Invisible Headlamp: micro lens array-based front lighting

Micro lens array (MLA) technology provides solution to the limited whole lamp assembly space

Shanghai, June 25, 2019. Lighting and electronics expert HELLA participated in the 7th China International Automotive Lighting Forum (IFAL) from June 25 to 26, 2019, and discussed with industry experts the current and future development trends and solutions of automotive lighting.

Current trends such as autonomous driving, connectivity and digitalization, electrification as well as the desire for individualization are increasingly influencing vehicle design. In view of the limited space available and the invisible modelling requirements, HELLA presented a system based on MLA that makes it possible to reduce the size of lighting components such as optical systems. The automotive lighting therefore can present its individualized characteristics through the shape and size instead of limiting itself to the functionalities. MLA is mainly used for homogenizing of lasers and illumination in microscopes. By improving materials and optimizing relevant parameters, it can also be applied to the field of automotive lighting, e.g. headlamp lighting technology.

Based on Köhler illumination, a method of specimen illumination used for transmitted and reflected light optical microscopy, micro lens array has the particularity of projecting each point of light source onto to precisely defined areas. The design of these lenses is particularly unique as each lens is actually made up of many micro lenses. A single lens generates a very weak strip of light due to its small size. When one combines a large number of these small projectors, however, a very bright light pattern result. This functional principle is also advantageous in that whenever the cover of the LED module becomes slightly dirty in a few areas, there are always plenty of other lenses pointed toward the same area to be illuminated. Research shows that MLA technology can make the automotive lighting narrower and more homogeneous.
Other applications of the light are also being conceived by the illumination development engineers at HELLA, one of which could be integrating the light into the ambient interior lighting concept to produce colored light and attractive motifs.

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