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光电系统与工程

汽车前照灯用LED光源的光学设计

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摘要：

LED光源作为汽车照明系统的一门关键技术，LED汽车前照灯的配光设计是一个具有挑战性的研究课题。根据光通量及色度指标的要求选择LED光源，采用抛物面反射器并结合两者的偏移与旋转来分析光分布。每个LED光源拥有独立的光学系统，并负责配光屏上不同区域的照度，近光系统采用8个LED，远光系统采用10个LED。用CATIA三维设计软件画出组合反射器模型图，通过光学软件Tracepro反复调用不同的模型来追迹光线得到最后的配光效果。设计中无需配光镜、挡光板以及复杂的计算程序，设计周期短、配光效果好，给出的配光模拟照度值完全符合最新出台的GB4599-2007标准。

关键词： LED汽车前照灯 配光设计 反射器 照度

Optical design of automotive headlamp with LED

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Abstract:

Due to its superior performances such as energy saving and environmental protection，LED is widely used in automotive lighting. As a key technique on automotive lighting system，light distribution design of LED automotive headlamp is a challenging research subject. LED sources were chosen according to the standard，and Light distribution was analyzed by using parabolic reflector under moving and rotating conditions. Each light source has its self contained optical system and arranges the irradiance of different area on distribute-screen, 8 LED sources were used in low-beam system，and 10 LED sources were used in high-beam system. Combined reflector model was drawn in CATIA software. The final results were achieved by using Tracepro after calling different lens model iteratively. Baffle board and complex calculation program were not required in this design process. This method has short design period and high distribution efficiency. The final illumination results completely conform to the revised standard of GB4599-2007.

Keywords: LED automotive headlamp light distribution design reflector illumination

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