



Arts

COLOUR SPECTRUM

Dr. Asha Gaikwad ^{*1}

^{*1} Physics Department, Shaskiya Maharani Laxmi Bai, Kila Maidan, Indore (M.P.)



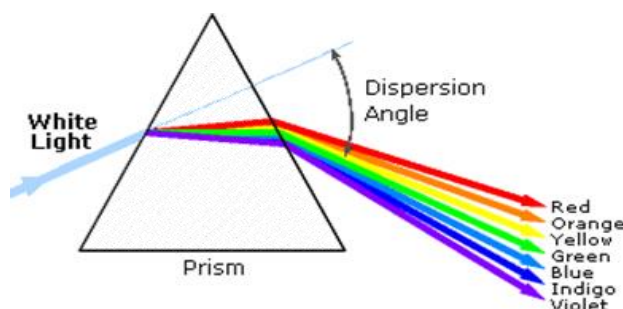
Abstract

Colour is one of the most important elements in our life. Colour can attract our attention and change our mood. When white light dispersed by prism or a diffraction grating the colours are produce. There is a continuous change in wavelength from red to violet. Seven colours are usually distinguished – Violet, Indigo, Blue, Green Yellow, Orange and Red. It is called spectrum. A rainbow shows the colours of the spectrum. It is a range of Light waves or radio waves within particular frequencies.

Keywords: Colour; Spectrum.

Cite This Article: Dr. Asha Gaikwad. (2019). “COLOUR SPECTRUM.” *International Journal of Research - Granthaalayah*, 7(11SE), 80-82. [10.29121/granthaalayah.v7.i11.2019.3704](https://doi.org/10.29121/granthaalayah.v7.i11.2019.3704).

1. Introduction



2. Spectroscopy

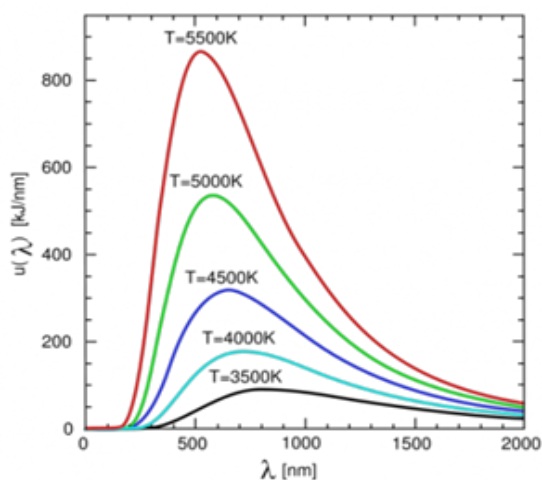
Spectroscopy is a very important tool in astronomy. Light is a energy that moves through space. Light has many different frequencies. Spectrometers are instruments which is spread light out into its wavelengths creating a spectra. In the spectra emission and absorption lines found which are the characteristics of atoms and molecules. An emmission line occurs when an electron drops down to a lower orbit around the nucleus of an atom and looses energy. An absorption line occurs when electrons moves to a higher orbit by absorbing energy. Each atom has a unique spacing of orbits. Each atom can emit or absorb only certain energies or wavelengths. So the spectral line is unique for each atom.



There are Three types of Spectra – Continuous Spectra, Emission Spectra and Absorption spectra.

3. Continuous Spectra

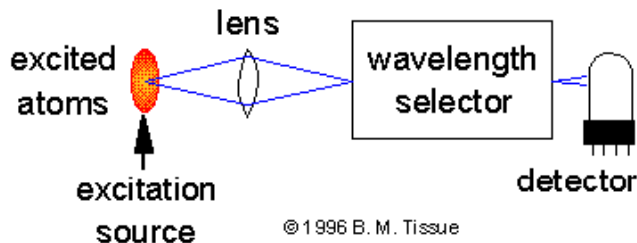
It also called a thermal or black body spectra. It is emitted by an object that radiates heat. The light is spread out into a continuous band with every wavelength having some amount of radiation. When Sunlight is passed through a prism it spread in different colours. A blackbody is a body that absorbs all electromagnetic radiation incident on it. By the second law of thermodynamics a body always tries to stay in a thermal equilibrium. To stay in thermal equilibrium a black body must emit radiation at the same rate as it absorbs. So it must also be a good emitter of radiation. Emitting electromagnetic waves of many frequencies.



4. Absorption Spectra

In some spectrum we get the presence of dark lines. The lines are caused by the Sun's atmosphere absorbing light at certain wavelengths, causing the intensity of the light at this wavelength to drop and appear dark. The atoms and molecules in a gas will absorb only certain wavelengths of light. The pattern of these lines is unique to each element. The absorption spectrum is found from regions in space where a cooler gas lies between us and a hot source. The absorption spectrum is produced from stars, planets with atmospheres and galaxies.

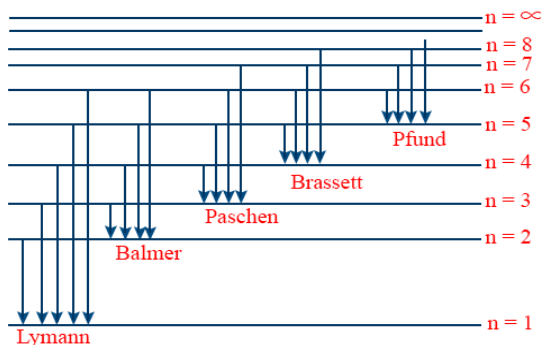
Emission Spectra –



An Emission Spectra occurs when the atoms and molecules in a hot gas emit extra light at certain wavelengths. The pattern of these lines is unique for each element. We can see Emission Spectra from comets, Nebula and certain types of stars.

5. Emission Spectrum of Hydrogen Atom

In the Emission Spectrum of Hydrogen Atom mainly the spectral lines of the following series are obtained - Lyman Series, Balmer Series, Paschen Series, Brackett Series, Pfund Series.



- **Lyman Series** – If the transition of electron is from any higher orbit to the first orbit, the spectral lines of Lyman series are obtained in the ultraviolet region.
- **Balmer Series** – If the transition of electron is from any higher orbit to the second orbit, the spectral lines of Balmer series are obtained in the visible region.
- **Paschen Series** – If the transition of electron is from any higher orbit to the third orbit, the spectral lines of Paschen Series are obtained in the infrared region.
- **Brackett Series** – If the transition of electron is from any higher orbit to the fourth orbit the spectral lines of Brackett series are obtained in the far infrared region.
- **Pfund Series** – If the transition of electron is from any higher orbit to the fifth orbit, the spectral lines of Pfund Series are obtained in the far far infrared region.

In these ways we can define different types of spectra.