

CREATOR

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RADIATIONS OF A GREAT GOD

... who is the blessed and only Sovereign, the King of kings and Lord of lords, who alone possesses immortality and dwells in unapproachable light, whom no man has seen or can see. To Him be honor and eternal dominion! Amen (1 Timothy 6:15-16).

A white-haired woman anxiously tugs at her peach-colored dress while preparing for her cross-country journey. “I mustn't be late,” she thinks, as she finishes packing her suitcase. Once at the airport she makes a familiar pass through the security entrance. As they scan her belongings, she is reminded that the safety of her trip is taken seriously. After all, her three blue-eyed grandchildren wouldn't want anything to happen to their grandmother! The long-awaited arrival of this special lady is met with big smiles and even bigger hugs in a city far from home. She leaves behind clouds and dreariness, and is greeted by the warmth of sunshine on her face. Stepping into her daughter's home, the sweet smells of honey-glazed ham surround her and charm the scene. Quiet dinner music drifts from the radio, filling the entire room. Supper is ready and Grandma is just in time. The last dish to reach the table

is a casserole from the microwave oven. Warmth and love fills the hearts of this family as they ponder their blessed reunion.

Stories like this take place the world over every day, and there is a common (mostly) invisible thread running through them all. It involves something ominous sounding—*electromagnetic (EM) radiation*. WHAT?! Grandma's been irradiated? No, but this special and versatile creation of our Lord Jesus Christ has made all of the above things possible.

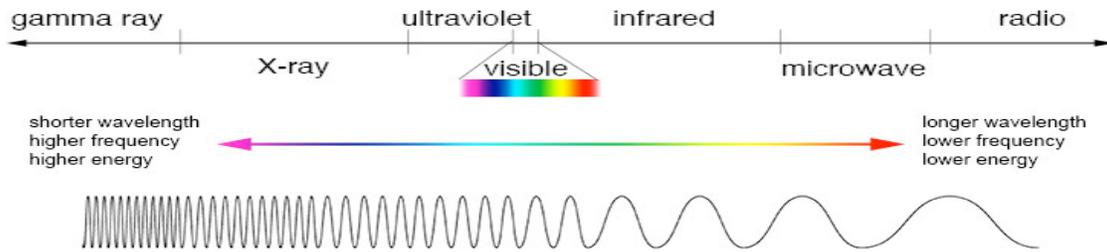
The color of the woman's hair and dress, the baby blues of her grandchildren, the x-rays employed to scan her luggage, the radar used to safely guide her plane, and the radio waves which carry such sweet music are all EM radiation. And yes, the microwave energy that cooked the casserole is EM radiation as well.

But what is electromagnetic radiation? EM radiation is an amazing, inseparable



A rainbow reveals a small portion of the electromagnetic spectrum and a large portion of God's glory and love (Gen. 9; Ez. 1:28; Rev. 4:3).

ELECTROMAGNETIC SPECTRUM



combination of electric and magnetic fields mysteriously sown together by Christ our Creator. The name EM *radiation* implies that this particular type of energy *radiates forth* from the object producing it. Now, the mere mention of the word “radiation” may create anxiety in some, but EM radiation is not the same as *nuclear* radiation. (Nuclear energy is associated with hydrogen bombs and power plants.)

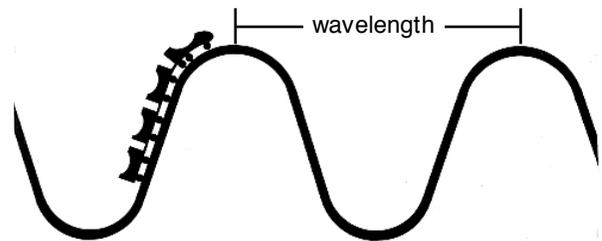
All forms of EM radiation are critically important to society (though some can be harmful to living organisms¹). Microwaves—one such form—allow you to talk on a cell phone. Of all types of EM radiation, however, the most familiar and useful is light. Electromagnetic radiation can be represented by a spectrum (see above), with radio waves at one end and gamma rays at the other and visible light in the middle.

Light, and all EM radiation, is made up of tiny packets of energy known as *photons*, which also act as waves. This dual character of light—a marriage of particle and wave energy—is unique in creation, for there is nothing else quite like it.² Only the wisdom and power of our amazing Lord could design and construct something so special, and it’s only in the last 100 years that scientists have begun to comprehend a little of its nature. Intense, ongoing research into EM radiation is slowly, painstakingly uncovering the mystery of light.

¹ Prolonged exposure to ultraviolet (UV) radiation, x-rays, or gamma rays can cause permanent damage to the tissues of plants, animals, and people.

² There are some subatomic particles, such as electrons, that also possess this dual nature.

Because light is simultaneously composed of particles (photons) and waves, an analogy to illustrate its character is hard to find. We might think of light as the cars of a roller coaster speeding over an endless number of rolling hills all in a straight line. The roller coaster cars represent photons (moving more than 670 million miles per hour!) and the hills represent waves. The difference between the various



kinds of EM waves lies in the *wavelength* and *frequency* of each type, as well as its inherent energy.³ The wavelength is the distance between one “hill” or crest and the next “hill” or crest. The frequency is the number of waves that pass a particular point in one second, or in the case of our illustration, the number of hills the cars go over in one second. Radio waves are incredibly long, some measuring more than one mile in length. They provide a “smoother roller-coaster ride.” Gamma rays, on the other hand, are remarkably short and have wavelengths less than the diameter of an atom. Anyone taking this “ride” would be instantly shaken to pieces!

³ God created each type of EM radiation with a specific amount of energy. Radio waves, for example, are very low in energy. Visible light contains a moderate amount of energy and, if focused with a magnifying glass, can burn. X-rays and gamma rays are highly energetic.

Electromagnetic radiation travels very fast. The speed of all EM radiation equals the speed of light, which is 186,000 miles per second (3×10^{10} cm per second) or greater than 670 million miles per hour (over one billion kilometers per hour). So, in reality, even radio waves possess high frequencies because they are moving incredibly fast.⁴ Visible light “vibrates” or oscillates an average of 600 trillion times per second. Thus a “roller coaster” of light would travel up and down 600 trillion hills in just one second!

In a vacuum, the velocity of light will always remain the same and is one of the few constants in the universe. Unlike so many other things in nature, light does not change, even after hundreds of years. Consider the star astronomers call *Delta Canis Majoris*, which is 2,100 light-years away from Earth. (A light-year is the distance light travels in one year—almost six trillion miles or roughly 9.5 trillion kilometers.) The light that now reaches our eyes from Delta Canis Majoris was first generated by this star over 100 years *before* Jesus was born. Unlike waves on a pond which disappear within a minute or two, or sound waves which are gone within seconds, light waves keep on going—in this case, unchanged after two millennia.

The energy or strength of each type of electromagnetic radiation varies and is dependent on its frequency. The x-rays that scanned grandma's purse are thousands of times more energetic than the light bouncing off her peach-colored dress. This explains why x-rays can be harmful if we are exposed to them in large doses.

Incredibly, any object, living or not, gives off radiation over the full EM spectrum (this is known as *black-body radiation*). And the hotter the object, the more radiation it will produce. Theoretically, even people give off radiation across the entire EM spectrum . . . but please don't run away for fear of gamma- or x-ray

exposure the next time someone enters the room. And you can't "tune in" to the radio waves your dog or cat transmits (though sometimes their behavior is admittedly on a “different frequency”). You see, most of the EM spectrum produced by living things is negligible and cannot be detected. Amazingly, a small number of organisms do give off visible light,⁵ but the greatest amount of EM radiation produced by warm-blooded creatures is in the infrared range. Infrared radiation is another name for heat.

In EM radiation, our incomparably brilliant Creator has stored an energy source which is simple on the one hand, but provides a wide variety of uses on the other. This marvelous creation allows doctors to probe the body using x-rays, enables us to communicate with people on the other side of the world via microwaves, and allows people to inform, inspire, and entertain via radio waves. Our skin produces Vitamin D when energized by the ultraviolet radiation of the sun, and everything we see is due to the electromagnetic waves we call light.

A visit from grandma would not have been possible without EM radiation. Like God, it is invisible yet ever present. The EM spectrum reflects the awesome power of our Lord, His beauty, and the magnitude of His creativity. And the enduring quality of light reminds us of His unchanging character (Malachi 3:6). Is it any wonder that God the Father has compared the brilliance of His Son's love for us to this unique and marvelous creation?

*In Him was life, and the life was the Light of men.
The Light shines in the darkness, and the
darkness did not comprehend it (John 1:4-5).*

⁴ If a radio wave is one mile in length and it is traveling 186,000 miles per second, then a radio wave “roller coaster” would go up and down 186,000 hills in one second (a radio frequency of 186 kHz)!

⁵ Examples include deep-sea creatures, certain types of plankton, fireflies or lightning bugs, and some species of mushrooms.



THE LIGHT OF MEN

The electromagnetic spectrum gives us a unique glimpse into the character of its Creator, Jesus Christ. Radio and microwaves allow us to communicate with each other (cell phones), and help planes and ships navigate (radar and GPS). Infrared radiation warms us, and visible light allows us to see the glory of our God throughout the universe. The ultraviolet radiation of the Sun stimulates our skin to produce essential Vitamin D and can be used to disinfect clothes hung out to dry. X-rays and gamma rays—though admittedly quite dangerous—allow doctors to see inside our body and often assist in treating diseases like cancer. Thus Christ’s kindness can be seen across the entire EM spectrum!

This branch of science also gives us a “taste” of God’s mysterious, otherworldly nature. After all, who really understands photons? Einstein didn’t. The Bible records that ours is a God who is invisible (1 Timothy 6:15-16)—the vast majority of EM radiation is invisible to our eyes as well. Much of EM radiation can penetrate right through us (radio waves, x-rays, gamma rays), hinting that nothing can be hidden from the eyes of our Omniscient Creator. And what speaks more plainly of God’s holiness than the dangers of ultraviolet light, x-rays, and gamma rays—energies that must be used cautiously or we could suffer harm?

So, is it any wonder that God calls His Son “the Light of men” (John 1:1-5; 8:12)? In reality, Jesus reveals to us the character of God far more than EM radiation can. And He also brings to light our own wickedness. We were originally created in God’s image to reflect and radiate His character, His glory. But when Adam and Eve fell into sin, the whole human race was plunged into darkness, and we lost the ability to shine the glory of God.⁶ We are therefore quite literally “in the dark” (Matthew 4:16) if we do not know Jesus.

Because of God’s great love, He sent His Son into the world to reveal His glory to us in the clearest possible way, to show us our own rebellion and sin, and to provide us the only way to be forgiven. Believing in Christ is a bit like going to your doctor; he or she may very well use an x-ray machine to see if there is anything wrong inside you. In our case, we know that there is something wrong because God plainly tells us that there is (Romans 3:23). In order for the disease of sin to be “burned out” of us, we must submit ourselves to Christ’s Spirit, as one would submit to radiation therapy to cure cancer.

Amazingly, Jesus is the one who endured this deadly, purifying treatment upon the Cross on behalf of sinners. The only way for us to be cured of the cancer of our sin is to be united to Christ. He took the sins of His people upon Himself. (It would be as a parent taking upon themselves the disease of their dying child—if that were possible—thus suffering in their place.) Simply stated: God calls you and me to repent and believe in what His Son has accomplished (Mark 1:15). It is faith in Christ alone that can save you, nothing else.

⁶ Sadly, those in Hell will forever be in darkness (Matthew 8:12; 22:13; 25:30).



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