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## LED light for health and well-being

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With the advanced of LED lighting, it is envisaged that lighting can be used to improve not only our work efficiency but also well-being, including higher sleeping quality, less eye fatigue, better mood. This has become a hot topic called health integrated lighting (HIL). They are related to the human circadian system, which is affected by a newly found photoreceptor, ipRGC, intrinsic photosensitivity Retina Ganglion Cell (ipRGC). More recently, CIE recommended 5 terms in SI unit to measure ipRGC influenced light responses, e.g. Emel, Erd, Esc, Emc, Elc in irradiance. Rea et. al. also proposed CS Circadian Stimulus (CS) to estimate light response directly proportional to nocturnal melatonin suppression. This paper will be focused on the technology required to achieve high quality of HL.

### Recent Publications:

1. M Safdar, G Cui, Y J Kim and M R Luo (2017) Perceptually uniform color space for image signals including high dynamic range and wide gamut. Optics Express 25:15131–15151.
2. Y J Cho, L C Ou and M R Luo (2017) A cross-culture comparison of saturation, vividness, blackness and whiteness scales. Color Res and Appl. 42:203–215.
3. Withouck M, Smet K A G, Ryckaert W R and Hanselaer P (2015) Experimental driven modelling of the color appearance of unrelated self-luminous stimuli: CAM15u. Optics Express 23:12045–12064.
4. M R Luo, G Cui and C Li (2006) Uniform colour spaces based on CIECAM02 colour appearance model. Color Res. Appl. 31:320–330.
5. M R Luo, G Cui and B Rigg (2001) The development of the CIE 2000 colour-difference formula: CIEDE2000. Color Res. Appl. 26:340–350.

### Biography

Ming Ronnier Luo is a Global Expertise Professor at the College of Optical Science and Technology, Zhejiang University (China), a Visiting Professor of Colour Science and Imaging, University of Leeds (UK) and a Chair Professor at the National Taiwan University of Science and Technology, Chinese Taipei. He is also the CIE Vice-President of Publication. He received his PhD in 1986 at the University of Bradford in the field of Colour Science. He has published 600 publications in the areas of colour science, imaging science and LED illumination. He is a Fellow of the Society for Imaging Science and Technology (IS&T), and the Society of Dyers and Colourists (SDC). He has received numerous awards for his research in Colour Science and Technology including the recent AIC 2017 Judd Award.

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