Electromagnetic Radiation

Electromagnetic waves

In the electromagnetic waves, as graphically illustrated, each peak represents a quantity of photons. An electromagnetic pulse has only one peak which represents a big amount of photons, which are produced i.e. by a nuclear explosion. The width of the wave depends of the number of photons emitted per period (T). The quantity of photons passed per period corresponds to the area of two successive peaks. The distance between two successive peaks is the wavelength (λ).

In 2010 photons observed in the condensation Bose-Einstein where required a nonzero effective mass[1]. Moreover, virtual photons have masses. Black holes in space and the twin born effect (where a photon decays into two leptons) indicate that probably light has mass. At the horizon of a black hole the light is pulled from this. It has been observed that black hole's gravity accelerates light changing its direction. Even if we consider that it simply follows the space curvature, curveting motion also means acceleration.

But assuming a tiny mass for the photon, then can it move with c? According to relativity this would require infinite amount of energy (E). At this point we can wonder how much energy is consumed by neutrinos in the recent (2011) experiment OPERA[2], provided that they moved close to the light speed and they have mass. Why we have to accept the hypothesis of the photon has no mass and not the case the relativistic formula for the energy to be wrong?

Possibly mass decreases with speed: $m=m_o\alpha^u$, $0<<\alpha<1$, m_o: rest mass, u: velocity

In the phenomenon of fluorescence, for any absorbed photon a new one of lower energy is emitted. Lower energy (E) means lower frequency (ν): E=hν. In the Compton effect frequency decreases. But since in this effect photon behaves as a particle, then what means frequency for it as a particle? And what is frequency (ν=1/T) meaning for one or a few photons?

If we consider photon as a particle with mass, then de Broglie equation applies to it: $\nu=mc^2/h$. So, it becomes obvious that frequency expresses the photon mass or size and thereby there are various photon sizes. That's why its mass is not defined yet. Its assumed rest mass has experimentally been calculated from momentum to be less than 10^{-27} eV.

Varying size is the reason for many observable effects, as the followings:

-Different refractive index of different colors

The larger photon size leads to more random collisions decreasing speed

-Short radio waves reflection from the ionosphere

Ions form a kind of multiple grid, a structure similar to crystals. Small photons pass between this. This can not hold large photons because they have great momentum. Photons with certain sizes hitting on it and reflected back.

-Long radio waves large permeability (submarines radio)

The smaller photon size leads to less random collisions

-UHF and microwaves reflected from objects more than the above

-Light waves reflected from objects more than radio waves

-Light waves are more absorbable than radio waves

The larger photon size leads to more random collisions

As we know there are free electrons within a metal pipe. When they are accelerated (by an electric field for example) they are forced to jump from a lower to a higher energy level (stimulation). The gap among levels depends on the force (acceleration). Then (when the electric current is stabilized) each electron goes to lower energy level releasing a quantum of energy (photon). This effect is observed when we switch on/off (current starts or stop running, this is acceleration) electrical devices: radio waves produced.

Oscillation is also acceleration. In alternating current (A.C.) because metal's free electrons oscillate fast there is huge acceleration so that released photons. In this way radio waves are produced. The size of photon is relating to the frequency: with increasing oscillation frequency increases the acceleration; in A.C. free electrons oscillate in high frequency, which means big acceleration, between two energy levels emitting photons. As we said above, the gap among levels depends on acceleration. So, the higher frequency, the larger energy level gap. The larger energy gap, the more energy (bigger size or higher frequency of photon) is emitting. When this photon collides and is absorbed by a free electron antenna captures this energy.

There is also oscillation due to heat. Increasing the temperature increases the frequency of oscillation. As already explained, this represents a greater stimulation and higher frequency (bigger photon) emission. In this way infrared rays are produced. In nonmetals, due to thermal motion of atoms orbital electrons collide with and stimulate each other similarly to the fluorescence effect.

It appears as if photons are electron's fragments. Actually, what we instrumentally observe as a single photon is a group of elemental photons joined by a force[5]. Energy is quantized because each photon is composed of a natural number of pieces (elemental photons). When the photon produced by laser the pieces have a normal distribution, so the shape of photon is spherical. When emitted spontaneously by an atom the pieces follow the Poisson distribution, so the photon has the drop shape. If you collide two beams of different sizes photons then produced photons with the average size of the two original.[3]

In the Compton Effect some elemental photons are absorbed by the electron, so the photon mass decreases. If the collision is temporary plastic, then fluorescence and phosphorescence effects appear.

In incandescent lamp electrons forced to pass through a thin pipe and collide with each other thus detached photons of various sizes.

When X-rays produced electrons collide with nuclei so generated photons from both pieces. As a result X-photon consists of proton and electron pieces, such as γ-photon (rest mass) consists of an electron and a positron pieces.

It is not true that electromagnetic waves are unaffected by electric fields[5]. Scientists choose to ignore what all the technicians know, how the antenna-TV amplifier does works: electricity fed to the antenna. It seems like the electric field to pull the waves[5]. But this is not the electric force. This is the force which holds the photons inside proton or electron, the fifth force in universe. Perhaps black holes are strong fields of this force.

Light

Doppler Effect appears in waves produced by oscillators which have "peaks" and "hollows". These peaks can be "condensed" or "diluted" by the Doppler Effect.

Radio oscillators pulsating emit photons "in waves". But photons are not only produced by oscillators (i.e. by nuclear reactions). Incandescent lamp and most stars (except pulsars) emit photons continuously, irregularly and randomly (by random nuclear explosions), not in pulsate waves. These light "waves" are not polarized and not pulsate. On these "waves" the wavelength αs a distance between two peaks does not make sense. To them frequency ($\nu=c/\lambda$) has meaning only as a measure of their energy or mass.

Stars emit particles of all sizes such as UV-rays, X-rays, radio waves, γ-rays and ions. The radiation is continuous, not in pulsed waves. If an ion departs from a star and travels towards earth, except of a possible collision, it will arrive on earth integer, regardless to star's motion. That is also true for a photon: we do not expect change its size on the way because the star is moving. A γ-photon emitted from a far star will not arrive on earth as an X-photon. An X-photon will not arrive as a UV-photon. Blue photons will arrive as they are and make man's eye to feel the blue color. Therefore, any calculation based on redshift or blueshift is false. In 1987 at Stockholm Astrophysics Symposium Jan Pierre Vigier and Jan Claude Pecker[4] blame the cosmic dust for redshift. Now, their speculation becomes reasonable: Blue photons because of bigger size absorbed more by cosmic dust than the red ones. The bigger size, the much more collisions occur leading to higher absorbance. The longer distance among star and earth, there is more dust between them. The more dust between them, the less blue photons arrive on earth than the reds. For the same reason the old lighthouses had red lamps. Another possible explanation involving dust is due to Compton Effect.

Consequently, we can't be sure about the speeds of stars or galaxies and so the existence of the dark matter. Also, the supposed acceleration of the universe and the attendant concept of "dark energy" is a mistake.

References

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