

Highly Adaptive Micro LED-Array

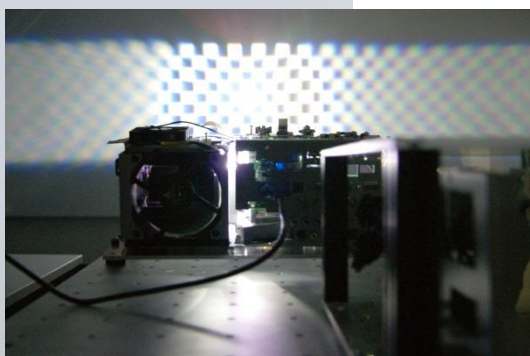
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Project ID: B2

Situation

Highly adaptive multi-pixel light sources are ideal tools to realize spatial and temporary variable light distributions. Thus for instance the traffic area can be illuminated without glaring the oncoming traffic participant. The integrated camera system in the vehicle detects safety hazards and illuminates them. The attention of the driver will be led to the potential threat by which the safety will be enhanced. Reflections of road signs which glare the driver himself can also be reduced by this approach. In addition to that information can be transmitted into the traffic area so the driver does not have to look away from the road, which enhances the road safety. Furthermore an adaptation of the eyes due to changes in lightning conditions is no longer an issue.

An appropriate system can be a valuable contribution to enhance the active and passive road safety.



Highly adaptive headlamp prototype based on DMD array

Project ambition of the PhD program

Current concepts for highly adaptive headlamps are based on partial masking of the light distribution through DMDs or LCDs, known by video projectors. The basic idea of the concept in this project is a light source that consists of an array of many small LEDs. This system of several individual addressable LEDs provides a superior level of efficiency compared to the above mentioned concepts. Unlike conventional systems where parts of the emitted light are blocked through an absorber, a PWM-modulated operation of single diodes ensures that only the required amount of light is emitted. A maximum frame size of 70 mm x 70 mm with at least 10,000 pixels and a minimum

luminous flux of 4000 lm is preferred relating to automotive applications. The reliability of the circuit topology of the LEDs has to be considered as a part of the array designing. An appropriate redistribution of the light beam through a free-form optic ensures an increase of the luminous intensity and angular resolution in the critical sections of the light distribution, as it is necessary for automotive headlamps.

As part of the PhD program Tailored Light the invented LED-array is supposed to be available for further projects. Another application is possibly project B6.



This is a PhD-project of Tailored Light. Tailored Light is a coordinated PhD-programme of the Hanover Centre for Optical Technologies from the Leibniz Universität Hannover together with the Hochschule Hannover, the Laser Zentrum Hannover, the HAWK Hildesheim/ Holzwinden/ Göttingen, the TU Braunschweig and the TU Clausthal.

Students interested in this or another project of Tailored Light can apply for fellowships. Have a look at www.tailored-light.uni-hannover.de for details.

