

Review of spectral lighting simulation tools for non-image-forming effects of light

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Abstract. Light via our eyes influences visual performance, visual comfort and visual experience, but also affects several health related, non-image-forming (NIF) responses. New metrics have been developed to quantify the NIF effects of light. In order to incorporate these in lighting design practice, simulation tools are required that are able to process information about the spectral distribution of light sources and materials. However, most of the tools currently used for daylight and electric light simulations simplify the spectrum into RGB (Red, Green, Blue) colour values. This paper presents an overview of the currently used programs for simulating the NIF effects of light in building design and discusses the possibility of using existing spectral rendering software as an alternative. A review of literature shows that mostly Radiance or Radiance-based programs have been used so far, but new user-friendly tools could employ existing spectral rendering tools. As the NIF effects of light gain greater importance in lighting design, new simulation workflows are needed. This paper aims to support the development of future workflows by presenting the current state-of-the-art.