

APPLICATIONS OF RAYS-GAMMA RAYS, RADIOWAVES, UV RAYS AND VISIBLE LIGHT

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ABSTRACT

The electromagnetic (EM) spectrum is the range of all types of EM radiation. Radiation is energy that travels and spreads out as it goes – the visible light that comes from a lamp in your house and the radio waves that come from a radio station are two types of electromagnetic radiation. The other types of EM radiation that make up the electromagnetic spectrum are microwaves, infrared light, ultraviolet light, X-rays and gamma-rays. In this we will see some applications of gamma rays, radiowaves, uv rays and visible light.

Keywords: Radiation, Electromagnetic Spectrum, Gamma Rays, Radiowaves, Uv Rays And Visible Light.

I. INTRODUCTION

Radiation is energy that comes from a source and travels through some material or through space. Light and heat are types of radiation. The kind of radiation discussed on this site is called ionizing radiation because it has enough energy to remove an electron from an atom, making that atom an ion.

In order to reach stability, these atoms give off, or emit, the excess energy or mass in the form of radiation. The two types of radiation are electromagnetic (like light) and particulate (i.e., mass given off with the energy of motion).

Gamma radiation and **Radiowaves** are examples of electromagnetic radiation. Beta and alpha radiation are examples of particulate radiation. Ionizing radiation can also be produced by devices such as X-ray machines.

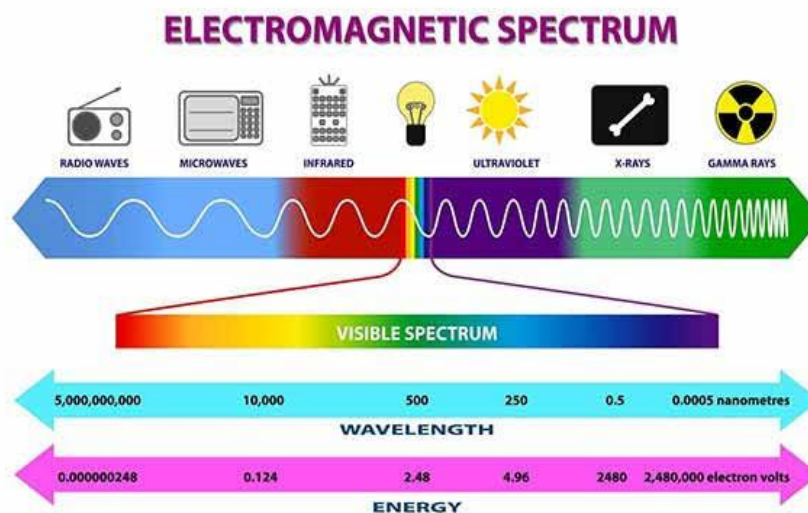


Figure 1

GAMMA RAYS are a type of wave on the electromagnetic spectrum. Out of all the waves on the spectrum, gamma rays have the shortest **wavelength** and the highest energy of the waves.

These are produced in many places. Most often, they occur in area as gamma ray bursts. Gamma ray bursts are the most powerful explosions in the universe considering that the Big Bang. On Earth, gamma rays can be produced with the aid of lightning and nuclear explosions.

An example of this is the Gemini laser at the Rutherford Appleton Central Laser Facility in the United Kingdom.

RADIO WAVES are typically produced via radio transmitters and can be received by way of radio receivers. Radio waves having exceptional frequencies includes various traits of propagation in the Earth's atmosphere.

SOLAR ULTRAVIOLET (UV) radiation has been used since long time to deal with a variety of diseases. This has a scientific history that a massive variety of molecules (chromophores) in unique layers of the skin have interaction with and absorb UV.

These interactions may have advantages and as well as negative biological implications.

In this assessment we only pay attention on the advantageous effects other than the vitamin D production.

VISIBLE LIGHT can be said to be a form of the rays of light which include; infrared radiations, X-rays, ultraviolet radiation, radio waves, or we can as well say electromagnetic radiation.

The above radiations cannot be seen with the eyes, you can only see a little part, that part you're able to see is what called visible light. Anything that gives off waves or rays of light that we can see, is what is called visible light.

1.APPLICATIONS OF GAMMA RAYS:

1.1. How are gamma rays used in medicine?

Gamma rays put off electrons from atoms. Because of this, they are a form of radiation acknowledged as ionizing radiation. Studies exhibit that radiation can damage DNA, and this damage can lead to cancer. However, gamma rays can additionally be used to treat cancer. Radiation therapy, or radiotherapy, makes use of high-energy gamma rays to kill cancer cells and shrink tumours. Gamma Knife Radiosurgery is a exceptional structure of radiotherapy. It uses beams of gamma rays to deal with injured intelligence tissue by destructive the DNA of risky cells.

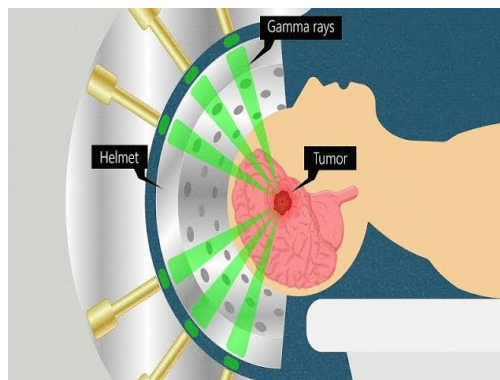


Figure 2

1.2. How are gamma rays used in the meals industry?

That's a type of irradiation that uses gamma rays to amplify the shelf-life of meals and drinks. Food products are bombarded with a source of high-energy gamma rays, generally Cobalt-60 or Cesium-137. These gamma rays regulate chemical bonds and kill bacteria that can reason illness.

1.3. How are gamma rays used in manufacturing?

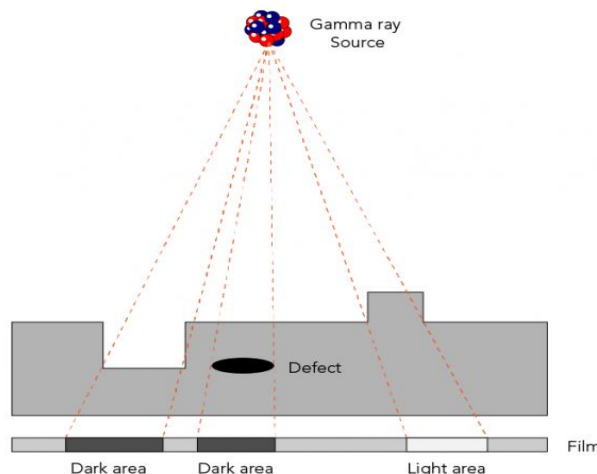


Figure 3

Industrial radiography is a method used to test materials for flaws, such as cracks. Using high-energy electromagnetic radiation, testers can see a material's internal structure. In industrial radiography, gamma rays let people look for problems without damaging the materials. X-rays can safely pass through your skin and organs without harming you. In the same way, gamma rays can pass through materials without damaging them. Industrial radiography is a **nondestructive** way to test products such as pipes, welded materials or airplane parts. These testing procedures ensure that the materials are safe and of good quality.

II. APPLICATIONS OF RADIO WAVES RAYS

2.1. Radio Communication:

Radio wave has been used as a means of communication over a hundred years since the discovery of first radio transmission by Marconi in 1895. Within thirty years of his discovery, radio was being used on a daily basis for broadcasting and for two-way radio communication by the military and the police.

Radio waves, microwaves, infrared and visible light can all be used for communication. Radio waves are used to transmit television and radio programs, microwaves are used to transmit satellite television and for mobile phones, while Infrared is used to transmit information from remote controls.

2.2. How radio communication works in mobile phone?

Mobile phone is a relatively new technology used in communication system. Mobile phones and their base stations transmit and receive signals using radio waves.

A radio frequency wave used for radio communication is referred to as a carrier wave. The transmitter as a sine wave produces radio frequency carrier wave of any system.

2.3. Mobile phone networks

A mobile phone sends and receives information such as voice messages, fax, computer data, etc. by radio communication. Radio frequency signals are transmitted from the phone to the nearest base station and incoming signals carrying the speech from the person to whom the phone user is listening are sent from the base station to the phone at a slightly different frequency.

III. APPLICATIONS OF UV RAYS

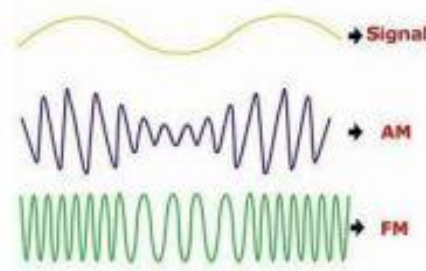


Figure 4

One of the benefits of ultraviolet rays is that it is used in the disinfection of air, water, food, surface etc. UV Disinfection system is a method that inactivates pathogens, microbes, and microorganisms by permanently destroying their DNA, rendering them ineffectual so they can't reproduce, which eliminates the risk of infection. It makes use of no chemicals, so its 100% chemical-free.

Following are five ways that a spectrum of facilities can utilize UV disinfection effectively.

3.1. Air Disinfection

Any facility that needs to disinfect air spaces can use a UV light to do so, to some extent. There needs to be sufficient contact of the air with the UV light, making this type of disinfection more effective on still or stagnant air than on moving air. Facilities can also choose to install UV lamps near coils and drain pans of cooling systems such as air conditioners and refrigeration devices, which can prevent bacteria from growing in those cool, damp conditions and eventually being released into the air.

3.2. Water Disinfection & Wastewater Treatment

Facilities can also use UV light to disinfect water and even for wastewater treatment. Because UV disinfection is a physical process and does not require adding any chemicals to the water to clean it, this can be a very safe and effective option. While wastewater treatment must take place on a much larger scale, UV light can play a major role in this process as well, even taking the place of chlorination. While UV light is not used as a sole disinfection protocol, it has become quite common in many metropolitan areas as part of the wastewater treatment process.

3.3. Equipment Disinfection

In addition to stationary surfaces like countertops, tables, and floors, UV light is a popular disinfection solution for equipment. For example, laboratories that risk contamination may use UV to disinfect goggles, glassware, or other laboratory instruments. As with other applications, the UV light has the benefit of being effective but also dry and simple, unlike washing or bleaching, which can leave residue and moisture behind.



Figure 5

3.4. Food & Beverage Disinfection

The use of UV light in food and beverage disinfection combines the effectiveness of UV light on surfaces as well as liquids. UV disinfection has been shown to be effective in food manufacturing facilities when used to disinfect things like conveyor belts that are otherwise difficult to clean thoroughly. When the right products are used, these types of surfaces can be disinfected without shortening the life of the equipment.

IV. APPLICATIONS OF VISIBLE LIGHTS

There are a lot of visible lights in the world today and they all have important uses in which would look at below.

4.1. We use it to see

This is the main and most important use of visible light in the modern world. There are lights like an electric bulb, fireworks and other sources of light rays, with their shiny rays, we can see things and make a dark room visible.

4.2. To make lasers for use in a surgery room

Laser light is a collection of light or concrete of light that is then pronounced as a beam. The laser lights are used in surgery rooms as the rays make it clear for a surgeon to see and carry out his activities. There is also a surgery called the laser surgery and that is used to cut tissues.



Figure 6

4.3. for our television

The waves of light that make the television that we use to have fun and watch videos is made up of visible light. Without visible light, there is no way we would be able to focus our eyes on the TV and watch movies and other entertainment.

4.4. for our cell phones

Of course, the ray of light in our phones is made up of visible light, or you can as well say, visible light in encompassed in it. The phone screens would have been difficult to view if it was just the main waves of light.

4.5. Used for signalling

Visible light can be used for signalling thorough the VLC (visible light communication). This is a kind of communication technology in which data can be transmitted at a speed of 10kbit/s.

4.6. Use of military

This is another important use of visible light. The military fighters do use it when going on missions in the dark to be able to identify their enemies clearly without their enemies seeing them. The visible light is fixed into a kind of big eyeglass and it could have different colors.

4.7. Vehicular communication

With the headlights from vehicles and the traffic lights in the road, there is a vehicle to vehicle communication. This communication or use exist due to visible lights fixed or used in these headlights and traffic lights, if not, there would be accidents and chaos.

4.8. Information signboards

As we all know the signboards emit light in the night for an easy view to see the information given. The led-light incorporated in these signboards is visible light and it's very beneficial in our modern world.

4.9. MRI scanners

Of course, the MRI scanner in our hospital is made up of visible light. It is also made up of other rays like the radio waves, but it can be switched to visible light for various functions. With this, we can see that visible light is good stuff, which is not harmful but has come to serve humanity.

V. CONCLUSION

Electromagnetic Waves, which is commonly known as EM Waves, consists of 2 perpendicular sinusoidal Electric and magnetic field vectors which are also perpendicular to the direction of propagation of the wave. The orderly distribution of the electromagnetic waves by their wavelength or frequency into distinct groups having widely differing properties is called the electromagnetic spectrum. The various regions of the electromagnetic spectrums do not have sharply defined boundaries, and they overlap.

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