

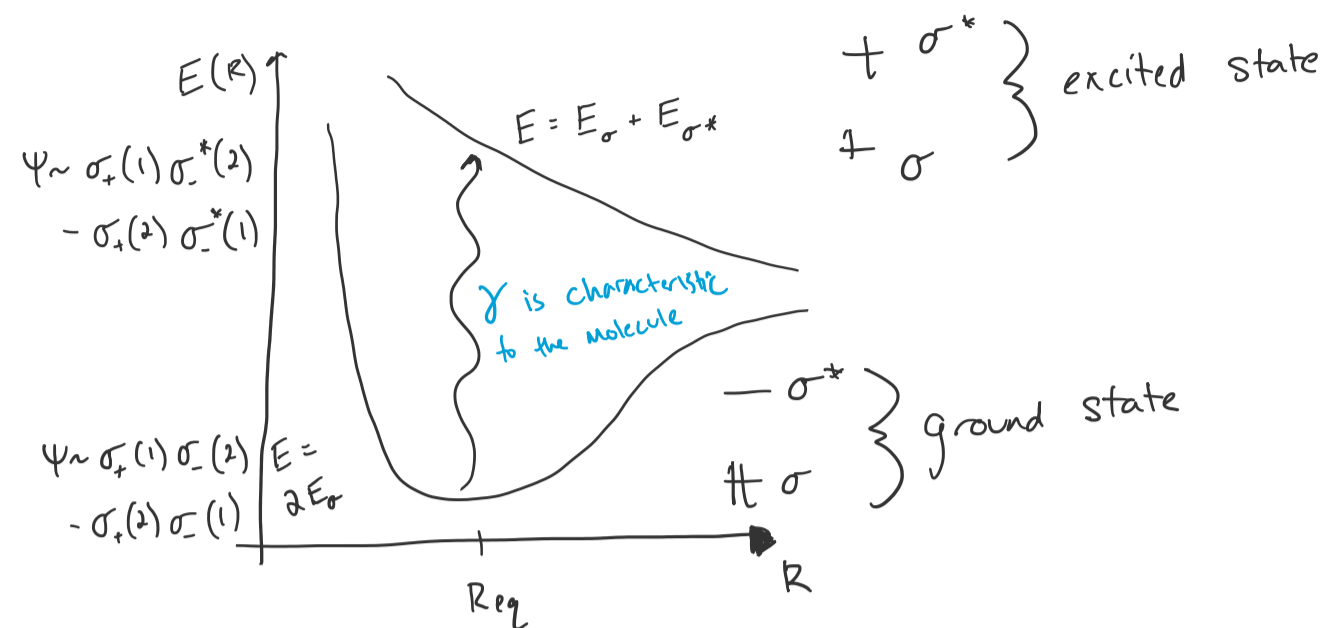
# Lecture 14

Friday, September 22, 2023 9:55 AM

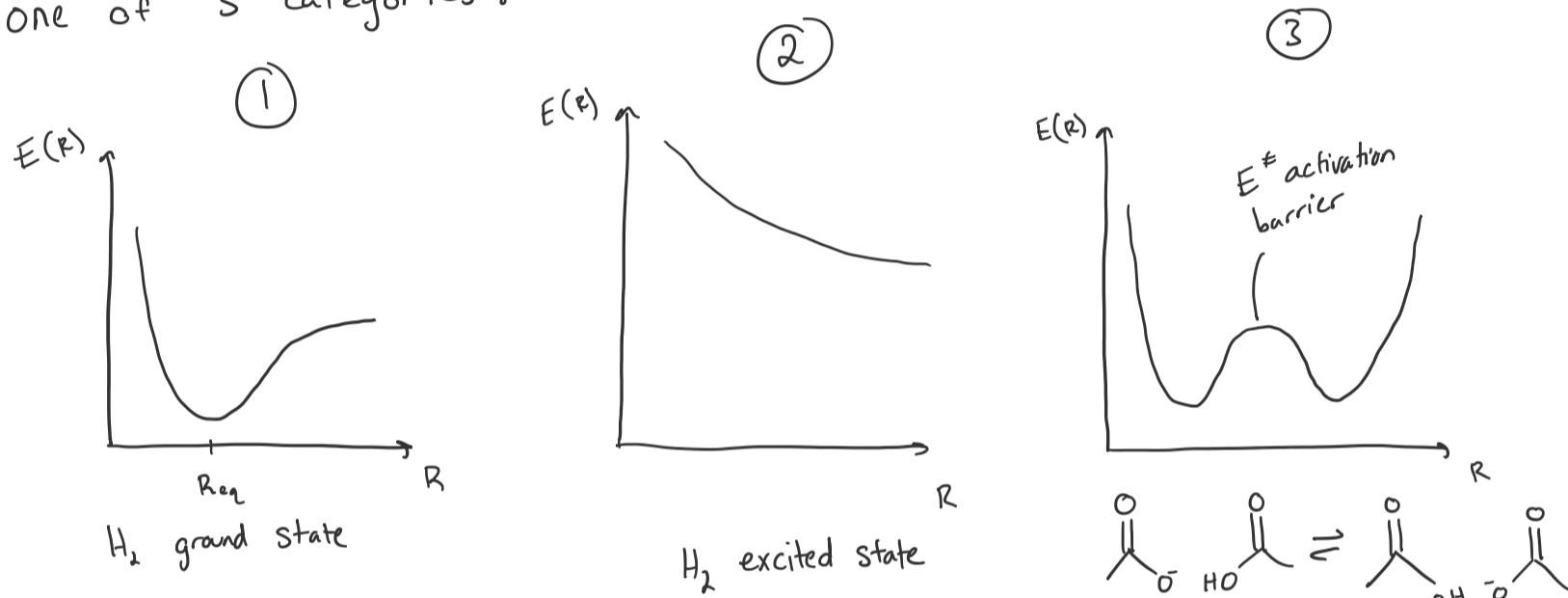
## Spectroscopy & Alien Life

$e^-$  can be excited to higher energy configs or "excited states"

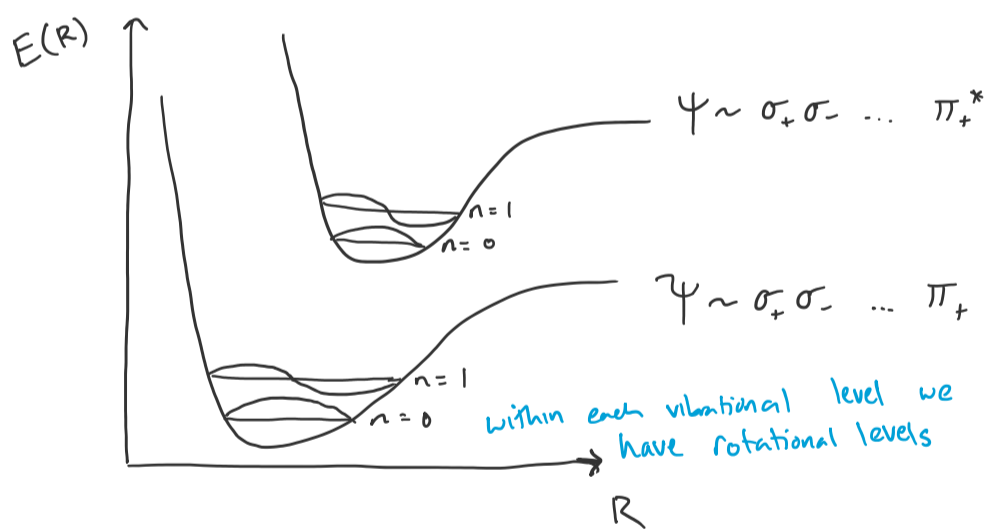
Ex.  $H_2$



Almost all molecular potential energy surfaces  $E(R)$  fall into one of 3 categories:

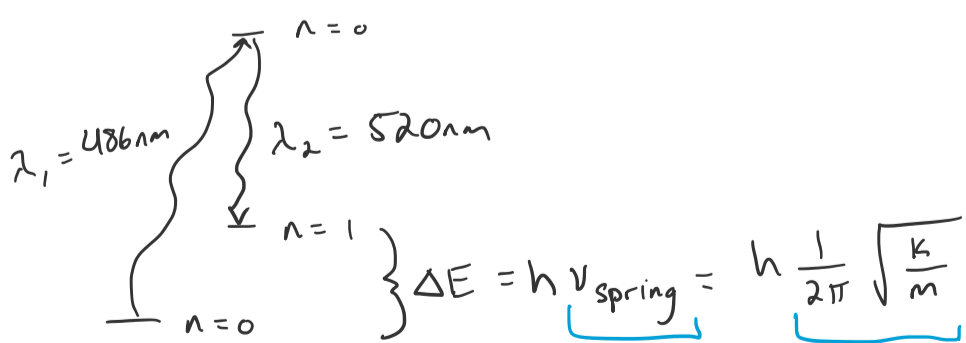


Each electronic state has energy levels



Each molecule has a unique frequency & can be determined anywhere in the universe

## HW Q5.1 Absorption & Emission



$$\textcircled{1} \lambda \nu = c \Rightarrow \nu = \frac{c}{\lambda}$$

$$\textcircled{2} \Delta E = h(\nu_1 - \nu_2) = h\nu_{spring}$$

$$\textcircled{3} \nu_{spring} = \frac{\Delta E}{h} = \nu_1 - \nu_2 = \frac{c}{\lambda_1} - \frac{c}{\lambda_2}$$