Editorial

Cornelius Neumann*

Development in illumination optics

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Even for somebody, who is working in the field of LED technology and illumination optics for more than 15 years, the current innovative speed in research and application is amazing.

Recent progress has been driven by the rapid development of the LED as a powerful light source, new sensing and computing capabilities and better injection molding manufacturing technologies. The optics and applications one can find on the market today are far beyond what has been possible at the (not so far behind) beginning of this century.

In this issue of *Advanced Optical Technologies* you will find a small selection of what is going on in the field of illumination optics.

Three of the articles deal with automotive lighting. They can be described briefly as seeing and be seen.

Seeing is the major task while driving at night time. The headlamp should improve night vision for the driver with emerging new functions and technologies. So the vision of the perfect headlight is pushing the development further on. Today, sensing, recognizing and illuminating are typical functions of an advanced headlamp system. In the far field the light has to give the best possible illumination, without glaring other drivers. In the near field new functionalities will support the driver with comfort and information. The two contributions, High resolution vehicle headlamps: technologies and laser scanning prototype by Kloppenburg et al., as well as High resolution headlamp by Gut et al., present an overview of different concepts, technologies and applications.

Signal functions are responsible for the recognition of vehicles and their behavior at night. Tail-, stop- or indicator lamps show other participants where I am and what I intend to do. Beside this important task, signal lamps can transport additional attraction. Today new optical systems are designed to show new styling and corporate identity during day- and night-time. You will find many beautiful examples of styling opportunities with new optical systems in the article Signal lights–designed light for rear lamps and new upcoming technologies by Mügge and Hohmann.

Freeform technology, another strong driver of illuminating optics, is represented by two articles.

The strong asymmetry of a flashlight illumination, or the low beam function in automotive application demand special solutions for the calculation and manufacturing of free form lenses presented in Free-form illumination optics by Mohedano et al.

Additionally, different freeform design and optimization methods are tested and evaluated for the design of light guide (TIR) reflectors by Talpur and Herkommer in Review of freeform TIR collimator design methods.

A specialty of LED lighting is color. With the additive RGB(W) LED mixing, a large color gamut can be used for illumination tasks. The last article of our topical issue, Angular and spatial LED color mixing with dispersive mixing rods by Bonenberger et al., presents a spatial and angular mixing light guide rod adopting the concept of chaotic billiard systems in classical mechanics.

I would like to thank all the contributors to this issue and hope that you will be attracted by the presented topic Illumination optics.

Thank you and kind regards
Cornelius Neumann

Cornelius Neumann
Karlsruher Institut fur Technologie
Lichttechnisches Institut, Engesser Str. 13
Karlsruhe 76131, Germany
cornelius.neumann@kit.edu

Cornelius Neumann studied Physics and Philosophy at the University of Bielefeld, Germany. After his PhD, he worked for the automotive supplier Hella in the advanced development for automotive lighting. During his time at Hella he was responsible for signal lighting, LED application and acted as a director of the L-LAB, a laboratory for lighting and mechatronics in public private partnership with the University of Paderborn, Germany. In 2009, he became Professor for Optical Technologies in Automotive and General Lighting and one of the two directors of the Light Technology Institute at the Karlsruhe Institute of Technology, Germany.

***Corresponding author: Cornelius Neumann,** Karlsruher Institut fur Technologie, Lichttechnisches Institut, Engesser Str. 13, Karlsruhe 76131, Germany, e-mail: cornelius.neumann@kit.edu