Infrared radiation (IR) is a type of electromagnetic radiation that lies within the electromagnetic spectrum just beyond the range of visible light. It has longer wavelengths than visible light, typically ranging from about 700 nanometers (nm) to 1 millimeter (mm). Infrared radiation is not visible to the human eye, but it can be detected and measured using specialized instruments and sensors.

Here are some key characteristics and applications of infrared radiation:

Heat and Temperature Sensing: Infrared radiation is often associated with heat. Objects emit and absorb infrared radiation based on their temperature. Infrared thermometers and thermal imaging cameras use IR sensors to measure and visualize temperature variations in objects and environments. This technology is widely used in various fields, including industrial, medical, and building inspections.

Remote Sensing: Infrared sensors are used in remote sensing applications, such as weather forecasting and Earth observation. Infrared imagery from satellites can provide valuable information about temperature distributions, cloud cover, and surface features.

Infrared Communication: Infrared radiation is used for short-range wireless communication in devices like TV remote controls, computer peripherals, and some smartphone features. It transmits data by encoding information in modulated IR light pulses.

Night Vision: Infrared night vision technology relies on the detection of thermal infrared radiation emitted by objects. This allows for the creation of images in low-light or no-light conditions. Military, law enforcement, and security agencies commonly use infrared night vision devices.

Infrared Spectroscopy: Infrared spectroscopy is a powerful analytical technique used in chemistry and materials science. It involves shining infrared light on a sample and measuring the absorption, reflection, or transmission of the light to identify the chemical composition and molecular structure of the material.

Medical Applications: Infrared radiation is used in medical devices like infrared ear thermometers and non-invasive blood glucose monitors. It can also be used for therapeutic purposes in physiotherapy and pain management.

Astronomy: Astronomers use infrared telescopes to observe celestial objects that emit little or no visible light. Infrared observations help astronomers study stars, planets, and galaxies, and can reveal information about their temperature, composition, and formation.

Industrial and Manufacturing: Infrared cameras are used in various industrial processes, such as quality control, detecting defects in materials, and monitoring machinery for overheating.

In summary, infrared radiation plays a crucial role in a wide range of applications, from temperature measurement and communication to remote sensing and scientific research. Its ability to detect and analyze heat and temperature variations makes it invaluable in many fields.

see Fourier Transform Infrared Spectroscopy.

see Near-infrared

see Infrared oculography

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