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Over the past decades the use of the light emitting diodes (LEDs) have become prevalent in general illumination applications (homes, offices), not only because of their positive environmental impact, but also because the versatile control of their emission properties brings entirely new functionalities to lighting systems. Notably, the rapid response of LEDs to the changes in the driving current allows for easily control of the light output intensity and color. However, visual perception of rapidly changing light can be unpleasant or even irritating when producing flicker or the stroboscopic effect, and exposure to such lighting can have negative impact on our physiology, leading to fatigue or triggering headaches. These can be prevented by suppressing the light modulation, however solutions to do so typically require a trade-off with cost, size, lifetime and/or efficiency of LEDs.

Through a series of psychophysical experiments we developed and validated measures that can be used to objectively quantify the visibility of flicker and the stroboscopic effect, and as such to support the design of LEDs that balance good temporal light quality with optimal other aspects. One of the measures, the SVM, has been implemented is several, commercially available devices. It is also recommended by the International Commission on Illumination (CIE) to quantify the stroboscopic effect visibility, it is standardized by the National Electrical Manufacturers Association (NEMA), and it is used by the European Commission’s regulation of light sources under the Ecodesign Directive.