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CIE Technical Note

“Visual Aspects of Time-Modulated Lighting Systems – Definitions and Measurement Models”

CIE TN 006:2016

The fast rate at which solid state light sources can change their intensity is one of the main drivers behind the revolution in the lighting world and applications of lighting. Linked to the fast rate of the intensity change is a direct transfer of the modulation of the driving current, both intended and unintended, to a modulation of the luminous output. In turn, the light modulation can give rise to changes in the perception of the environment. While in some very specific entertainment applications a change of perception due to light modulation is desired, for most everyday applications and activities the change is detrimental and undesired. These changes in the perception of the environment are called “temporal light artefacts” (TLAs) and can have a large influence on the judgment of the light quality. Moreover, the visible modulation of light can lead to a decrease in performance, increased fatigue as well as acute health problems like epileptic seizures and migraine episodes.

The potential negative impact of temporal light artefacts has prompted lighting manufacturers, lighting application specialists, universities and governments to look for ways to measure the impact and come to a better understanding of the temporal quality aspects of lighting systems. In this context, the CIE formed Technical Committee (TC) 1-83 “Visual Aspects of Time-Modulated Lighting Systems”.

This Technical Note (TN) is an intermediate product of the work of the TC. In the first part of the TN, new definitions for the perceptual effects modulated light can produce are given. In the second part, an overview of the relevant literature is given as well as an overview of the parameters that influence the visibility of the different TLAs. The last part gives a description of two methods, one in the time domain and one in the frequency domain, which can be used to quantify TLAs. Furthermore, three implementations of the general methods into specific visibility measures are given as an example.

The publication is written in English, consists of 23 pages and is freely downloadable from the [CIE webpage](#).