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LIGHT DISPERSION SPECTRAL ANALYSIS

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Abstract
This article covers the definition of spectral analysis of light dispersion, mohoyati, types, the domain and processes of their application, and the reasons for association with other phenomena.

Keywords: Light dispersion, spectral analysis, emission spectrum, absorption spectrum, wavelength of light. structure of matter.

Introduction

What is light dispersion?

Light dispersion is the phenomenon of the separation of white light into colored components as a result of the scattering of light rays of different colors at different speeds in an environment. In other words, dispersion is the process by which light is separated into colors.

The reason*:* the wavelength of light rays of different colors will be different. Rays with different wavelengths interact differently with the substance, that is, refract at different angles. For example, red rays refract less than other colors.

Spectral analysis

Spectral analysis is a method of determining the composition of substances by studying the spectrum of light emitted or absorbed by them. Each substance has its own spectrum, which is considered to be like its "fingerprint".

Spectrum types:

• Emission spectrum: the spectrum of light emitted by a heated gas or Steam itself.
• Absorption spectrum: the spectrum produced when certain wavelengths of light are absorbed in the passage of white light through the layer of matter.

Application of spectral analysis:

• Determination of chemical elements and measurement of their quantity
• Studying the composition of stars and galaxies
• Checking the purity of substances
• Widely used in metallurgy, geology and other fields.

Relationship between light dispersion and spectral analysis

Due to the phenomenon of light dispersion, we will have the opportunity to study Spectra. For example, white light transmitted through the prism decomposes into colors, and we observe

the spectrum. Analyzing this spectrum, we get information about the composition of the substance.

The relationship of light dispersion to other phenomena

• Rainbow: when the sun's rays pass through rain drops, dispersion occurs and a rainbow is formed.

• Diamond shine: due to the high refractive index of the Diamond, Light in it is strongly refracted and dispersed, giving the Diamond a distinctive glow.

In Physical Science and electrical engineering, dispersion relations describe the effect of dispersion on the properties of waves in an environment. It is calculated that the dispersion relation depends on the wavelength or the number of waves on its frequency. Given the dispersion relation, the phase velocity and group velocity of the waves in the medium can be calculated depending on the frequency. In addition to the geometry-dependent and material-dependent dispersion relations, the extensive Kramers-Kronig relations characterize the frequency dependence of wave propagation and weakening.

Dispersion can occur due to geometric boundary conditions (waveguides, shallow water) or the interaction of waves with the transmitter. Elementary particles perceived as waves of matter have a non-trivial dispersion relation, even if there are no geometric constraints and other environments.

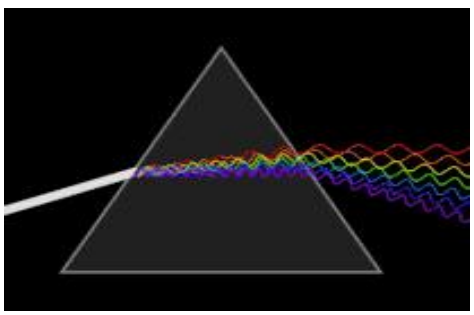
In the presence of dispersion, the wave velocity is no longer uniquely determined, leading to a difference in Phase velocity and group velocity.

Conclusion;

Light dispersion and spectral analysis are amazing phenomena of nature that allow us to learn more deeply about substances. These phenomena are of great importance for physics, chemistry, astronomy and many other sciences.

Light Dispersion

Light dispersion is the process by which light is separated into components of different colors. In other words,when white light passes through the prism, it splits into colors. The reason for this phenomenon is that light waves of different colors move at different speeds and therefore break at different angles.



Causes of dispersion:

• Structure of matter: molecules and atoms of different substances interact differently with light waves.

• Wavelength of light: short-wave light (purple) refracts stronger than long-wave light (red).

Spectral Analysis

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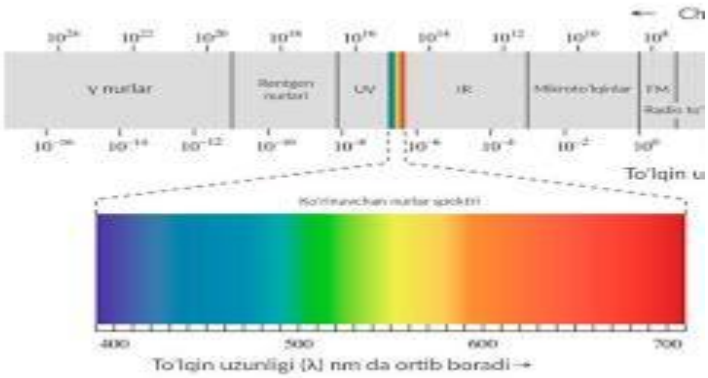

Spectrum types:

* **Emission spectra:** light spectra emitted by heated gases or vapors.
* **Absorption spectra:** when white light passes through some substance, the substance absorbs light of a specific wavelength and black lines appear in the spectrum obtained.

Application of spectral analysis:

* **Astronomy:** determination of the chemical composition of stars and galaxies.
* **Chemistry:** determination of the composition of substances, synthesis of new substances.
* **Metallurgy:** control of the quality of metals.
* **Archaeology:** determining the composition of ancient objects.

Importance Of Spectral Analysis

Spectral analysis is widely used in many areas of modern science and technology. With it, we will be able to reveal the secrets of the universe, create new materials and develop technologies.

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