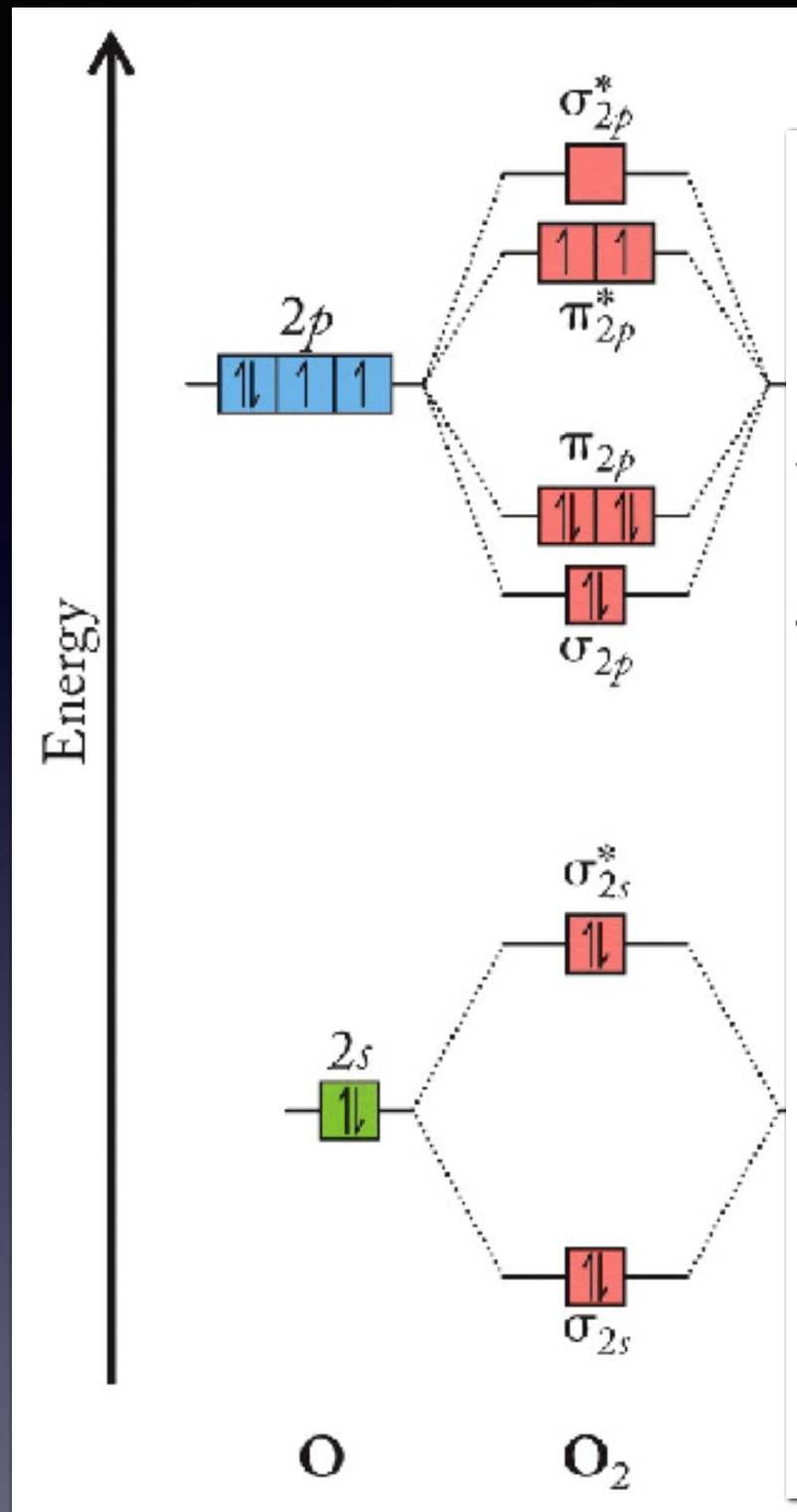


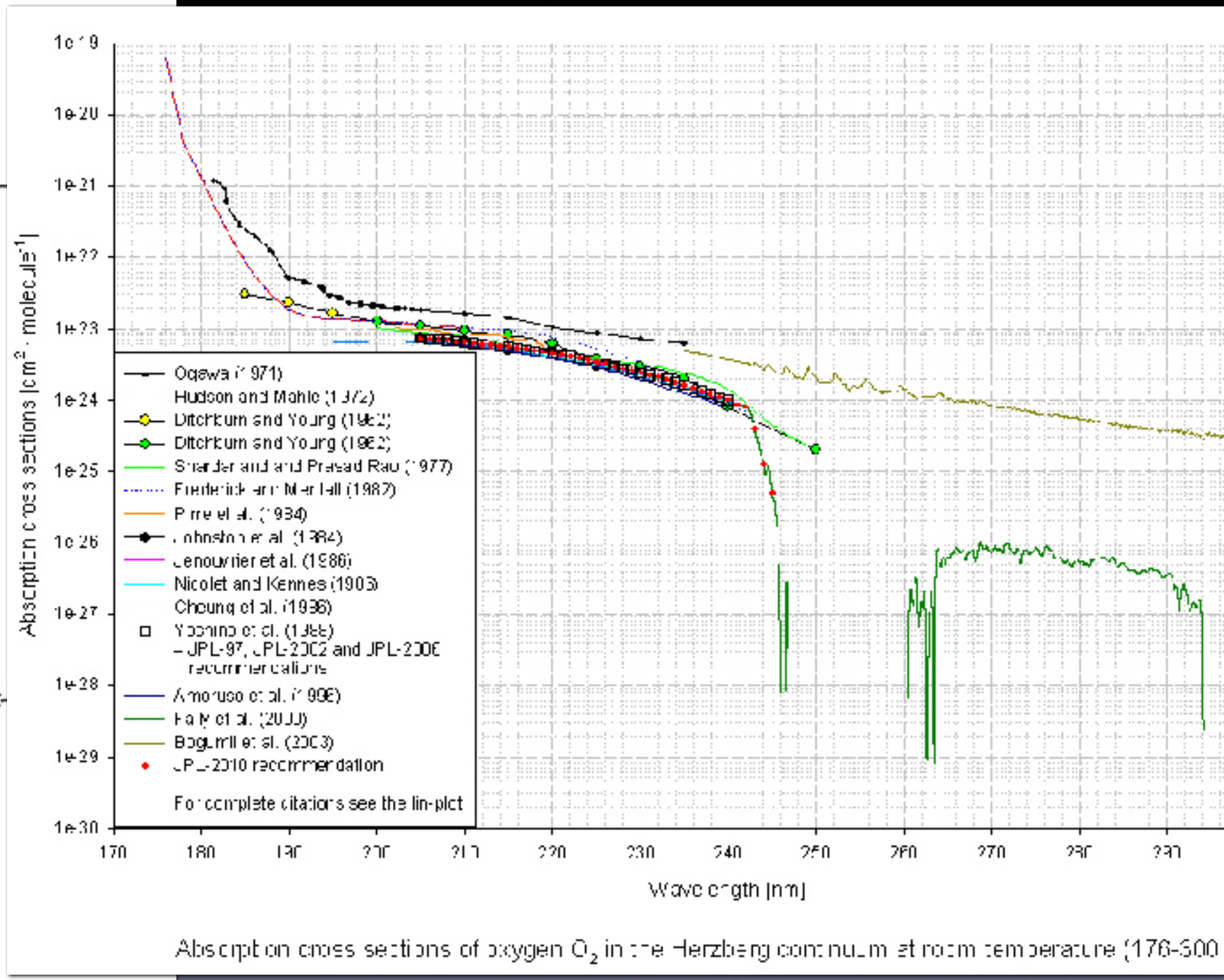
Temperature dependence of the absorption cross sections of oxygen O_2 at 650-800 nm,
Bogumil et al., J. Photochem. Photobiol. A: Chem. 157 (2003) 167

joseba.mpch-mainz.mpg.de
O2_650-800nm_lin.jpg

GKF 5.46

π_{2p} to π^*_{2p} (off chart < 170 nm)

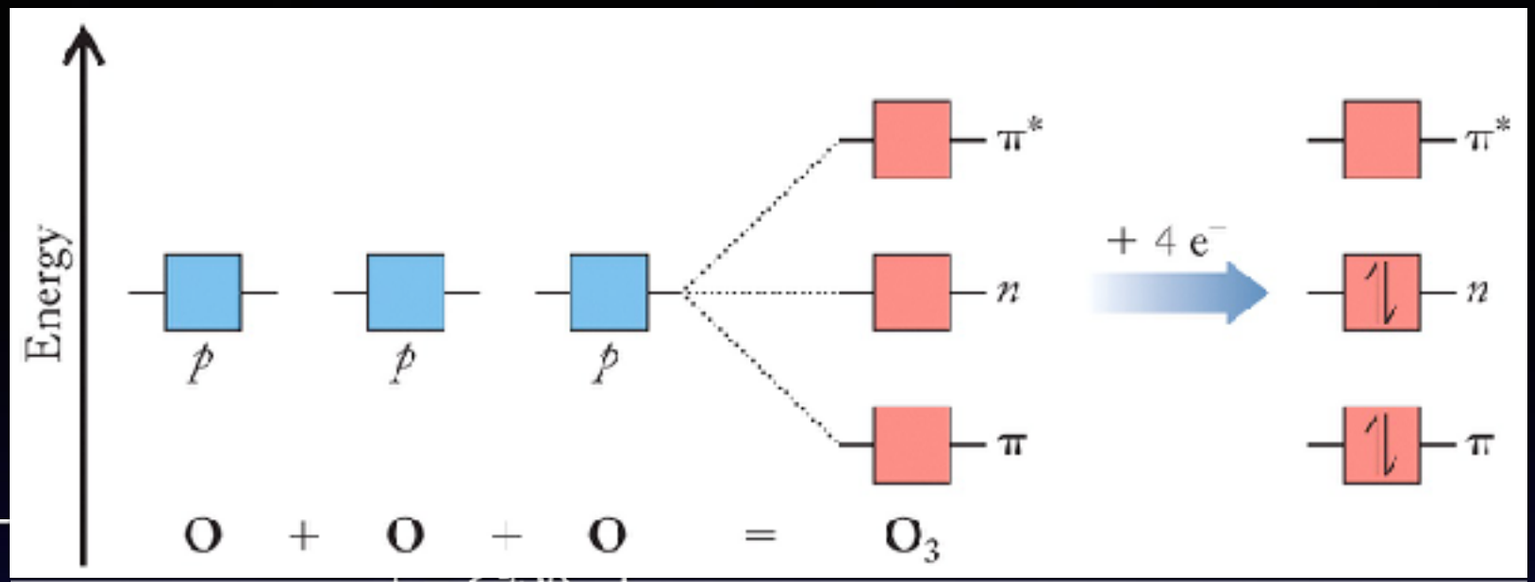




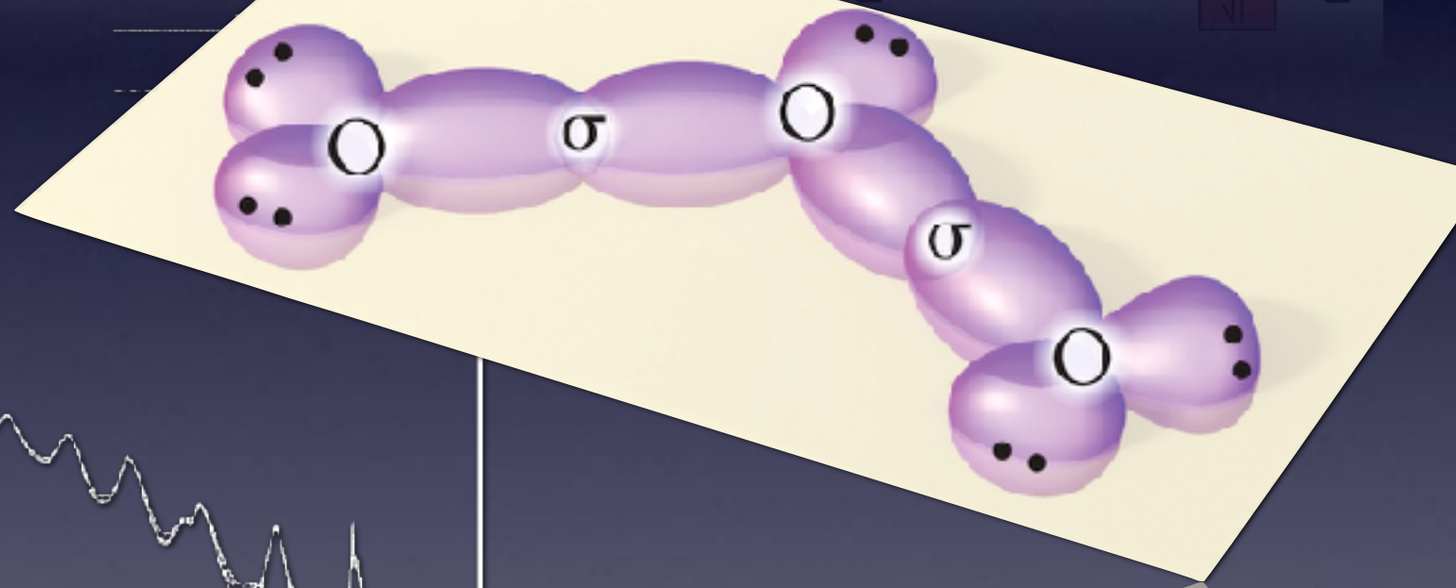
Absorption cross sections of oxygen O_2 in the Herzberg continuum at room temperature (176-300

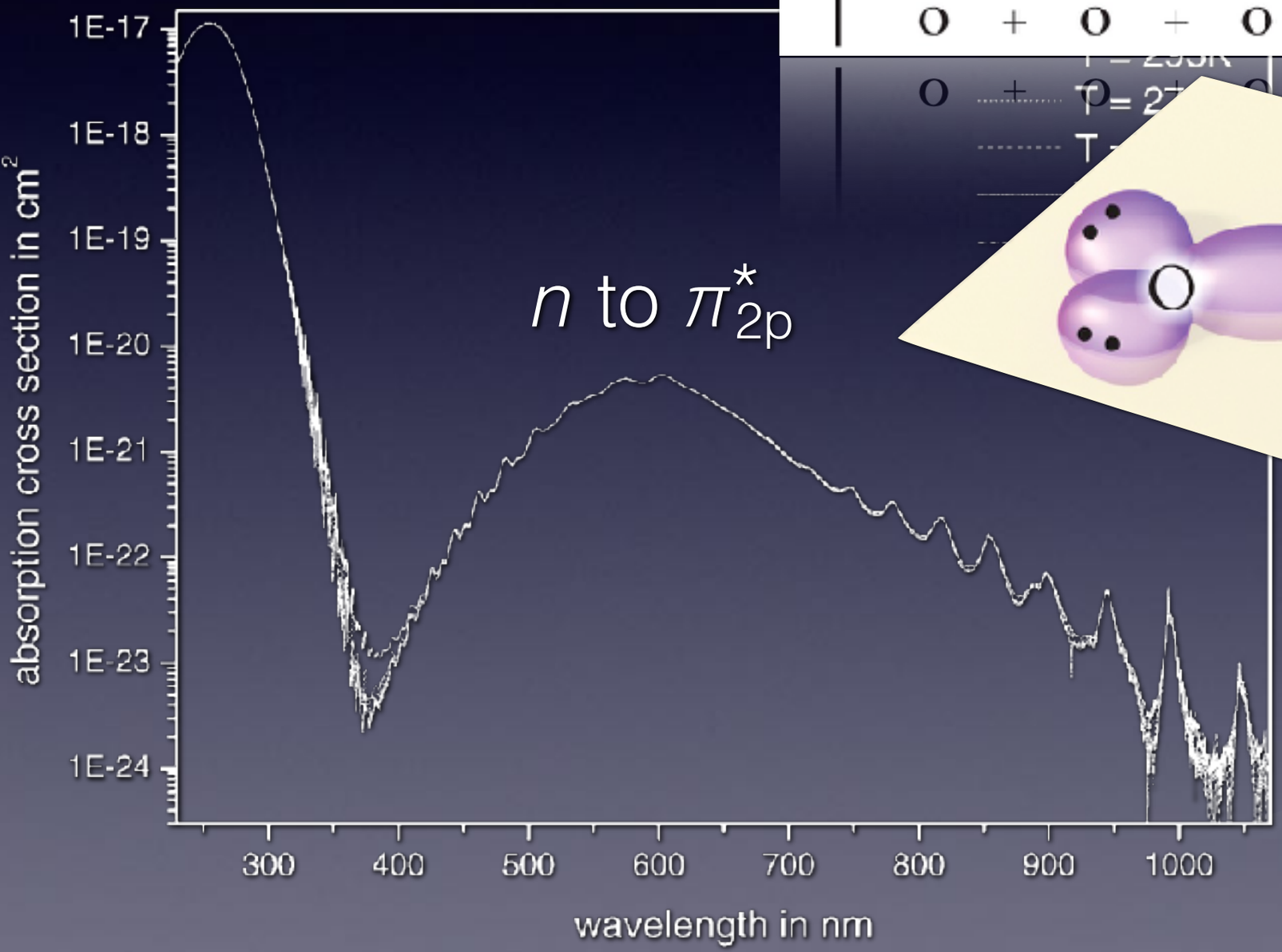
joseba.mpch-mainz.mpg.de
O2_Herzberg_log.jpg

π_{2p} to π^*_{2p}



GKF 5.51,52





n to π^*_{2p}

Bogumil et al. J Photochem Photobio A **2003**, *157*, 167.
http://dx.doi.org/10.1016/S1010-6030(03)00062-5

MO Expectations

- Can you…
  - … draw MO cartoons indicating phase and nodes?
    … identify the MO from a picture (i.e. σ vs σ* vs π vs π*)?
  - …construct an energy diagram of a diatomic molecule?
    …give the electronic energy configuration ($1\sigma^2\ 2\sigma^{*1}$…)?
    …indicate the bond order of that diatomic molecule?
  - …recognize how MO shape and character change in heteronuclear diatomic molecules?
  - … understand the correlation between MO diagrams and molecular spectroscopy?

Where did we go today?

Ch1010-A17-A03 Lecture 22

- §6.4-6.5 Morelecular orbitals

Next time…

- Ch11 London fog and also dispersion. Polar interactions

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