

What is blue-violet light?

Blue-violet light is part of the narrow band of light frequencies referred to as the “visible spectrum”, that is, light capable of being seen by the human eye. This spectrum consists of varying wavelengths. Blue-violet is among the shortest wavelengths detectable by the human eye. A common component of our world’s illumination, blue-violet light helps increase feelings of wellbeing, and helps us control our waking and sleeping hours. However, excessive or prolonged exposure to blue light can be harmful to the eyes.

Today, blue-violet light, defined as light with wavelengths from 380 to 500nm, is known as blue light, or HEV (High Energy Visible light), reflecting the fact that it is the most energetic part of the visible light spectrum.

What is the source of blue-violet light?

Blue-violet light is a component of direct sunlight, and it is also emitted by an increasing number of artificial light sources.

What artificial light sources emit blue-violet light?

We are constantly exposed to a wide variety of artificial light sources that emit blue-violet light. These include TFT (Thin-Film-Transistor), which is light from the screen of a computer, notebook, television, video games, and so on; LED (Light-Emitting-Diode) is the light from mobile screens, car headlights, illuminated road signs, energy-saving lamps, fluorescent tubes, and others.

What is the difference between artificial light and natural light (white daylight)?

Natural light, or white daylight, is characterized by a balanced spectrum with a harmonious proportion of colors. In comparison, the spectrum of artificial light is unbalanced, even discontinuous, with an unnaturally high proportion of short waves of blue light with peaks of “energy highs”, especially in the 450nm range. Artificial light contains **high levels of HEV light**.

What are the consequences of exposing the eye to various types of blue-violet light?

Excessive or prolonged exposure to blue-violet light can cause photochemical lesions in the retina, leading to retinal toxicity. Adding to the problem is the fact that we have no physiological filters that can block this light. Blue-violet light penetrates tear film, the cornea, the crystalline lens of the eye and its internal vitreous body, eventually reaching the retina where it can do its damage.

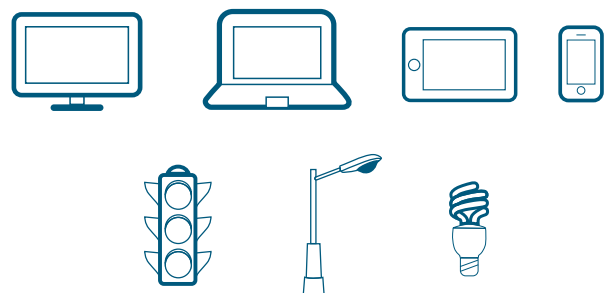
Does blue-violet light present a threat to our health?

Yes! HEV LIGHT IS 15 TIMES MORE HARMFUL TO THE RETINA THAN ALL THE OTHER RADIATIONS FROM THE VISIBLE SPECTRUM.

Perhaps the biggest threat of blue light is the role it plays in the development of age-related macular degeneration, mainly in the form of photo-oxidation. People at high risk of this disease should protect their eyes from blue light exposure. Some doctors recommend halogen lights as a safer alternative.

Another problem caused by blue-violet light is its potential for disrupting our natural biological cycles, also called circadian rhythms. Melatonin is a sleep hormone in our bodies that helps to regulate our circadian rhythms. The eyes have receptors that contain a photo-pigment called melanopsin, which is sensitive to blue light. These receptor cells give information to the body that allows it to regulate our sense of day and night. Research has shown that blue-violet light boosts attention and mood during the day. Chronic exposure to blue light at night, however, can give messages to the brain to reduce melatonin secretion. This effectively tells the body to wake up and be more alert, potentially disrupting our natural rhythms and sleep cycle.

Artificial light sources



Can cataract surgery diminish our protection from blue light?

Yes, it can. The lens of the eye tends to yellow with age, which actually helps filter out blue light. Cataract surgery replaces the natural lens with a clear one, improving vision, but removing that little bit of protection.

Does blue-violet light effect our visual acuity?

Yes, it does! Blue-violet light is scattered and therefore not focused on the macula, the center of the retina, responsible for high visual acuity. The result of this is a reduction in contrast sensitivity and lowered visual acuity.

Do we need to block 100% of blue-violet light?

No, we don't. Blue-violet light is a natural part of the visible light spectrum and should not be totally blocked. Tests show that blocking just 5%-10% of the blue-violet light wavelength has a positive effect on vision, supporting contrast sensitivity.

What kinds of lenses offer protection from blue-violet light?

Lenses with fixed tint/s, or lenses with a special coating, such as Shamir Glacier Blue-Shield UV, available on a variety of lenses including: Freeform progressive lenses, Freeform occupational lenses, and Smart SV lenses.

What is the disadvantage of lenses with fixed tint?

Fixed tint lenses absorb 100% of blue-violet light wavelength, blocking it totally and changing the wearer's color perception.

How can we best protect our eyes from the harmful effects of blue-violet light?

During the day, when engaged in outdoor activities, the eyes should be protected by wearing ECP approved sunglasses. For protection indoors, there are specially developed eyeglass lens coatings that block out the right amount of blue-violet light. Eyeglasses with lens coatings such as Shamir Glacier Blue-Shield UV, offer the best protection.

