# What is Electromagnetic Radiation



**Electromagnetic radiation is of two types, Ionizing radiation and non-ionizing radiation. In this, ionizing radiation is more dangerous than non-ionizing radiation since it has the power to ionize particles in its path. Higher frequency radiation like X-Rays and gamma rays are ionizing radiations. Exposure to this kind of radiation is quite dangerous and sometimes results in death. In today’s world, it is impossible to escape electromagnetic radiation. Our whole world is buzzing with electromagnetic radiation caused by cell phones, radio and TV signal transmission, power lines, microwaves, hair dryers etc. We are exposed to electromagnetic radiation wherever we go, whether in office, school, home or on the road.**



With such levels of exposure to electromagnetic radiation, comes the fear of radiation poisoning. Many fear that electromagnetic radiation causes cancer. Though many studies have been conducted on this topic, nothing conclusive has been said about cancer caused by radiation. The scientists who have studied the effects of radiation say that there isn’t enough concrete data available to study the effects of long term radiation exposure. But there are also scientists who believe that there has been an increase in the rate of cancers and tumors in the latest years.  They attribute this to the increase in electromagnetic radiation in the atmosphere.

 **Damaged DNA** is believed to be the cause for cancer. Scientists are of the opinion that the radiation which is emitted into the atmosphere by cell phones and other electrical appliances, are not strong enough to cause damage to our cells. Studies are still going on to find out whether electromagnetic radiation and the increase in the number of cancer and tumor patients are connected.

 **We need electromagnetic protection**

In this scenario, there are few things we can do to protect ourselves from radiation. Becoming aware of the dangerous of electromagnetic radiation is the first step. Knowing what causes radiation and what are the harmful levels of radiation is the first step towards shielding oneself from this danger. Though cell phones emit only slight levels of electromagnetic radiation, it is best to use it as less as possible. Since the effect of long term use of cell phones are still under study, taking precautions to safe guard oneself is very important. Using cell phones in areas of low reception should be avoided, as the Electromagnetic radiation during this time is more. Unplug all appliances when they are not in use. When there is no electricity running through them, they cannot emit electromagnetic radiation.

# Types Of Electromagnetic Radiation

Types of electromagnetic radiation in the electromagnetic spectrum range from the high frequency gamma rays to the low frequency radio waves. Hence the different types of electromagnetic radiation cover wavelengths from a fraction of the size of an atom and thousands of kilometers. The various types of electromagnetic radiation are described by their wavelength and frequency. If a wave has a low wavelength compared to others then its frequency is high. The behavior of the various types of electromagnetic radiation depends on their wavelength.
The different types of electromagnetic radiation are described below according to the descending order of their wavelength.

## Radio waves

The wavelengths of radio waves range from hundreds of meter to a millimeter. The radio waves are received by antenna whose size varies according to wavelength of radio waves. Radio waves have the higher wavelength and lower frequency among the different types of electromagnetic radiation. These waves are used for information transmission in radios, television, mobile phones and wireless networks.

## Micro waves

Micro waves are popularly used in the microwave ovens which are used in heating food. At low intensity level, Micro waves are used in Wi-Fi also. M1icro waves provide uniform heating in a microwave oven. However, it is advised, appliances which use other types of electromagnetic radiation are not to be kept near a source of micro waves.

## Infrared waves

The wavelengths of infrared rays range from one millimeter to 750 nanometers. These waves are used in astronomy for mapping objects on earth. Infrared rays, among the various types of electromagnetic radiation are used in night-vision devices.

## Visible light waves

The Sun and stars emit light in this range only. Human eye is sensitive to this visible light only among the various types of electromagnetic radiation. The visible light wavelength ranges from 380 to 760 nanometers. The light reflected by an object is processed by our brain and transmits that information to our eyes.

## Ultraviolet waves

Ultraviolet rays can make molecules highly reactive by breaking the chemical bonds. The prolonged exposure of human skin to these waves can result in skin cancer. Large amount of ultraviolet rays are emitted by sun which can turn earth in to an unfertile land. This catastrophe is avoided by ozone layer present in earth’s atmosphere.

## X-rays

X-rays have one of the lowest wavelengths in the various types of electromagnetic radiation. X-rays are being used for seeing through the objects. These waves are used in the medical field for diagnosing the various parts of human body. They help in detecting tumors and cancers making the treatment easier.

## Gamma rays

Gamma rays have the lowest wavelength among the different types of electromagnetic radiation. These waves are known for their penetrative ability since their frequency is high. These waves are used in astronomy and diagnostics like PET scan.

# What Is Electromagnetic Energy And What Are Its Different Types?

The energy radiated by light waves and other type of waves is referred to as electromagnetic energy. These other types of waves excluding the light waves that generate electromagnetic energy are radio waves, micro waves, infrared waves, X rays and gamma waves. These waves in electromagnetic radiation are classified according to their wavelength or frequency.  The frequency which can be felt by our eyes is in visible light only. Other forms of waves cannot be seen by naked eye. The waves in electromagnetic energy have electric and magnetic components. Both these components travel in right angular direction to each other at the speed of light. Electrons are the main source of Electromagnetic energy.  When rapid moving electrons come across a region of force then they produce electromagnetic energy depending upon the magnitude of force. The energy released by an electron upon charging varies according to how far it lies from the nucleus in an atom.

James Maxwell was the one to discover electromagnetic energy. The wavelength of a wave is measured as a distance between the two crests and troughs that lie in succession. These crests and troughs were formed during the propagation of the wave. If the wavelength of a wave is low then that wave has high frequency and vice versa. The electromagnetic energy is high if the wave has low wavelength and the electromagnetic energy is low if the wave has high wavelength. Since electromagnetic radiation is a periodic wave motion, its frequency is measured in “Hertz”. The different type of waves in electromagnetic energy form a band of energy waves which is called Electromagnetic Spectrum. The energy waves are arranged in the order of their wavelength.

Electromagnetic energy has quite a lot of uses. The radio waves contribute to the modern communication making it easier and simpler. X-rays help in diagnosing the human body for various ailments or diseases. Infrared rays are used in the imaging of objects on earth, through satellites. Infrared light can be used for face detection during night. Gamma rays are used for radiation in cancer therapy. Gamma rays are also used in diagnosis like PET scanning. However electromagnetic waves do not constitute the sound waves.
The electromagnetic energy waves with high frequency like X-rays and gamma rays have high energy in them. So they can charge or ionize electrons easily when compared to visible light. This is reason why the waves with electromagnetic energy are considered hazardous for human health.