Audi
MediaCenter

Product and Technology Communications
Stefanie Melander
Spokeswoman Lighting Technology
Phone: +49 841 89-38053
E-mail: stefanie.melander@audi.de
www.audi-mediacenter.com/en

Product and Technology Communications
Christoph Lungwitz
Spokesman Lighting Design
Phone: +49 841 89-33827
E-mail: christoph.lungwitz@audi.de

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PRESS RELEASE

Brand-defining aesthetics and uncompromising functionality: How Audi reinvents light

In a nutshell

New dimensions in lighting technology

- **Digitization of light opens up multi-faceted communication channels**
- **Audi lighting technology combines exceptional design with high functionality**
- **Close teamwork between Lighting Technology and Light Design as a success formula**

Audi is advancing into new dimensions in automotive lighting technology. Originally, vehicle lighting mainly served the purpose of ensuring traffic safety for all road users. Previously unknown prospects are now opening up in the wake of digitizing headlights and rear lights: light becomes a medium of external communication and interaction, personalizes design, and provides customers with new styling and customization options.

Lighting has made a veritable technology leap: The evolution from halogen light to xenon headlights to LED technology in automobiles took less than two decades. These milestones of new technologies provided customers with noticeably added value. As well as continually enhancing visibility, Audi lighting has been defining the face of the brand's models in every era while extending everyday usability by an equally communicative and aesthetic dimension.

In the wake of the transformation of lamps, both illumination and energy efficiency improved. Now, digitization provides another innovation boost with all-new design potential: Light is becoming smart. By means of light signals, the car interacts with its surroundings. As far back as in 2003, the then A8 offered adaptive light with automatic-dynamic headlight range control before a camera on the windshield began detecting other road users in 2010. Two years later, the brand underpinned its innovative prowess and pioneering role in the R8: The introduction of the dynamic turn signal that allows indicated directional changes to be perceived out of the corner of one's eye marked a significant gain in safety – and still does. In 2017, following their debut in the R8 LMX, Audi presented LED headlights featuring HD Matrix technology with the laser as an additional high-beam light in the A8 luxury sedan – a world innovation in large-scale production. Now, the premium manufacturer is digitizing the Matrix LED headlight while adding even greater variety. The digital OLED rear lamps in the new Q5 have been opening the door to car-to-x communication since this year and, for the first time, make choices of new taillight designs possible at the time of configuring the vehicle.

As well as intelligently illuminating the road, Audi provides its models with an unmistakable personality using distinctive signatures and dynamic lighting scenarios. Even at this juncture, customers are offered various model-dependent lighting signature options, to be followed by further differentiations. The dynamic turn signal or the impressive scenarios of the leaving and coming home functions cause the light to strike an emotional chord. Going forward, lighting technologies will make driving even safer, the individuality of each model even more visible, and external communication even more effective.

Lighting technologies

From the incandescent lamp to the digital high-tech application: light-years of progress with Audi

Halogen incandescent lamps enabled initial technical improvements that also affected the look of automobiles. With free-form headlights in the nineteen-eighties and clear lens covers in the late nineteen-nineties, designers were increasingly able to use light as a styling element to define the face of Audi models. The second-generation xenon headlights in the 1994 Audi A8 and the tiltable modules from 2003 onward marked development leaps that elevated the quality of light and the customer's experience to a new level. The technology of LED light introduced in 2008 was used by Audi to make a veritable quantum leap. It replaced the previously unsegmented and indivisible lighting units, significantly surpassing the efficiency, range and illumination performance of the previous headlights. In addition to this technical progress, light-emitting diodes permitted much higher degrees of freedom in designing the light source, so light as a styling element acquired much greater significance. Segmentation as a Matrix and digitization expanded the potential even further: The lights of an Audi no longer serve the mere purpose of providing illumination. They create a new customer experience by pioneering external communication including social interaction as well as enabling a wide variety of lighting design choices.

Headlight technology: looking ahead

In 2004, Audi used light-emitting diodes for the first time in LED headlights, in the daytime running light of the Audi A8. Light-emitting diodes are semiconductors that can directly convert electrical energy into light. They operate with particularly high efficiency: their energy consumption is low and their light output high. In 2008, the first full LED headlights followed in the Audi R8. Today, headlights with LED technology are standard equipment in all model ranges – except for the Audi A1 as an entry-level model. In 2013, Audi was the first automobile manufacturer to be awarded the eco-innovation certificate of the European Union for using LED technology.

Light-emitting diodes still provide the foundation for headlight technology today. Whereas the high-beam assist system, by detecting oncoming traffic, automatically switches the high beam on or off, Matrix LED headlights paved the way for new applications in the Audi A8 in 2013. The high-beam light's 25 individual light-emitting diodes could be discretely activated or deactivated and, alternatively, even be dimmed. Back then as today, the lighting system by means of a camera detects other road users with high precision, avoids headlight dazzle by deactivating individual diodes while still brightly illuminating the road. Navigation-based, it responds to the respective driving situation and predictively distributes the light according to the route data. In the case of the smart cornering light, the focal point of the light shifts in the direction of the corner as soon as the driver turns the wheel.

The laser as an additional high-beam light, which debuted in the Audi R8 LMX limited edition in 2014, doubled the headlight range. In 2017, the A8 combined the latest ideas: Rear lights with

OLED technology and HD Matrix LED headlights featuring the Audi laser as an addition high-beam light represented the benchmark among the competition. This is achieved by each headlight integrating two times 16 small, discretely controllable light-emitting diodes to generate a multi-row Matrix LED high beam. The system delivers cornering, urban and freeway lighting with maximum precision and complements the high-beam light by masking out other road users with enhanced accuracy. The laser is activated at a minimum speed of 70 km/h (43.5 mph) and as a spotlight illuminates a distance of roughly 600 meters (1,970 ft).

In the Audi e-tron, the brand's first fully electric model, the digital Matrix LED headlight with a digital micromirror device (DMD) debuted in 2019. It marked another Audi success in launching a world innovation in the area of low-beam and high-beam lighting in large-scale production, because it was the first to feature the installation of DMD technology that had its origins in video projectors in an automobile. At its core is a small chip that integrates 1.3 million micromirrors, each with an edge length of just a few hundredths of a millimeter. Using electrostatic fields, every single one of them can be tilted at a rate of up to 5,000 times per second. Depending on the position, the light from three high-performance LEDs reaches the DMD chip in concentrated form via specifically calculated lenses and a free-form reflector. From there, the light hits the road either via lenses or an absorber that masks it out. This goes hand in hand with as many as three innovations delivering high customer value. Above and beyond the previously known, albeit more precisely achievable functions, the technology is able to project a kind of "light carpet" in front of the vehicle when traveling on expressways such as the autobahns in Germany. This so-called lane light brightly illuminates the vehicle's own lane, dynamically spreads when changing lanes, and thus enhances traffic safety. Innovation number two: The orientation light facilitates lane-keeping especially in narrow sections by indicating the vehicle's position in its own lane as a strip-like boundary. Innovation number three: Used in combination with the optional Night Vision Assist feature is the marking light. It detects pedestrians close to the roadway and alerts the driver to them by means of a precision light cone.

Rear light technology: A signaling function evolves into a display

Similar to the headlights, the rear lights have seen a rapid evolution at Audi as well. In 2011, LEDs provided the rear lights of the Audi A6 with a new visual homogeneity and enhanced the efficiency of lighting technology, which also benefits other road users: The LED brake light responds instantaneously and thus two tenths of a second faster than an incandescent lamp. As a result, the driver of a following vehicle can react faster. Accordingly, at 100 km/h (62 mph), the distance on which a following vehicle is able to brake is extended by nearly 6 meters (20 ft). In 2012, the turn signal with dynamic indication was introduced in the Audi R8. This pioneering achievement, in which Audi worked closely together with approval authorities, has since become standard equipment. Due to the movements of the turn signal, directional changes are more clearly perceptible by the drivers of following vehicles, especially from a distance and at night.

OLED rear lights on the Audi TT RS rang in a new era in 2016. The light of the light-emitting diodes, which consist of organic material, is extremely homogeneous and precise. OLED light sources are ultra-thin area light sources and do not require reflectors. This technology is

efficient, lightweight and visually impressive. In 2020, Audi was the first manufacturer to digitize the rear lights that turns them into a display and opens up new potential in terms of styling, personalization and safety. Due to the increased segmentation of the digital OLEDs to currently 18 segments, diverse rear light designs can be achieved for the first time. Customers purchasing a Q5 can choose between three rear light signatures. Irrespective of these choices, a particularly sporty signature can be set in “dynamic” mode in Audi drive select. In addition, the proximity indication feature enhances traffic safety: When the Q5 is standing still and another road user approaches from behind at a distance of less than two meters (6.5 ft), all OLED segments are activated. As a result, the visible area is enlarged and perceptibility enhanced. The proximity indication feature is contingent on the car being equipped with either of the two assistance systems, Adaptive Cruise Control or Active Lane Assist. A total of five different visual lighting patterns can be achieved here with just a single set of hardware.

An experience for the senses: Design, signature and dynamics

On or off: Those were the lighting options for the parking light, low and high beam in the analogue age. Functions above and beyond purely seeing and to be seen hardly existed. Styling potential was rather limited up until the nineteen-eighties. Smaller light sources paved the way for increasingly individual and distinctive designs. Halogen incandescent lamps enabled free-form headlights. The clear cover lenses appearing in the late nineteen-nineties and the small xenon lamps gave Audi’s headlights a look resembling the pupil of a human eye. They permitted more compact headlight shapes and component arrangements. This marked the advent of a new business segment of offering options in the area of lighting and a resulting opportunity for differentiation underscoring the brand’s premium character in line with technical progress.

Segmentation and modularization allow for styling freedoms in vehicle design and foster new creativity in the design and animation of light. In combination with digitization, new functionalities emerged such as lighting signatures and dynamic lighting scenarios. As is typical for Audi, all lighting signatures are designed for absolute precision and homogeneity. They emphasize the width of the vehicle by means of distinctive horizontal lines and accentuating details on the car’s exterior. In their interaction, these segments form a body, ensuring that the vehicle sports a visually wider look and sits squarely on the road.

Styling innovations and customer experience always go hand in hand with maximum functionality and high customer value. In 2004, LED daytime running lights defined Audi’s face for the first time while enhancing visibility. Today, on the A3 as the first model range, Matrix LED headlights can feature model- and line-specific signatures in the daytime running lights using just one set of hardware.

The dynamic lighting scenario of the leaving and coming home function in the Audi A7 Sportback and A8 created a new customer experience. This function is activated when unlocking and leaving the car. The digital Matrix LED headlights with DMD technology for the Audi e-tron are now offering five different welcoming versions within the range of extended dynamic lighting scenarios. They can appear as projections on a wall or on the ground. With such diversity and

innovative prowess, Audi has been and will remain not just the globally leading brand in automotive lighting technology, but also makes this type of “Vorsprung durch Technik” visible in the design of lighting signatures and their dynamic enactment.

Versatile and forward-thinking: Safety, communication and interaction
Light at Audi stands for a symbiosis of technology, design, safety and customer experience. Connectivity ensures smart functionality. Lamps turn into displays and a one-dimensional signaling and warning function of the past will evolve into a versatile means of communication with the external world, going forward.

Be it at the front or rear, thanks to freely selectable signatures with identical hardware, a wealth of variety has found its way into the brand’s model ranges. Going forward, it is conceivable that, via the MMI, owners will be able to switch between a wide range of signatures or achieve custom designs. Via the myAudi app, Audi e-tron customers already have the opportunity of booking additional lighting functions even after having purchased their car – anytime and with great flexibility. Other models will follow.

Today, the digital Matrix LED headlight with DMD technology already offers projections for specific lane guidance and orientation, which serve to make driving easier and avoid accidents. As a forward-thinking prospect, this technology, combined with other ideas, may enhance the driver’s attention as well as mutual consideration and respect among road users.

Since 2020, the proximity indication feature in the Audi Q5 has made car-to-x communication of the rear lights a reality as well. The proximity indication feature is contingent on the car being equipped with either of the two assistance systems, Adaptive Cruise Control or Active Lane Assist. Hence Audi is pursuing an anthropocentric path and, with the digital OLED rear lights, paving the way into a new age. The rear lights are evolving into a display medium, which can be extended by versatile functions in the next evolution. In the medium run, the digital OLED will have more than 60 segments, each of which can be individually controlled and systematically activated. Looking forward, besides enabling the versatile styling and personalization of lighting designs, the digital OLED, for instance, will be able to issue early warnings of local hazards such as slippery roads and the end of traffic jams to other road users.

Looking forward even further, Audi is working on the flexible digital OLED. Instead of the roughly 0.7 millimeter (0.03 in) thin yet rigid supporting material, flexible substrates such as thin glass, plastic films or metal foils may be used, which can be bent in one or several directions. This new potential provides greater styling freedoms for rear light designs. The technology’s key characteristics are retained as well as the low weight of the existing two-dimensional OLED displays. For the first time, the light emitted will be able to shine in a three-dimensional way. Flexible digital OLEDs facilitate the integration of the “display area” all the way into the vehicle’s flanks, thereby visibly enlarging the usable area for lighting design and communication with the surroundings once again.

Milestones

Lighting development at Audi

- **1994** Second-generation xenon headlights in Audi A8
- **2003** Audi adaptive light with automatic-dynamic headlight range control in Audi A8
- **2004** LED daytime running light in Audi A8 W12
- **2007** “String of pearls” daytime running light as a lighting strip in Audi A4
- **2008** Full LED headlights in Audi R8, now available across model ranges
- **2010** LED headlights with adaptive light in Audi A8; connectivity of the headlights with navigation data
- **2011** Visually homogeneous LED rear lights in Audi A6
- **2012** Turn signal with dynamic indication in Audi R8
- **2013** Full LED headlights for the compact class in Audi A3
  Audi is first manufacturer to be awarded EU validation of LED technology as eco-innovation
  Audi Matrix LED headlights with adaptive high beam in Audi A8
- **2014** Laser as additional high beam in Audi R8 LMX
- **2015** Opening of the Lighting Assistance Center with a light tunnel measuring 120 meters (394 ft) in length
- **2016** OLED rear lights in Audi TT RS
- **2017** HD Matrix LED headlights including laser as additional high beam in Audi A8
  Dynamic lighting scenarios: leaving and coming home functions in Audi A8
- **2019** Digital Matrix LED headlights (DML) in Audi e-tron and e-tron Sportback
- **2020** Digital daytime running light signatures in Audi A3
  Digital OLED technology in Audi Q5

Glossary

Lighting technology terms

Headlights

Halogen headlights

Halogen headlights use incandescent lamps as a light source. Their light is typically concentrated in a reflector with a vapor-deposited aluminum coating. Halogen lamps consist of a thin tungsten filament inside an airtight glass envelope filled with halogen gas. When voltage is applied, current flows. Due to its Ohm resistance, the filament heats up and radiates light of approx. 2,700 on the Kelvin scale. The inert gas – halogen – protects the filament against oxidation, resulting in higher light output. Halogen lamps achieve very high luminous power because the glass envelope can withstand extremely high temperatures.

Xenon headlights

Xenon headlights are gas discharge lamps. A concentrated arc of light burns between two tungsten electrodes in a quartz-glass envelope. With a color temperature of approx. 4,200 on the Kelvin scale, it emits a much brighter light, resulting in much better illumination of the road than halogen headlights using incandescent lamps. The energy consumption of xenon headlights is about 20 percent lower, while their life is much longer than that of the previous, commonly used lamps with filaments.

LED headlights

LEDs (light-emitting diodes) are luminescent spotlights. The light is generated by the supply of electrical energy without mechanical action inside the semiconductor crystal. The development of the blue light-emitting diode in 1993 made it possible to generate all colors of light. The application of a small phosphorus plate converts part of the blue light into yellow light, resulting in white as the total color. This enabled the utilization of LEDs in headlights. Compared to xenon headlights, LED headlights deliver longer visual range, high efficiency and benefits in terms of safety and comfort. Because their color temperature of 5,500 on the Kelvin scale is similar to daylight, they hardly cause eye fatigue, which assists drivers in darkness and adverse weather. In conditions of fog and precipitation, LED headlights reduce glare from reflected light. The low beam roughly requires just 2 times 20 watts, which is significantly less than conventional halogen light. The typical forward voltage of a white LED in the headlight is between 3.0 and 3.5 volts, with possible variations, depending on the type of LED. Light-emitting diodes are maintenance-free and designed for life equaling that of the car.

Matrix LED headlights

Matrix LED headlights produce the high beam with small light-emitting diodes that are concentrated in shared reflectors or lenses, depending on the model. They always optimally illuminate the road without dazzling other road users. As soon as the camera on the windshield detects other vehicles or city limits, the controller partially switches off individual LEDs or dims

them in multiple stages, creating several million possible light patterns. The Matrix LED light masks out other vehicles while continuing to fully illuminate the areas between and adjacent to them. Other light-emitting diodes of the Matrix LED headlight assume the function of the maneuvering light that illuminates the lateral area in front of the car when driving in reverse as well as the function of the all-weather light. The latter reduces glare from reflected light in conditions of poor visibility and delivers wider illumination as a fog light with quadrupled range. The dynamic cornering light is generated by shifting the focal point of the light along the curve. The turn signal is predictively activated shortly before the car arrives at an intersection. In addition, Matrix LED headlights include the dynamic flasher and the dynamic lighting scenarios when the driver unlocks or leaves the vehicle.

HD Matrix LED headlights
In 2017, in the A8, Audi introduced HD Matrix LED headlights as an evolution of the Matrix LED headlights. Here, each headlight integrates 2 times 16 small, discretely variable light-emitting diodes for multi-row control of the high beam. They are arranged in two rows inside a shared housing. Thanks to this new configuration and to a low beam that is also variable, the HD Matrix LED headlights illuminate the road with even greater precision and enhanced adjustment to the particular situation.

Audi laser light
Audi laser light refers to the additional high beam that operates in concert with the HD Matrix LED headlights. This laser doubles the range of the high beam. A small laser module in each headlight generates a light cone that extends roughly 600 meters (1,970 ft) as a spotlight. Drivers enjoy greater contrast and tire less quickly. The laser spot, which is active at speeds of 70 km/h (43.5 mph) and above, offers significant visibility and safety advantages. The laser spot is dimmed automatically when the camera mounted on the windshield detects other cars within its range.

Digital Matrix LED headlights with DMD technology
The digital Matrix LED headlight is able to deliver cornering, urban and highway lighting as versions of the low-beam light with maximum precision. It complements the high-beam light by masking out other road users with enhanced accuracy. DMD stands for digital micromirror device, a chip consisting of 1.3 million micromirrors, which is a prerequisite for projections from the headlight. It splits the light into tiny pixels and enables novel functions such as lane light, orientation light and marking light. These innovations assist the driver and enhance traffic safety.

Rear lights

OLED rear lights
OLEDs are organic light-emitting diodes that are less than one millimeter (0.04 in) thin. Their name is derived from the organic semiconductor material of which they are made. Just 3 to 4 volts of electrical potential are enough to cause the thin layers to illuminate. Unlike point light sources such as LEDs, OLEDs are area light sources. As a result, the light achieves an all-new level of homogeneity and can be split into discretely dimmable segments. It requires no optical components such as reflectors and light guides, and makes OLED units efficient and lightweight. OLED rear lights debuted in the Audi TT RS in 2016 featuring a total of 12 segments per lamp. In the Audi A8 in 2017, the number of segments had already increased to 16.

Digital OLED rear lights
Since 2020 Audi has been offering digital OLED rear lights in the Q5 and, for the first time, offers customers a choice of various taillight designs using just one set of hardware. Unlike the OLED rear light in the TT RS, where each lighting function is supplied with energy by a dedicated line, the digital OLED rear lights are connected to the control unit of the on-board electrical system by a bus system. This enables clearly more functions. The technology features a larger number of discretely controllable segments than the OLED rear lamps launched in 2016. The rear light of the Audi Q5 uses three panels, each of which integrates six OLED segments. These can now be activated as desired and with infinite variability of brightness. Communication is created beyond classic signaling functions: in the Q5, Audi, for the first time, has integrated a proximity indication feature for traffic approaching from the rear. The proximity indication feature is contingent on the car being equipped with either of the two assistance systems, Adaptive Cruise Control or Active Lane Assist. Going forward, the digital OLED with more than 60 segments will feature a roughly tenfold number of discretely controllable segments, enabled by higher performance levels of future vehicle electronics and the specifically developed OLED hardware. In addition to personalizing light designs, the digital OLED can be used as an indicating instrument in the rear lighting assembly and hence for car-to-x communication. Subject to government approvals, the drivers of following vehicles could, for instance, receive early warnings of slippery road surfaces or the ends of traffic jams. Thanks to high precision, extremely high contrast and great variability, the rear lights are progressively evolving into displays.

Forward-thinking technology: flexible digital OLED rear lights
Whereas digital OLED rear lights only permit a two-dimensional integration into lamps, new pliable substrates for flexible digital OLED rear lights now enable curvatures to be achieved for the first time. This new freedom creates a three-dimensional light design that enhances the way in which it blends in with the shape of the bodywork. As a result, the area that can be used to personalize the lighting signature, and for communication with the surroundings, will once again become visibly larger. The key features of this technology – perfect homogeneity and high contrast – will be retained, even from various viewing angles.

Interview

Between artistic freedom and legislation: A talk between a developer and a designer of light

Stephan Berlitz (Head of Lighting Development) and César Muntada (Head of Lighting Design) are closely working together in the development and design of lighting systems. Their exchange shows how design and functionality at Audi go hand in hand.

Stephan, César, uncompromising functionality of light and aesthetic design – are these two aspects compatible at all?

Stephan Berlitz: As early as in the pre-development stage, we, as engineers, work together very closely with the design team. The questions to be answered are: What will be the benefits of a new technology in terms of functionality, but also in terms of styling? At Audi, light – first and foremost – means safety for drivers and occupants, in other words, to see and to be seen. However, our highly functional technology, let's say, our HD Matrix LED headlights with the Audi laser as an additional high-beam light, provides scope for attractive styling as well.

César Muntada: Lighting technology and light design are inseparable at Audi. Light becomes the visible expression of 'Vorsprung durch Technik.' This means that we're giving the car an unmistakable face while sharpening the character of the model and brand. At night, an Audi has to be visible at first glance, both close-up and from a distance. Consequently, we use a principle that guarantees recognition without confining the scope which the character of a particular car requires. Specifically speaking, Audi creates a total lighting experience. It begins with the exterior and continues in the interior with contour ambient lighting for which the customer can choose the option of a customized color ambience.

Aside from technological limits and budgets, legislation – with significant worldwide differences in some cases – restricts the potential of lighting development. How do you reconcile such differences?

Stephan Berlitz: Each technology is subject to specific requirements in various countries. The statutory provisions worldwide stipulate minimum spatial, lighting and anti-dazzle requirements. Colors are regulated by law, depending on the light's function. In the taillight, Audi deliberately uses a vibrant red with a higher wavelength to generate a high-grade look and a more effective differentiation from the yellow turn signal. Generally speaking, though, along with a growing scope for functionality and styling, the complexity of the approval process increases as well and always requires an individual, country-specific assessment. The dynamic turn signal is a perfect case in point showing that legislators are receptive to good ideas. Audi convinced the regulatory authorities that this idea is a gain for road traffic safety. As a result, we succeeded in launching a world first. Many competitors subsequently adopted this function.

Technological progress with hardware, as well as digitization, are raising light to a new level and creating fascinating opportunities. What kind of changes does this entail for you?

Stephan Berlitz: The significance of lighting technology is in a state of fundamental transformation. Due to consistent digitization, the perspective is expanding from driver-centric safety to comprehensive external communication and personalization. The utilization of light is changing: it is turning into a means of communication and, as a result, receiving a social and emotional component. Light will increasingly be able to indicate the intentions of the driver and the vehicle. We have smart, highly adaptive light control technology even today. Projections such as the marking light are an example of external communication with other road users. And the digital OLED, as well, shows how we can achieve car-to-x communication using light – a concept that may become even more important in the context of automated driving.

Light as a language for communication: How can on-road communication work completely without words?

César Muntada: Humans can grasp information particularly fast with their eyes. That's why we take advantage of the smart interaction between light and the surrounding area in our models. The objective is to achieve simple and direct communication that can be understood without words across cultures and around the world. Digitization will significantly help us in our efforts of setting light into motion and make this form of communication even more understandable. Take, for example, the wiping turn signal whose motion is reminiscent of the beckoning of a hand. In this way, light becomes a universal language in road traffic – both during daytime and at night.

Going forward, what prospects can you already share with us today?

Stephan Berlitz: Over the next ten years, LED will continue to be the dominant lighting technology. In addition, there are two other lighting technologies. On the one hand, it's the laser light source, in other words, the continuing evolution headed for high performance. On the other hand, it's the OLED with its area-like, homogenous rear lighting that gives us great latitude. We're going to continue developing the digital OLED and complement it by new functions. In addition, we're already working on the next generation: the flexible digital OLED.

César Muntada: The flexible digital OLEDs provide us designers with new freedoms because they're bendable. This technology enables us to achieve an even better integration of the taillights into the vehicle contour and to generate three-dimensionality. The prospective communication between the vehicle and environment will be found in a combination of simple symbols and dynamic movements. In addition, we want to provide customers with light design styling options according to their personal tastes – in the future even more so than today.

The Audi Group, with its brands Audi, Ducati and Lamborghini, is one of the most successful manufacturers of automobiles and motorcycles in the premium segment. It is present in more than 100 markets worldwide and produces at 17 locations in 11 countries. 100 percent subsidiaries of AUDI AG include Audi Sport GmbH (Neckarsulm, Germany), Automobili Lamborghini S.p.A. (Sant'Agata Bolognese, Italy) and Ducati Motor Holding S.p.A. (Bologna, Italy).

In 2019, the Audi Group delivered to customers about 1.845 million automobiles of the Audi brand, 8,205 sports cars of the Lamborghini brand and 53,183 motorcycles of the Ducati brand. In the 2019 fiscal year, AUDI AG achieved total revenue of € 55.7 billion and an operating profit of € 4.5 billion. At present, around 87,000 people work for the company all over the world, 60,000 of them in Germany. With new models, innovative mobility offerings and other attractive services, Audi is becoming a provider of sustainable, individual premium mobility.