

## LATEX PRACTICE

RAUL VILLALOBOS

(27)

$$\lambda = 589 \times 10^{-9} \text{ m}$$

$$t = 1.60 \times 10^{-8} \text{ s}$$

$$m = 9.11 \times 10^{-31} \text{ kg}$$

a. Find the  $\Delta E$

$$\Delta E \Delta t \geq \frac{\hbar}{2} ; \frac{h}{4\pi}$$

$$\Delta E \geq \frac{h}{4\pi \Delta t} ; \frac{6.626 \times 10^{-34} \text{ J s}}{4\pi \times 1.60 \times 10^{-8} \text{ s}} = 3.296 \times 10^{-27} \text{ J} \left( \frac{1 \text{ eV}}{1.602 \times 10^{-19} \text{ J}} \right)$$

$$\Delta E \geq 2.057 \times 10^{-8} \text{ eV}$$

b. Find  $f$

$$f = \frac{v}{\lambda} = \frac{3.00 \times 10^8 \frac{\text{m}}{\text{s}}}{589 \times 10^{-9} \text{ m}} = 5.093 \times 10^{14} \text{ Hz}$$

c. Find  $\Delta f$

$$\Delta E = h \Delta f ; \Delta f = \frac{\Delta E}{h} = \frac{3.296 \times 10^{-27} \text{ J}}{6.626 \times 10^{-34} \text{ J s}} = 4.974 \times 10^6 \text{ Hz}$$

$$\% = \frac{4.974 \times 10^6 \text{ Hz}}{5.093 \times 10^{14} \text{ Hz}} \times 100 = 9.766 \times 10^{-7} \%$$

Math problems from AoPS: Intro to Algebra

**4.27** Simplify the following:

$$\begin{aligned} & \text{(a)} -3w - 2x + 5 - (2w - 3x - 4) \\ & -3w - 2x + 5 - 2w + 3x + 4 \\ & -5w + x + 9 \end{aligned}$$

$$\begin{aligned} & \text{(b)} 2(r^2 - 3s) - 3(2r^2 + 2r - s) \\ & 2r^2 - 6s - 6r^2 - 6r + 3s \\ & -4r^2 - 6r - 3s \end{aligned}$$