

LATEX PRACTICE

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

a. Find the ΔE

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

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

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

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 Δf

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

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

Math problems from AoPS: Intro to Algebra
4.27 Simplify the following:

(a) $-3w - 2x + 5 - (2w - 3x - 4)$
 $-3w - 2x + 5 - 2w + 3x + 4$
 $-5w + x + 9$

(b) $2(r^2 - 3s) - 3(2r^2 + 2r - s)$
 $2r^2 - 6s - 6r^2 - 6r + 3s$
 $-4r^2 - 6r - 3s$