

Wavelength

- In a vacuum $\lambda = c/f$
- In a material $\lambda_n = v/f = (c/n)/f = \lambda/n$

Air wavelength vs vacuum wavelength

- refractive index of air ≈ 1.00028
- wavelength dependent
- also pressure dependent
- wavelength of light in air slightly shorter than wavelength in vacuum

Wavelength and energy levels

For the Balmer- α line ($n=3$ to $n=2$)

Upper energy level	97492.2 cm^{-1}
Lower energy level	82258.9 cm^{-1}
Energy difference	15233.3 cm^{-1}
Vacuum Wavelength	6564.58 \AA

Tabulated (air) wavelength of B_α line is 6562.85 \AA , a difference of 1.73 \AA