

50. Using Eq. 40-6 and the result of problem 3 in Chapter 39, we find

$$\Delta E = E_{\text{photon}} = \frac{hc}{\lambda} = \frac{1240 \text{ eV} \cdot \text{nm}}{102.6 \text{ nm}} = 12.09 \text{ eV} .$$

Referring to Fig. 40-16, we see that this must be one of the Lyman series transitions. Therefore, $n_{\text{low}} = 1$, but what precisely is n_{high} ?

$$\begin{aligned} E_{\text{high}} &= E_{\text{low}} + \Delta E \\ -\frac{13.6 \text{ eV}}{n^2} &= -\frac{13.6 \text{ eV}}{1^2} + 12.09 \text{ eV} \end{aligned}$$

which yields $n = 3$. Thus, the transition is from the $n = 3$ to the $n = 1$ state.