

ACRHEM – Laser Primer

Assignment 1

11-08-09

1. Plot qualitatively $\exp(-x)$, $\exp(-5x)$ and $\exp(-10x)$ on the same graph.
2. Give at least three examples where one encounters the exponential decay. Also comment on the meaning of the decay constant, including its dimensions.
3. Complete the following table :

Laser	Lasing level	Wavelength	Lifetime of Lasing level
Ar ion			
He-Ne			
Ti Sapphire			
Nd:YAG			
CO ₂			

4. Draw the experimental setup to record the following :
 - (a) Absorption
 - (b) Fluorescence
 - (c) Spontaneous emission lifetime
5. For the above mentioned lasers, calculate the ratio $\frac{N_2}{N_1}$, assuming room temperature and thermal equilibrium.