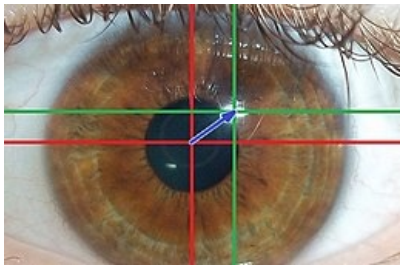
Visible light

Visible light , otherwise also referred to as just light, is electromagnetic radiation with a frequency of 3.9 x 10 14 Hz to 7.9 x 10 14 Hz, which in a vacuum corresponds to wavelengths in the range of **380–740 nm** . This part of the electromagnetic spectrum has the property that when it hits the photoreceptors of the human eye (rods and cones), it causes a visual sensation. It is the radiation of the Sun (star), which falls on the earth's surface when it passes through the atmosphere. In all electromagnetic waves, light lies between infrared (wavelength greater than 740 nm) and ultraviolet radiation(wavelength shorter than 380 nm). Light has a dual character, we can describe it as a wave, but also as a particle. The field of physics that deals with the investigation of the properties of visible light is called optics .

Speed of light

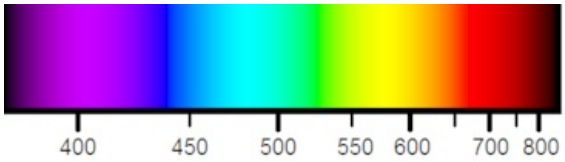
The speed of light (light speed) in a vacuum is 299,792,458 m/s, rounded to 3×10 8 m/s (**300,000 km/s**). The physical unit is marked with the letter c . In air its speed is only negligibly lower than in vacuum, but in other environments it is always lower, it depends on the refractive index . For example, in glass it is roughly 200,000 km/s and in water it is 225,000 m/s.

Color spectrum



Visible light eye-tracking algorithm

Visible light consists of several colors, which we call spectral. Individual colors are typical for a certain wavelength and blend into each other. **Violet** (380 to 430 nm) has the shortest wavelength but the highest frequency, with increasing wavelength and decreasing frequency followed by **blue** (430 to 500 nm), **cyan** (500 to 520 nm), **green** (520 to 565 nm), **yellow** (565 to 590 nm), **orange** (590 to 625 nm) and **red** (625 to 740 nm). The human eye is most sensitive to wavelengths around **555 nm** (green). We see the object in the color of the wavelength reflected by its surface, other colors are absorbed by the object(absorbed). In addition to spectral colors, there are also non-spectral colors that arise as a perception of mixing several colors. These colors include gray, white, black, but also, for example, pink or turquoise.



Visible spectrum, wavelength in nanometers

Spread

The propagation of light takes place on the basis of Huygens' principle using **wavefronts** , the properties of the environment in which the propagation takes place also have an influence on this phenomenon. In an optically homogeneous environment, the wavefronts near the light source have a spherical shape, at a great distance they could be considered planes. **Rays** , represent imaginary lines that show the direction of light propagation, and are always perpendicular to the wavefront, here they propagate in a straight line.

Light sources

We can call a light source any body in which light is produced and emitted into the environment (Sun, light bulb, flame, etc.). If the size of the source itself is negligible compared to the distance from which we observe it, we call it a point source of light (laser). Natural sources cannot be considered as point sources, since the light propagates simultaneously from several different points.

Optical environment

An optical medium is any medium in which light propagates. We can divide it into **transparent** (there is no scattering of light here), translucent (light spreads, but there is partial scattering) and **opaque** (light is absorbed or reflected on the surface). From the point of view of optics, it is further divided into homogeneous medium (it has the same properties throughout its volume), **isotropic** (properties do not depend on the direction of propagation - glass) and anisotropic (properties depend on the direction of light propagation - crystal). Transparent glass is divided into clear (light passes through unchanged) and colored (absorbs certain wavelengths).

Links

Related Articles

- Color of fabrics
- Artificial lighting
- Infrared radiation
- Ultraviolet radiation

Source

Links

WIKIPEDIE Otevřená encyklopedie. *Světlo* [online]. [cit. 2019-01-20]. <https://cs.wikipedia.org/wiki/Sv%C4%9Btlo>.

Gymnázium Ladislava Jaroše Holešov. *Úvod do optiky* [online]. [cit. 2019-01-20]. <http://www.gymhol.cz/projekt/fyzika/01_uvod/01.htm>.

Techmania Science Center / EDUPORTÁL. *Světlo* [online]. [cit. 2019-01-20]. <https://edu.techmania.cz/cs/encyklopedie/fyzika/svetlo>.

Encyklopedie fyziky. *Šíření světla* [online]. [cit. 2019-01-20]. <http://fyzika.jreichl.com/main.article/view/435-sireni-svetla>.

FYZIKA 007. *Šíření světla* [online]. [cit. 2019-01-20]. <http://www.fyzika007.cz/optika/sireni-svetla>.

Literature

Beneš, Jiří, Jirák, Daniel a Vítek, František. . *Základy lékařské fyziky.* 4. vydání edition. 2015. ISBN 978-80-246-2645.

Beneš Jiří, Kymplová Jaroslava, Vítek František. . *Základy fyziky pro lékařské a zdravotnické obory pro studium a praxi.* 1. vydání edition. 2015. ISBN 978-80-247-4712-5.