

De Broglie wavelength

$$\lambda = \frac{h}{mv}$$

h (J·sec)
 m (kg)
 v (m/sec)

WATCH
UNITS!

Nov 2-8:04 AM

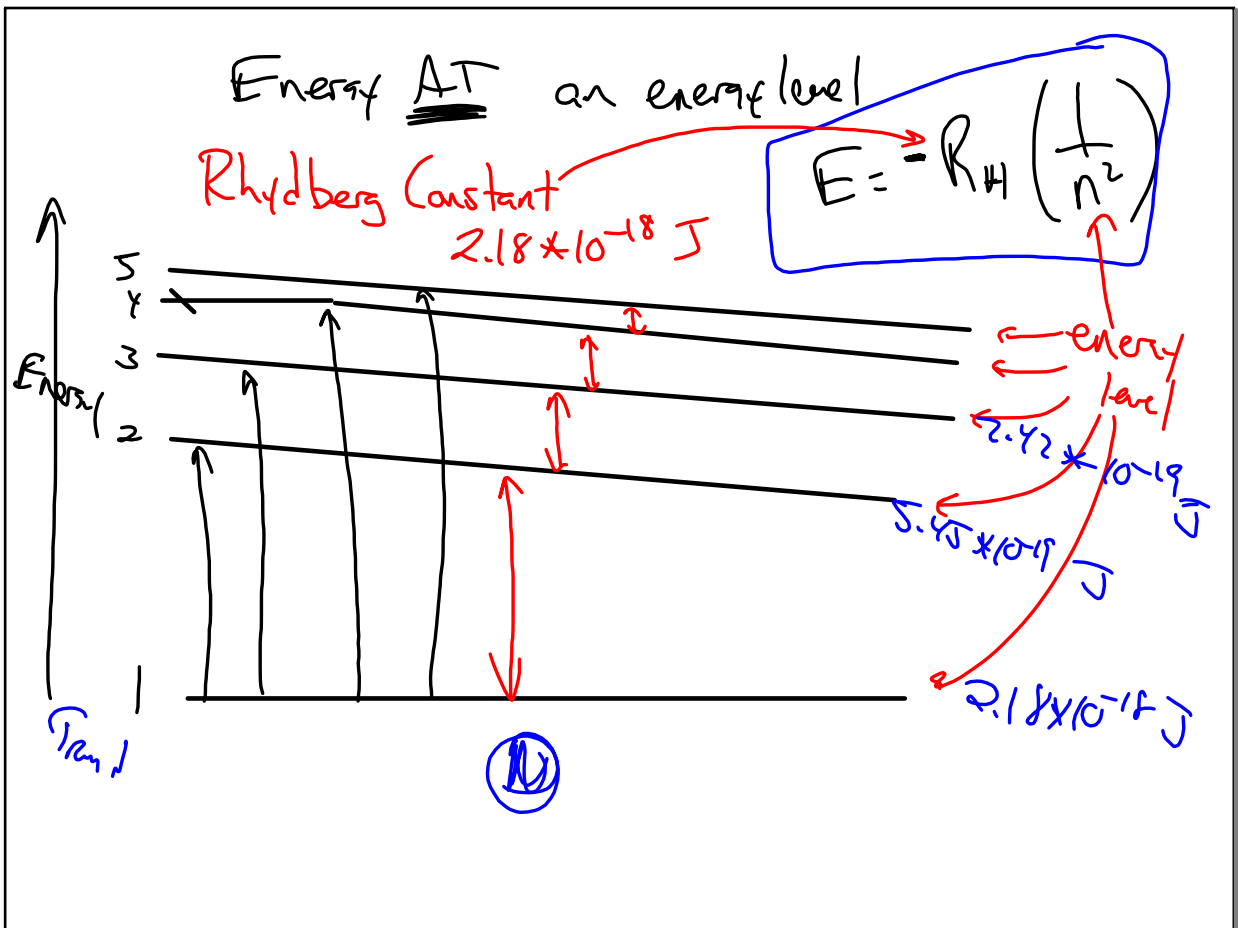
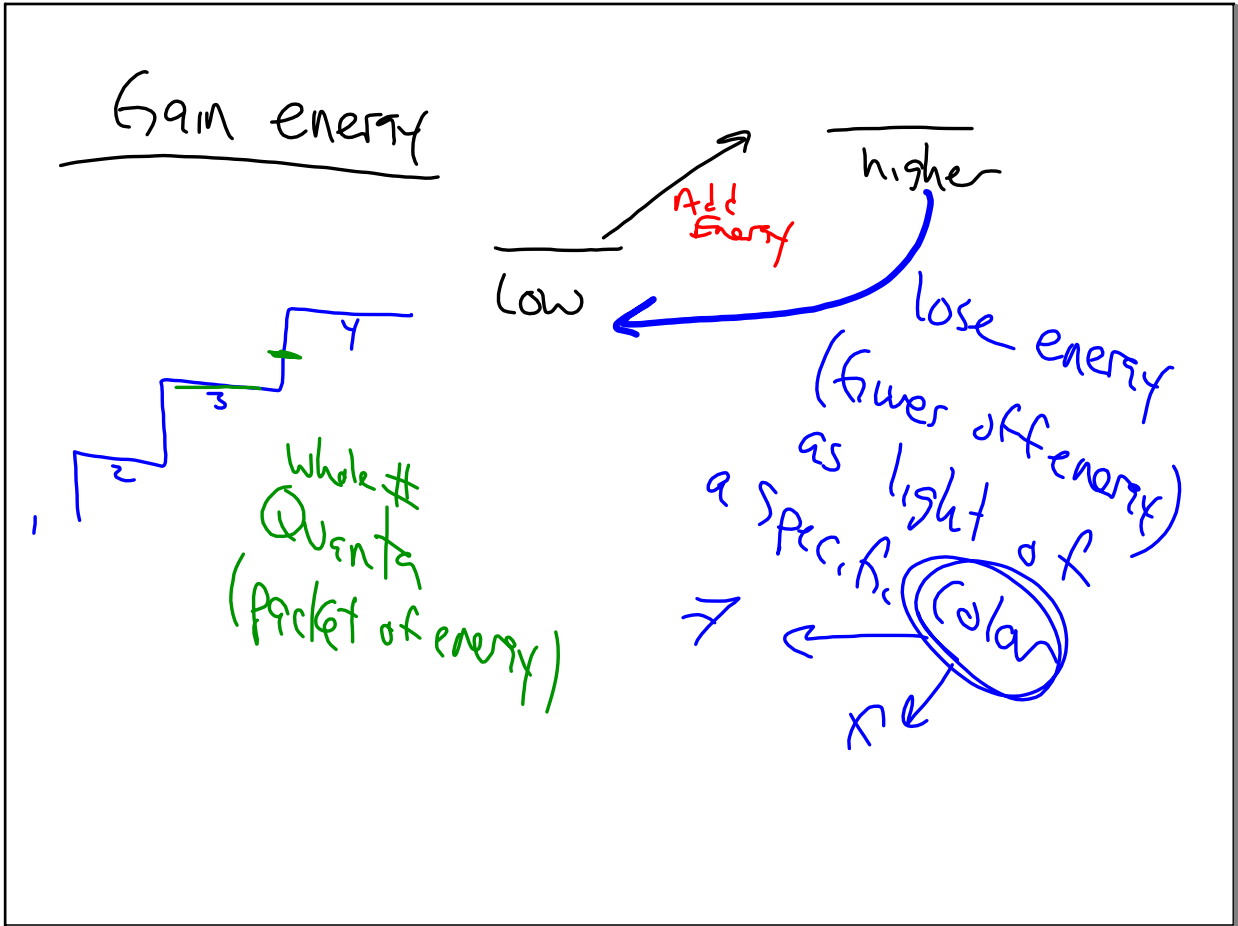
$$\lambda = \frac{h}{mv}$$

$$\frac{m}{1} = \frac{\text{J} \cdot \text{sec}}{\frac{\text{kg}}{1} \times \frac{\text{m}}{\text{sec}}}$$

$$\frac{\text{J} \cdot \text{sec}}{\text{sec}} = \frac{\text{kg} \times \text{m}^2}{\frac{\text{sec}}{\text{sec}}}$$

$$\text{J} = \frac{\text{kg} \times \text{m}^2}{\text{sec}^2}$$

Nov 2-8:16 AM



1st energy level $E = -R_H \left(\frac{1}{n^2} \right)$
 $= 2.18 \times 10^{18} \left(\frac{1}{1^2} \right) = 2.18 \times 10^{-18} \text{ J}$

2nd energy level $E = R_H \left(\frac{1}{n^2} \right)$
 $= 2.18 \times 10^{-18} \left(\frac{1}{2^2} \right) = 5.45 \times 10^{-19} \text{ J}$

3rd energy level $E = R_H \left(\frac{1}{n^2} \right)$
 $= 2.18 \times 10^{-18} \left(\frac{1}{3^2} \right) = 2.12 \times 10^{-19} \text{ J}$

Nov 2-8:28 AM

$$\Delta E = E_{\text{final}} - E_{\text{initial}}$$

$$= -R_H \left(\frac{1}{n_f^2} \right) - -R_H \left(\frac{1}{n_i^2} \right)$$

$$\Delta E = R_H \left(\frac{1}{n_i^2} - \frac{1}{n_f^2} \right)$$

$E = hf$

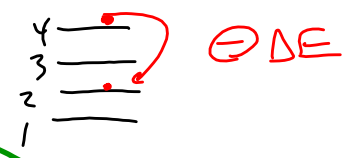
$hf = R_H \left(\frac{1}{n_i^2} - \frac{1}{n_f^2} \right)$

$\frac{hc}{\lambda} =$

$c = f \lambda$
 $f = \frac{c}{\lambda}$

Nov 2-8:35 AM

4 → 2
energy level



$$\Delta E = -R_H \left(\frac{1}{n_i^2} - \frac{1}{n_f^2} \right)$$

$$= -2.18 \times 10^{-18} \left(\frac{1}{4^2} - \frac{1}{2^2} \right)$$

$$\Delta E = 4.09 \times 10^{-19} \text{ J}$$

$E = h f$
 $4.09 \times 10^{-19} = 6.63 \times 10^{-34} f$
 $f = 6.17 \times 10^{14} \text{ sec}^{-1}$

$c = f \lambda$
 $\lambda = \frac{c}{f} = \frac{3 \times 10^8}{6.17 \times 10^{14}}$
 $\lambda = 4.87 \times 10^{-7} \text{ m}$
 487 nm
 $B \rightarrow 6$

Nov 2-8:38 AM

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Nov 2-8:45 AM