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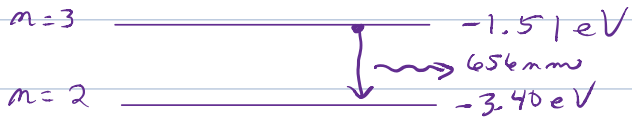
Start with an energy level diagram



First, the atom must be excited up to the n=3 state. Then it can decay down to n=2.

(a) Need $E_1 + K_{electron} \geq E_3$. For the minimum, use the equals sign.

$K_{electron} = E_3 - E_1 = (-1.51\,eV) - (-13.61\,eV)$

$K_{electron} = 12.09\,eV.$

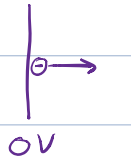
what speed is that?

$K_{electron} = 12.09\,eV = \frac{1}{2} m v^2$

$v = \sqrt{\frac{2K_{electron}}{m}} = \sqrt{\frac{2(12.09\,eV)(1.602\times10^{-19}\,J/eV)}{9.11\times10^{-31}\,kg}}$

$v = 2.06\times10^6\,m/s$

(b) what voltage is needed to give electrons this speed?



if $\boxed{\Delta V = 12.09V}$ then

$\Delta K = 12.09\,eV$