Photons can pass through any matter

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Modern physics generally believes that photons can only pass through a part of some matter. This theory believes that photons can pass through any matter at the speed of light. When photons pass through matter, they will cause energy loss of photons. The magnitude of energy loss varies when passing through different matter, and the energy may even be reduced to infinitesimal, which is usually hidden in the cosmic microwave background radiation, so it is difficult for humans to detect it. The reason why light is reflected when it passes through the surface of a matter is that the energy of the photon is transferred to the electrons on the surface of the matter, and then the electrons transfer the energy to the low-energy photons emitted from the opposite side, and the original photons have already passed through the matter. The reason why light is refracted when it passes through the surface of a matter is that the energy of the photon is transferred to the electrons on the surface of the matter, and then the electrons transfer the energy to other low-energy photons, and the original photons have already passed through the matter. This also explains why the speed of light propagation in matter is lower than the speed of light in a vacuum, because the photoelectric effect of the conversion of photoelectric energy takes a certain amount of time. Blackbody radiation is the energy of electrons in matter that excites low-energy photons hidden in space. This theory also boldly speculates that there are countless photons in any direction pointed by any spatial point in the universe.

Introduction.— When light passes through a matter, its intensity will decay and its energy will be absorbed. According to the Beer-Lambert law, it is the basic law of light absorption and applies to all electromagnetic radiation and all light-absorbing matters, including gases, solids, liquids, molecules, atoms and ions. The Beer-Lambert law is the quantitative basis of absorptiometry, colorimetry and photoelectric colorimetry. When a beam of monochromatic light is irradiated on the surface of an absorbing medium, after passing through a medium of a certain thickness, the intensity of the transmitted light will be weakened because the medium absorbs part of the light energy. The greater the concentration of the absorbing medium and the greater the thickness of the medium, the more significant the reduction in light intensity, and the relationship is:

$$A = log\left(\frac{I_0}{I_T}\right) = log\left(\frac{1}{T}\right) = Kbc \tag{1}$$

Where:
A: absorbance;
I0: intensity of incident light;
It: intensity of transmitted light;
T: transmittance, or transmittance;
K: coefficient, which can be absorption coefficient or molar absorption coefficient, see below; l: thickness of the absorbing medium, generally in cm;
c: concentration of the absorbing matter, in g/L or mol/L.

The physical meaning of the Beer-Lambert law is that when a beam of parallel monochromatic light passes vertically through a uniform non-scattering absorbing matter, its absorbance A is proportional to the molar absorption coefficient, the concentration of the absorbing matter c, and the thickness of the absorbing layer l. From this, it can be concluded that when the product of the molar absorption coefficient, the thickness of the absorbing medium and the concentration of the absorbing matter is infinite, the absorbance A of the matter is also infinite, and the energy of the photon after passing through the matter is also infinitesimal, and the photon still passes through the matter.

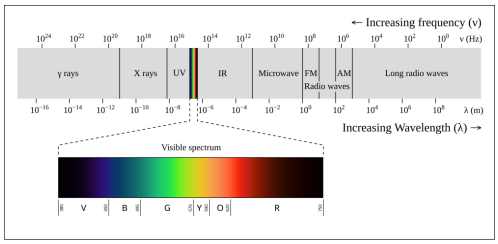

FIG. 1. Electromagnetic spectrum with visible light highlighted. The bottom graph (visible spectrum) shows wavelength in units of nanometres (nm).

According to the Planck-Einstein relationship, the energy of a photon is proportional to the frequency:

$$E = hv \tag{2}$$

Where:
E is the photon energy
h is the Planck constant
v is the photon frequency

So the frequency of a photon with infinitesimal energy is also infinitesimal. According to the Beer-Lambert law, the energy of an electromagnetic wave inside a matter decays exponentially with the depth from the surface of the matter. Because the energy of photons is reduced to infinitesimal, it is usually considered to be cosmic microwave background radiation, but the speed of light propagation does not decrease

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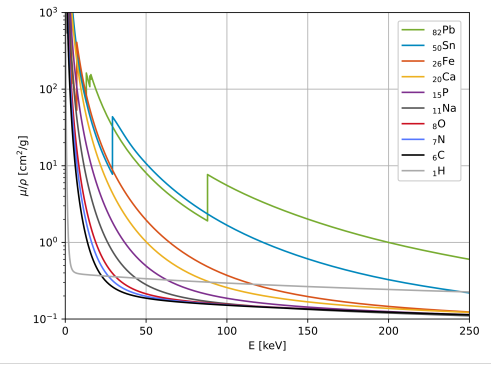

FIG. 2. Mass attenuation coefficient of 0 250 keV X-ray photons for different elements.

due to the reduction of energy, and photons still pass through objects.

Mass attenuation coefficient The mass attenuation coefficient is the attenuation coefficient normalized by the matter density, that is, the attenuation coefficient per unit mass rather than per unit distance. It measures the ease with which light, sound, particles or other energy or matter can penetrate a matter. The international unit of the mass attenuation coefficient is m2/kg, and other commonly used units are cm2/g.

The mass attenuation coefficient is defined as:

$$\frac{\mu}{\rho_m} \tag{3}$$

μ is the attenuation coefficient.
ρ is the density.
When using the mass attenuation coefficient, the Beer-Lambert law can be written as

$$I = I_0 e^{-(\mu/\rho_m)\lambda} \tag{4}$$

$\lambda = \rho_m \ell$ is the area density, also called mass thickness.
ℓ is the length over which decay occurs.

In summary, photons can pass through any matter at the speed of light.

Reflection of light.— The reason why light is reflected when it passes through the surface of a matter is that the energy of the photon is transferred to the electrons on the surface of the matter, and then the electrons transfer the energy to the low-energy photons emitted from the opposite side, and the original photons have already passed through the matter.

Refraction of light.— The reason why light is refracted when it passes through the surface of a matter is that the energy of the photon is transferred to the electrons on the surface of the matter, and then the electrons transfer the energy to other low-energy photons, and the original photons have already passed through the matter.

Blackbody radiation.— Blackbody radiation is the energy of electrons in matter exciting low-energy photons in space.

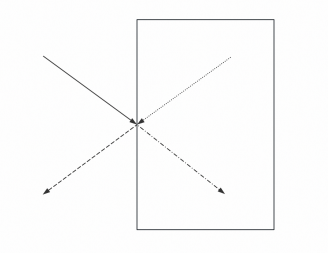

FIG. 3. Reflection of light

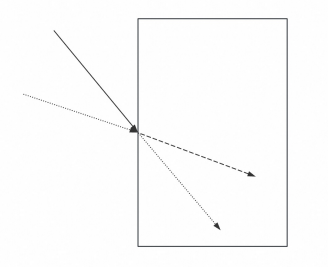

FIG. 4. Refraction of light

The speed of light in matter is slower than the speed of light in a vacuum.— Because the photoelectric effect of the conversion of photoelectric energy takes a certain amount of time.

Electricity generates light.— Electricity generates light because electrons transfer energy to low-energy photons hidden in space.

Remarks and discussions.— (i) Because the universe is infinite, and the time after the birth of the universe is also infinite, a photon can continue to propagate in the universe since the birth of the universe, and the energy of the photon increases or decreases, until the photon turns into matter with mass again, so there is reason to believe that there are countless photons in any direction pointed by any spatial point in the universe. Tracing and decoding the number of all photons in space and the frequency of each photon is equivalent to tracing the history of the universe.

Conclusions and summaries.—

- Photons can pass through any matter at the speed of light.
- There are countless photons in any direction at any point in space of the universe.

Acknowledgements.—

- This work was supported by my wife and my daughter.