

## LATEX PRACTICE

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$$\begin{aligned} (27) \\ \lambda &= 589 \times 10^{-9} \text{ m} \\ t &= 1.60 \times 10^{-8} \text{ s} \\ m &= 9.11 \times 10^{-31} \text{ kg} \end{aligned}$$

a. Find the  $\Delta E$

$$\begin{aligned} \Delta E \Delta t &\geq \frac{\hbar}{2} ; \frac{\hbar}{4\pi} \\ \Delta E &\geq \frac{\hbar}{4\pi\Delta t} ; \frac{6.626 \times 10^{-34} \text{ J s}}{4\pi \times 1.60 \times 10^{-8} \text{ s}} = 3.296 \times 10^{-27} \text{ J} \left( \frac{1 \text{ eV}}{1.602 \times 10^{-19} \text{ J}} \right) \\ \Delta E &\geq 2.057 \times 10^{-8} \text{ eV} \end{aligned}$$

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  $\Delta f$

$$\begin{aligned} \Delta E &= h\Delta f ; \Delta f = \frac{\Delta E}{h} = \frac{3.296 \times 10^{-27} \text{ J}}{6.626 \times 10^{-34} \text{ J s}} = 4.974 \times 10^6 \text{ Hz} \\ \% &= \frac{4.974 \times 10^6 \text{ Hz}}{5.093 \times 10^{14} \text{ Hz}} \times 100 = 9.766 \times 10^{-7}\% \end{aligned}$$

Math problems from AoPS: Intro to Algebra

**4.31** Express  $\frac{3x}{14y^2z^4} - \frac{5y}{18x^3z^2}$  as a single fraction.

$$\begin{aligned} \frac{9x^3}{9x^3} \frac{3x}{14y^2z^4} - \frac{7y^2z^2}{7y^2z^2} \frac{5y}{18x^3z^2} \\ \frac{9x^3(3x) - 7y^2z^2(5y)}{126x^3y^2z^4} = \frac{27x^4 - 35y^3z^2}{126x^3y^2z^4} \end{aligned}$$