(KTXFI2EBNF) Physics II. Practice

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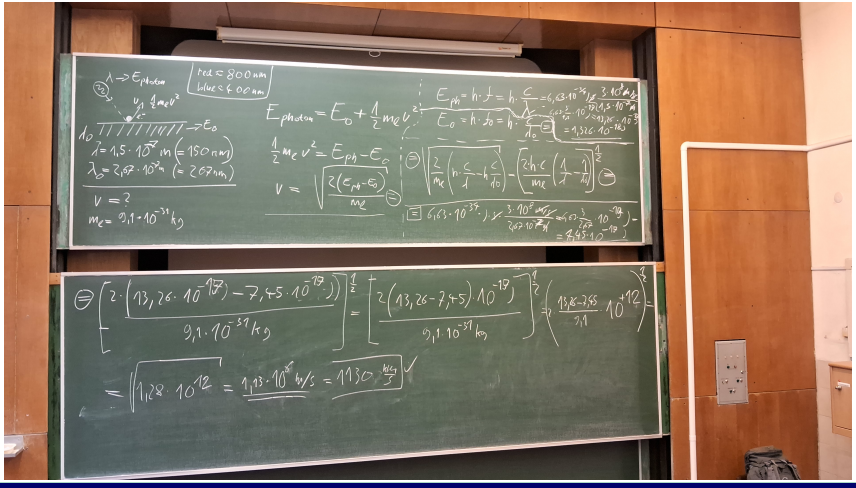
Correction


rot ≈ 800 nm
blue ≈ 400 nm
$E_{photon} = E_0 + \frac{1}{2} m_e v^2$
$\frac{1}{2} m_e v^2 = E_{ph} - E_0$
$v = \sqrt{\frac{2(E_{ph} - E_0)}{m_e}}$
$\lambda_1 = 1{,}5 \cdot 10^{-7}$ m (= 150 nm)
$\lambda_2 = 2{,}67 \cdot 10^{-7}$ m (= 267 nm)
$m_e = 9{,}1 \cdot 10^{-31}$ kg
$E_{ph} = h \cdot f = h \cdot \frac{c}{\lambda} = 6{,}63 \cdot 10^{-34} \cdot \frac{3 \cdot 10^8}{1{,}5 \cdot 10^{-7}}$
$E_0 = h \cdot f_0 = h \cdot \frac{c}{\lambda_0}$
$= 7{,}326 \cdot 10^{-19}$
$6{,}63 \cdot 10^{-34} \cdot \frac{3 \cdot 10^8}{2{,}67 \cdot 10^{-7}} = 7{,}45 \cdot 10^{-19}$
$\sqrt{\frac{2}{m_e}\left(h \cdot \frac{c}{\lambda} - h \cdot \frac{c}{\lambda_0}\right)} = \sqrt{\frac{2hc}{m_e}\left(\frac{1}{\lambda} - \frac{1}{\lambda_0}\right)}$
$\left[\frac{2 \cdot (13{,}26 \cdot 10^{-19} - 7{,}45 \cdot 10^{-19})}{9{,}1 \cdot 10^{-31}\,kg}\right]^{\frac{1}{2}} = \left[\frac{2(13{,}26 - 7{,}45) \cdot 10^{-19}}{9{,}1 \cdot 10^{-31}\,kg}\right]^{\frac{1}{2}} = \left(\frac{13{,}62 \cdot 10^{12}}{9{,}1}\right)^{\frac{1}{2}}$
$= \sqrt{1{,}28 \cdot 10^{12}} = 1{,}13 \cdot 10^6\,m/s = 1130\,\frac{km}{s}$ ✓

Exercises

- See other documents
- Photoelectric Effect
- Compton Scattering
- etc.

The End

Thank you for your attention!