

WORKSHEET - Practical Application of Absorption Cross Section ( $\sigma_{ba}$ )

QUESTION: What % of photons will get absorbed when a 1 cm pathlength (l) gas cell of hydrogen at 20°C temperature, 1 atm pressure is excited at its A/K-line (122 nm)?

HELPFUL INFORMATION:

From Fermi Golden rule you calculated,  $\sigma_{ba} = W_{2p-1s} / \Phi = 10^{-19} \text{ cm}^2$

From the ideal gas law you calculate the hydrogen atomic density ( $n = P/k_bT$ ) is  $n = 2.5 \times 10^{19} \text{ cm}^{-3}$

Transmission (T) is  $T = I/I_0 = e^{-n\sigma l}$

