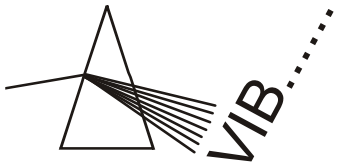
SPECTRA

Spectrum

When light emitted from a source pass through a prism, radiation with different wavelengths is scattered at specific angles, leading to their separation.

Angle of deviation $\propto \nu \propto \frac{1}{\lambda}$ this process is called dispersion.



And such a collection or dispersed light giving its wavelength composition is known as spectrum.

Spectrum are of two types.

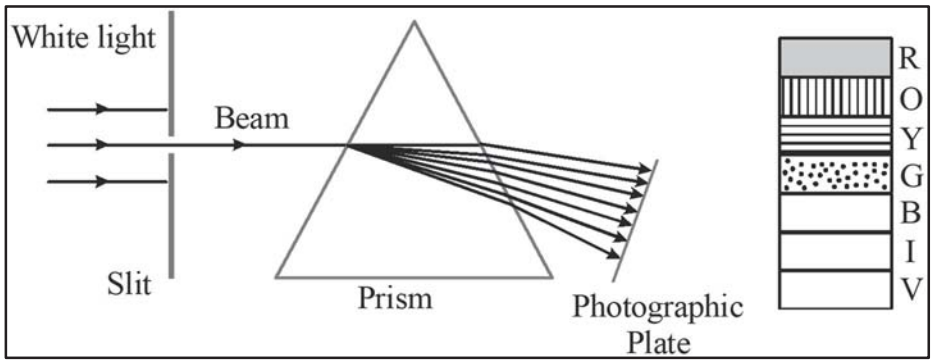
(1) Emission
   (i) Continuous (ii) Discontinuous
(2) Absorption

1. Emission Spectrum

This represents the spectrum of radiations released by any source, atom, or molecule of a substance, which is excited through processes such as heating or electric discharge.

(i) Continuous Spectrum

When white light is separated, a vibrant spectrum emerges, consistently spread across a dark backdrop. The colors smoothly transition from violet to red without distinct boundaries between them. The colors seem to blend into one another, giving rise to what is referred to as a continuous spectrum.



(ii) Discontinuous Spectrum

When an atom interacts with electromagnetic radiation, it induces the excitation of electrons to higher energy levels. As these electrons subsequently return to lower energy levels, they emit radiation corresponding to the difference in energy levels. Consequently, the spectrum observed in the case of an atom is discontinuous, with specific wavelengths, and is identified as an atomic spectrum or line spectrum.

2. Absorption Spectrum

When an atom is exposed to white light, it absorbs particular radiation associated with the disparity in energy levels. Consequently, the transmitted radiations lack specific frequencies, noticeable as missing lines, forming what is termed an absorption spectrum. This spectrum serves as the photographic

negative of the emission spectrum, signifying the absence of the bright lines present in the atomic emission spectrum. In the absorption spectrum, these absent lines are observed as dark lines.