

Studying Tomorrow's Headlamps... Today

Working with government and industry, the LRC is studying new automotive headlamp technologies and strategies for applying light to the road. Drivers are both praising and condemning the newer, "bluer" headlamps — the U.S. government has received thousands of complaints. Here is how the LRC is sorting through some of the complex issues:

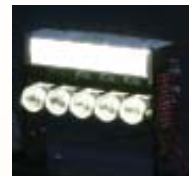
HID and LED Headlamps

A common perception is that the "blue" color of high intensity discharge (HID) headlamps is uncomfortable compared to conventional halogen lamps. However, LRC research has shown that halogen and HID lamps that provide the same amount of light to an oncoming driver's eyes will afford equal visibility. Light-emitting diode (LED) headlamps, now being developed, can also appear "blue" compared to halogen lamps; but the color of LED headlamps can be readily changed. These lamps can result in less discomfort than HID lamps and can actually help in detecting peripheral objects in the field of view.

Sponsors: Lumileds Lighting, Visteon



Left: High-intensity discharge (HID) lighting appears bluer. Right: Halogen appears yellower.



Prototype LED headlamp assembly

The color of LED headlamps can be readily changed.



Spectrally tunable headlamp provides yellower light toward oncoming drivers (left), bluer light toward center of lane (right).

Spectrally Tunable Headlamps

Another approach to reducing discomfort to oncoming drivers while improving peripheral visibility with HID headlamps involves special bulb coatings that selectively distribute the "bluer" and "yellower" light. This helps the headlamp to appear less uncomfortable to oncoming drivers while taking advantage of the "bluer" light to aid in peripheral detection. LRC research has demonstrated that such coatings work as intended, providing another way to optimize between comfort and visibility.

Sponsor: Philips Lighting

AFS System Performance

Traditional static low and high beams may become obsolete. Headlamp systems that change direction depending upon where we're steering, or that dim a portion of the beam pattern in response to oncoming traffic, or that change color during poor weather, are all components of advanced forward-lighting systems (AFS). Working with the U.S. government, the LRC is studying how these systems can be evaluated for potential benefits.

Sponsor: National Highway Traffic Safety Administration

LRC Transportation Lighting Program

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