

December 30, 2021

BY EMAIL

Jonathan Adkins, Executive Director
Governors Highway Safety Association
Jonathan.adkins@ghsa.org

Re: The LED Fraud

Dear Jonathan Adkins,

In 2016, the American Medical Association published ground-breaking recommendations regarding LED radiation with a document titled Human and Environmental Effects of Light Emitting Diode (LED) Community Lighting.¹ This document stunned the world as it alerted the public to the toxicity of LED radiation, and the AMA recommended setting limits on this radiation. The LED cartel fought the AMA's recommendations and continues to do so. Since 2016, neither the government nor the LED cartel have taken appropriate steps to address the dangers of LED radiation.

The Soft Lights Foundation has concluded that the entire switch to LED is based on fraud. The idea that has been sold to the public is that LEDs are energy efficient or save energy compared to incandescent or High-Pressure Sodium and that LED radiation is safe. These are fraudulent claims.

According to the US Department of Energy's website, energy efficiency means "using less energy to get the same job done."² The job is to provide uniform illumination with minimal harm. LEDs do not produce uniform illumination³, but rather they emit radiation from a flat surface which creates a mix of energies that are not uniform. Since LEDs do not do the same job as an incandescent or High-Pressure Sodium, **the claim that LEDs are energy efficient cannot be made**. LEDs are simply a low quality, toxic, hazardous, and discriminatory type of visible radiation.

As shown in Figure 1, a spherical emitter sends light in all directions in space. Because of the curvature of the emitter, the light rays do not overlap, and the radiation is spatially, spectrally, and temporally uniform. A flat surface emitter, such as an LED, sends light only in the forward direction. The light rays are confined to an 'escape angle' which is determined by the physical characteristics of the chip. There are thus overlapping rays, with the most overlap being in the center of the chip, and the least overlap being on the edges. The result is that every point in space has different spatial, spectral,

¹ <https://www.ama-assn.org/sites/ama-assn.org/files/corp/media-browser/public/about-ama/councils/Council%20Reports/council-on-science-public-health/a16-csaph2.pdf>

² https://www.energystar.gov/about/about_energy_efficiency

³ <https://ieeexplore.ieee.org/document/8879542>

and temporal properties. This non-uniform radiation profile is not suitable for illumination and not compatible with the human nervous system. **An energy efficiency comparison between an incandescent or High-Pressure Sodium and an LED cannot be made.**

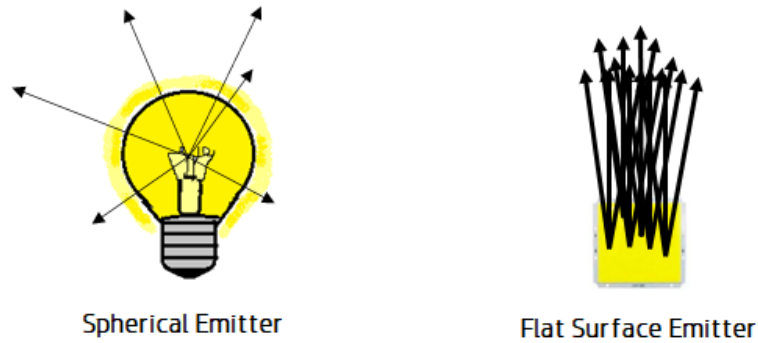


Figure 1 - Spherical vs. Flat Surface Emitter

Figure 2 shows the uniform spatial energy from candles, incandescent and High-Pressure Sodium versus the non-uniform spatial energy from an LED and LASER. The intense peak of energy will cause eye damage and will overload the nerve signals to the brain because the information is not uniform.

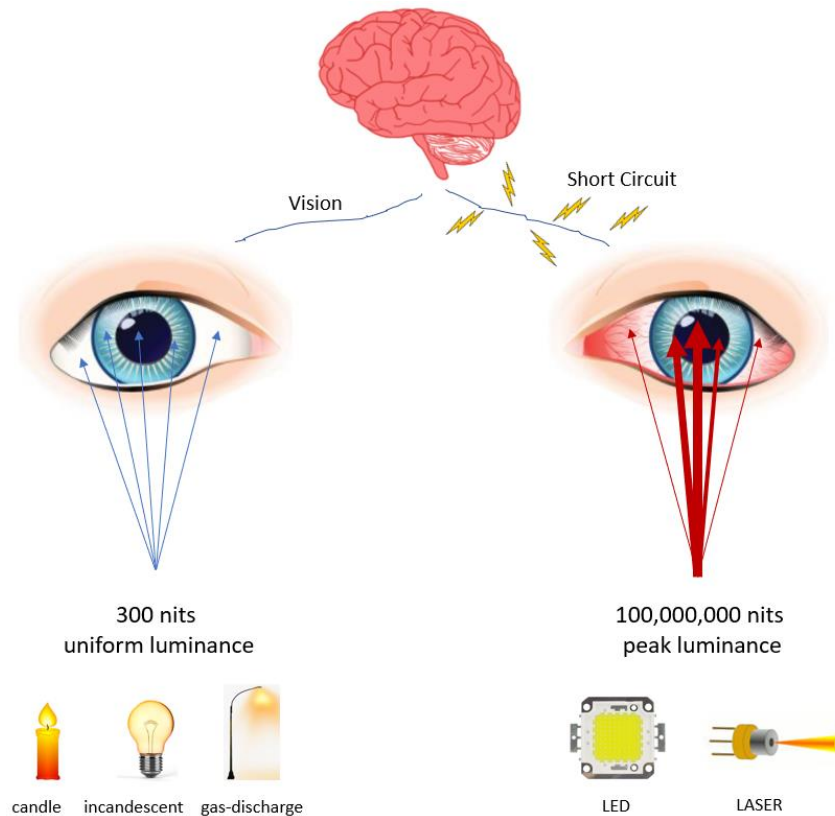


Figure 2 - Spatially Uniform v. Non-Uniform Radiation

Figure 3 is a diagram showing the categorization of radiation and shows that *light* and *illumination* are spatially isotropic radiation in the human visible portion of the electromagnetic spectrum. Radiation emitted by LEDs do meet the regulatory meaning of or comply with standards for the use of light as illumination.

Regulatory Meaning of Light and Illumination

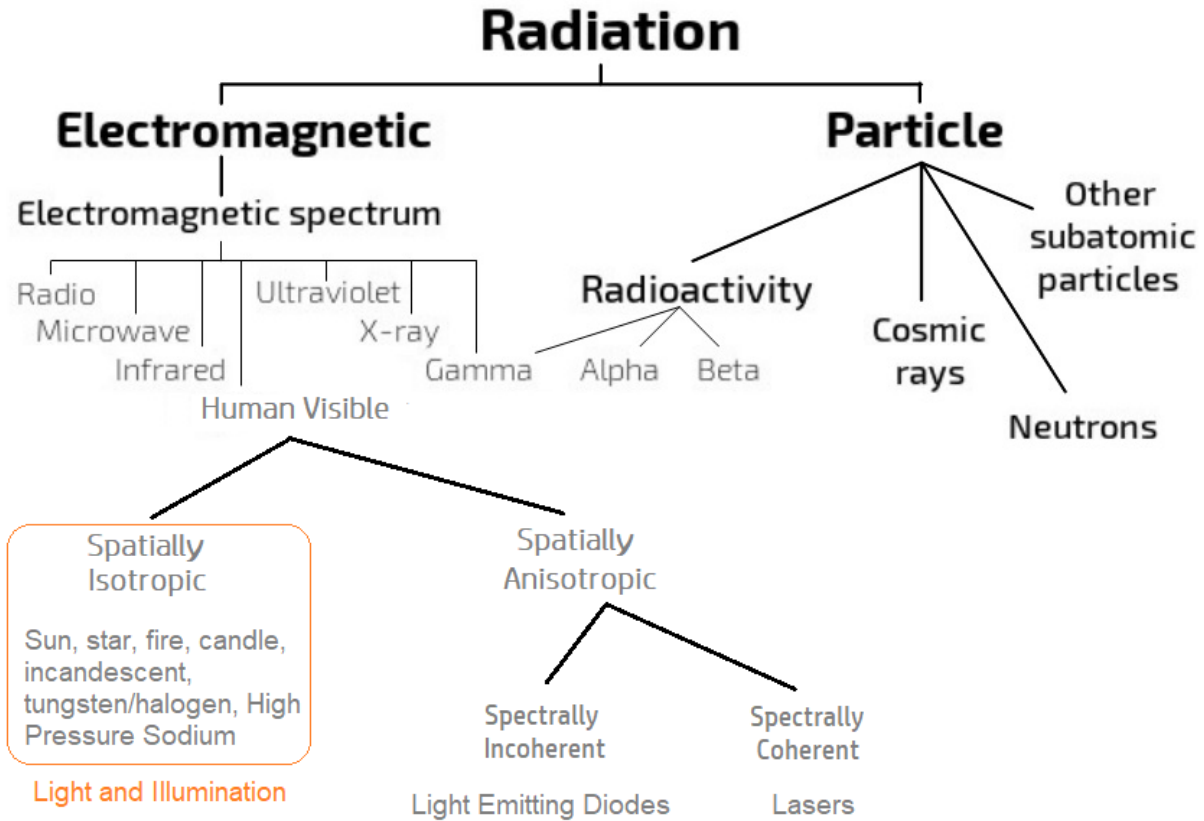


Figure 3 - Radiation Types

As an example of how dangerous LED radiation is, the operator’s manual for the Ryobi P705 Flashlight includes the following: “WARNING: Do not direct the light beam at persons or animals and do not stare into the beam yourself (not even from a distance) Staring into the light beam may result in serious injury or vision loss.”

⚠ WARNING:

Do not direct the light beam at persons or animals and do not stare into the light beam yourself (not even from a distance). Staring into the light beam may result in serious injury or vision loss.

As another example, consider this warning shown in Figure 4 from the company Gear Light.



Figure 4 - LED Flashlight

Clearly neither flashlight can be safely used in a dark environment, as there is no feasible way to protect every approaching person or animal from being hit in the eye with the light beam. The warnings also refer to children, who along with infants are an identified high-risk population vulnerable to LED-exposure harm. Babies often lack an adult's automatic, self-protective aversion response to bright or intense light, and will stare directly at the source.

The Soft Lights Petition to ban blinding LED vehicle headlights is approaching 30,000 signatures. Here are a few of the most recent comments.⁴

"These new bright headlights are dangerous and blinding to other drivers."

"I'm tired of being blinded with these bright lights! It's painful!"

"I can barely drive at night anymore. I'm afraid of an accident because I am constantly blinded by LED lights aimed into my vehicle"

The National Highway Transportation Safety Administration has never approved a flat surface emitter, such as an LED, for use as a vehicle headlight. The substance emitted by LEDs is spatially anisotropic visible radiation with orders of magnitude difference between the peak radiance at zero degrees along the center axis of the LED chip and angles greater than zero degrees. Mathematically, the shape of the radiation is a Lambertian which is created because the source of the radiation is a flat surface.⁵ The radiation energy from an LED is different at every point in space, which is very different than the spatially uniform energy of *light* as used in regulatory filings. Because the radiation emitted by LEDs is spatially anisotropic, and because the peak radiance is so dense, this LED radiation causes eye damage and reduced vision.

⁴ <https://www.change.org/p/u-s-dot-ban-blinding-headlights-and-save-lives>

⁵ <https://ieeexplore.ieee.org/document/8879542>



Figure 5 - LED Headlights on a Toyota

NHTSA has released a letter stating that NHTSA has never approved a single aftermarket LED headlight. This means that all aftermarket LED headlights are illegal.⁶ In addition, NHTSA has never approved a flat surface emitter, which creates spatially anisotropic visible radiation, for use in OEM headlights. The auto makers such as General Motors and Toyota and the headlight suppliers such as Hella have fraudulently certified LED headlights as compliant with NHTSA FMVSS-108 when they are not.

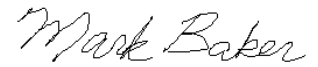
The result of exposure to LED radiation is immediate sickness in the form of headaches, nausea, eye pain, loss of balance, migraines, panic response, altered vision, epileptic seizures, disorientation, and other neurological disturbances. Each of these symptoms is being verifiably reported by an increasing number of individuals and constitute medical evidence of LED-induced harm. LED visible radiation exposure is causing catastrophic physical harm, subjecting at-risk individuals to illness and injury, and plunging formerly healthy, independent people into crisis levels of stress, hopelessness, psychological trauma, and persistent thoughts of suicide.

The Soft Lights Foundation requests that the GHSA produce a report in 2022 that details the harms caused by LED radiation, especially those in vulnerable populations such as babies and children, and those with epilepsy, autism, PTSD, Bipolar Disorder, migraines, and others. The report would also detail the failure of government agencies to account for the overlapping visible radiation of streetlights and vehicle headlights, the failure of government to understand the need to keep a low contrast between the natural night and artificial light, the failure of government to set guidelines to protect

⁶ <http://www.softlights.org/wp-content/uploads/2021/12/Leroy-Angeles.pdf>

persons with disabilities from LED radiation, the failure of NHTSA to recall vehicles with LED headlights, and the failures of the state DOTs to eliminate LED headlights on commercial vehicles.

Sincerely,

A handwritten signature in black ink that reads "Mark Baker". The signature is written in a cursive style with a large initial "M".

Mark Baker
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