MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE GWALIOR

Department of Mechanical Engineering

REPORT OF SKILL BASED MINI PROJECT

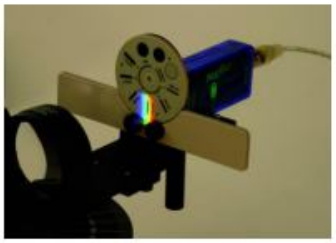
Heat and mass transfer (120513)

BLACK BODY

Introduction:

A black body is an ideal body which allows the whole of the incident radiation to pass into itself (without reflecting the energy) and absorbs within itself this whole incident radiation (without passing on the energy). This property is valid for radiation corresponding to all wavelengths and to all angels of incidence. the black body is an ideal absorber of incident radaition.

Description of Model



Use the spectrometer to record the blackbody spectrum at five different temperatures. The temperature can be set by changing voltage over the light bulb filament. Try to choose temperatures that give noticeably different blackbody curves. Fit your data in IGOR pro to calculate the approximate temperature of the filament for each measurement. Find the wavelength of peak emission. Does your measurement agree with Wien's Law?

Applications of Model

- **A black body is a perfect emitter and absorber of radiation. In a black body, the radiation emission depends on its temperature.**
- **Because of the temperature-emission-frequency relationship, the emission peak gives us the body's temperature.**
- **Black holes are perfect black bodies, able to absorb all radiation. Several mechanisms have been predicted and theorised by which they can emit radiation. One of them is the Hawking radiation.**

What I Learned Through Project:

Blackbody radiation was one of the first experiments that lead to quantum mechanics. It started with the simple observation that when you heat a metal that it first becomes red, followed by yellow and then white hot as the temperature increases.

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