

Human helth and light

Utsjoki 7.10.2025

Olli Reijonen

Syrjävaara Good Night Oy

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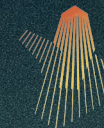
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LED LIGHTS

- White LED light is formed from red, green, and blue components
- LEDs lamps are divided into two main groups, each with different applications and effects.
- **LEDs with a color temperature maximum 3000 Kelvin** are recommended for all lighting, indoors and outdoors.
- **LEDs with a color temperature of over 3000 Kelvin** are marketed for industrial, office and public lighting

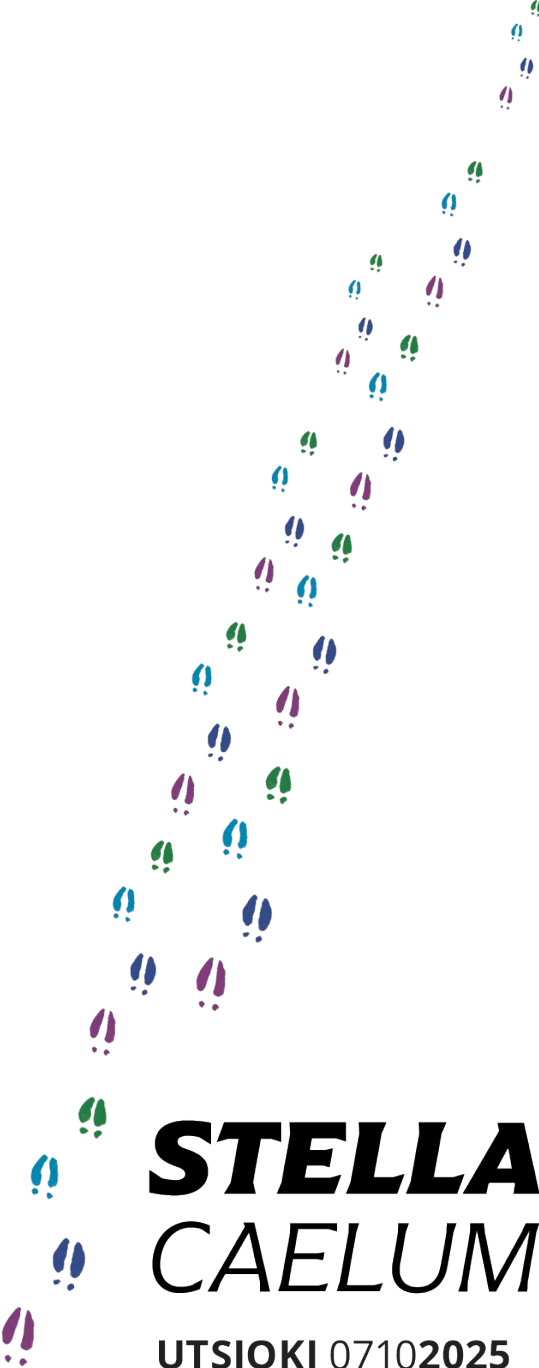


HOME AND PRIVATE LIGHTING

- 3000 Kelvin is considered the threshold below which light has little effect on the human physiological system.
- They have a lower amount of blue wavelength than daylight LEDs.

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OFFICE AND INDUSTRIAL LIGHTING

- Daylight lamps are for industrial, workplace, office, retail and public lighting.
- The main purpose is to manipulate the human physiological system.
- The color temperatures of the lamps are over 3000 Kelvin up to 6000 Kelvin.

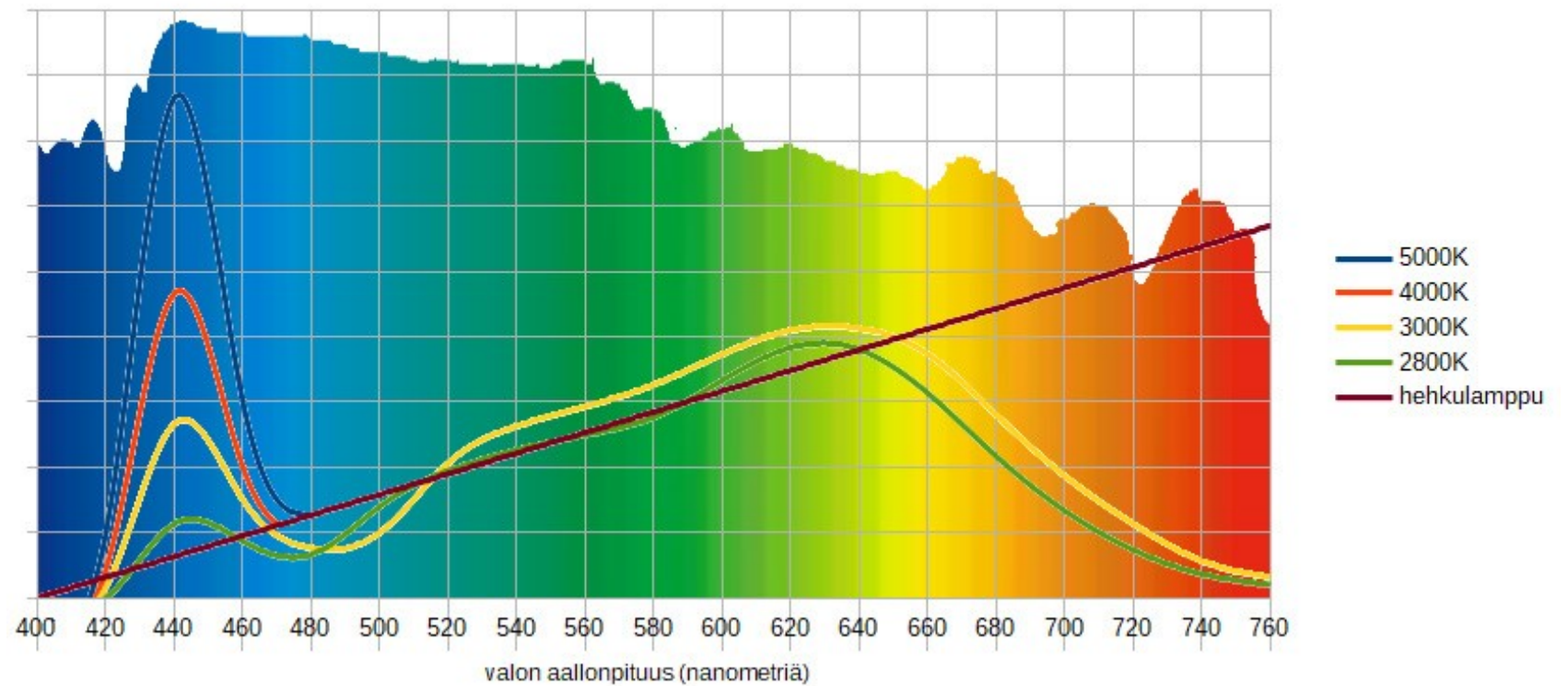
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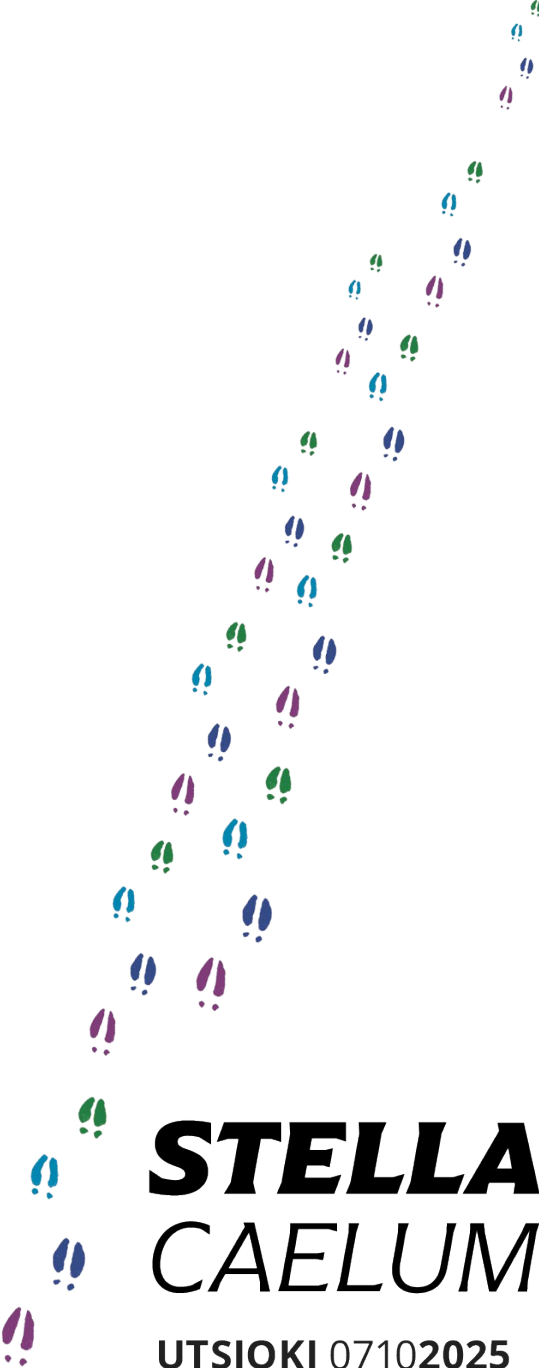
Spectrum of LED compared with the Sun and incandescent lamp

LED -lampun spektri verrattuna aurinkoon ja hehkulamppuun

sinisen valon määrän lisääntyminen värielämpötilan noustessa



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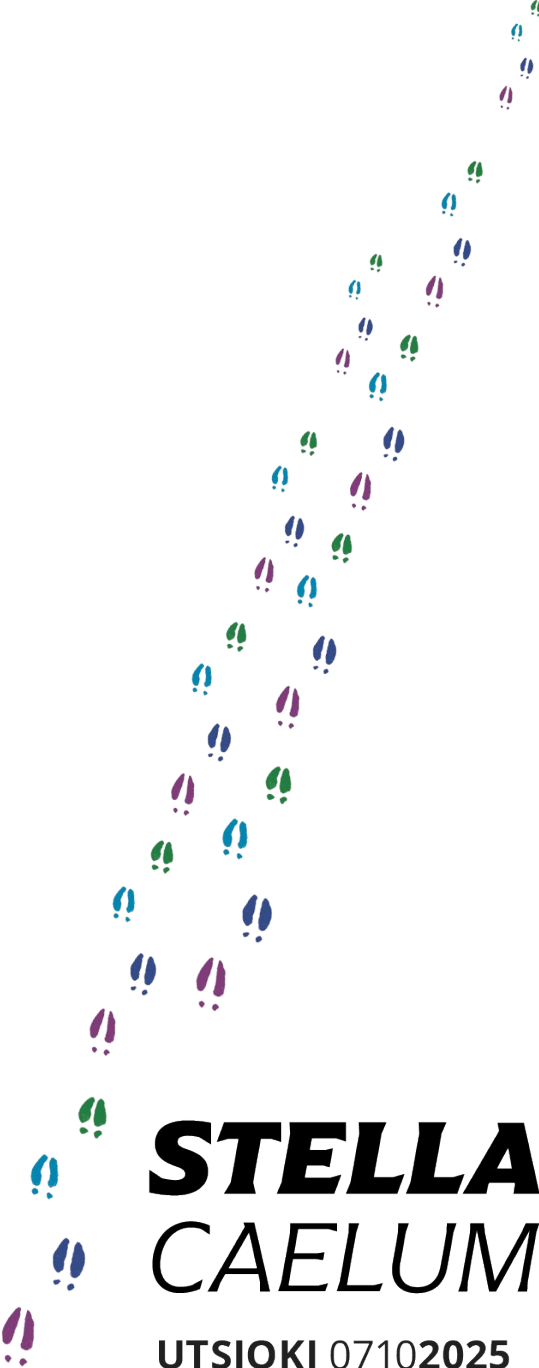


THE MAIN USES OF DAYLIGHT LAMPS ARE

1. Shifting the circadian rhythm
 2. Extending and strengthening the activity period
 3. Prevent the sleep phase
- *The effect of daylight lamps is based on the blue wavelengths that prevent the secretion of the hormone melatonin.¹*

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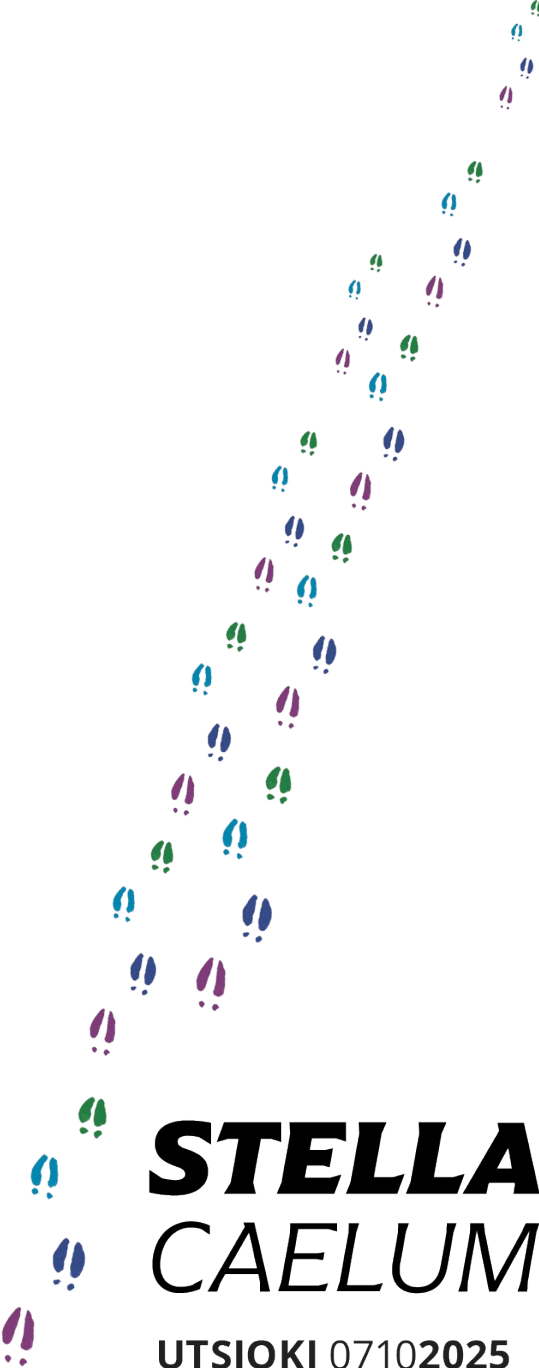


MANIPULATING CIRCADIAN RYTHM

- *The recommended lighting is a vertical illuminance of 254 lux at a color temperature of 5000 Kelvin.*
- *The threshold value of little effect on the physiological system is only about 30 lux.*

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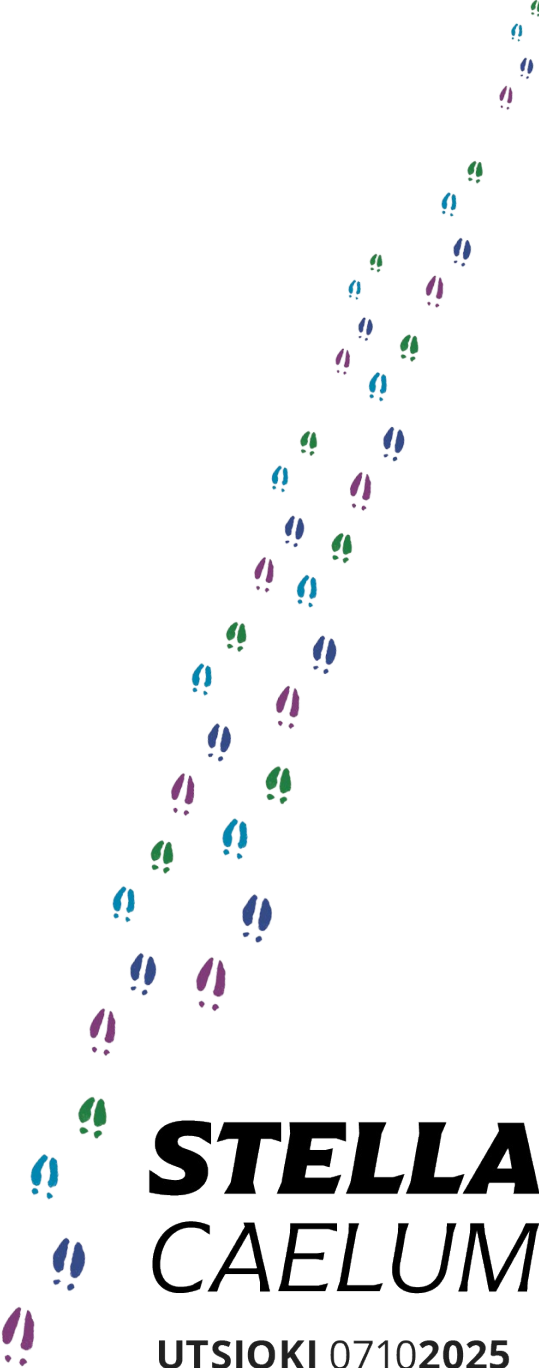


The human physiological circadian rhythm works best

- *when there is a clear difference between daylight and darkness at night.*
- *Daylight LEDs can be used to amplify weak and insufficient daylight at autumn and winter.*
- *Mortality is reduced by 17-34 percent compared to those who live their days in darkness.²*

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Light is the most important controller of the circadian rhythm.

- *In the evening and at night, light greatly increases morbidity and mortality.*
- *3-5 lux of light in the bedroom increase the risk of diabetes in older people.³*
- *Exposure to artificial light at night is reflected in a person's blood count within two days.*

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Light is the most important controller of the circadian rhythm.

- *differences are clear when comparing people who live in a natural light-dark cycle with those who are exposed to artificial light throughout the night:*
- *People exposed to artificial light all night have a 28% higher risk of diabetes and a 34% higher mortality rate.²*
- *In women shift work, breast cancer increases by 134-166 percent.⁴*

REFERENCES

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2. <https://www.pnas.org/doi/10.1073/pnas.2405924121>
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