Applied Physics 187

Activity 2 Familiarization with Properties of Light Sources

INDIVIDUAL WORK:

1. Compute and plot the emittance spectrum of a blackbody radiator for the following temperatures 1000K, 2500K, 5400K, 6500K. Interpret the expected colors based on the spectrum. Planck's Blackbody Radiation formula $B(\lambda, T)$ for emittance at temperature T is given by

$$B(\lambda, T) = \frac{2hc^2}{\lambda^5\left(e^{\left(\frac{hc}{\lambda k T}\right)} - 1\right)} \tag{1}$$

Where h : Planck's constant = 6.6262×10^{-34} Js
λ : wavelength of radiation
c : speed of light = 3×10^8 m/s
T : temperature in Kelvins
Use the wavelength range 350nm to 750nm for visible light.

GROUP WORK:

1. Search for light sources. You may look around the NIP building for lamps or you may go to hardware stores selling light sources. Take pictures of the rated Correlated Color Temperature and other specs of the lamp (usually written on the box) or take a snapshot of their CCT's if its on the tube. Also, take a picture of the light from lamps of different CCTs. Compare the captured color with CCT charts you may download from the web. NOTE: Lower the exposure value of your camera when taking a picture of light sources. Also, set the white balance to daylight and not Auto.

2. Measure the emittance spectrum from different light sources that you can find inside and outside the new NIP building. Research on the mechanism of light production of the source. Search for graphs of emittance spectra from the web for each of the light sources discussed. Whenever possible, compare with measured and computed values.