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China Automotive Lighting Market Research Report, 2022

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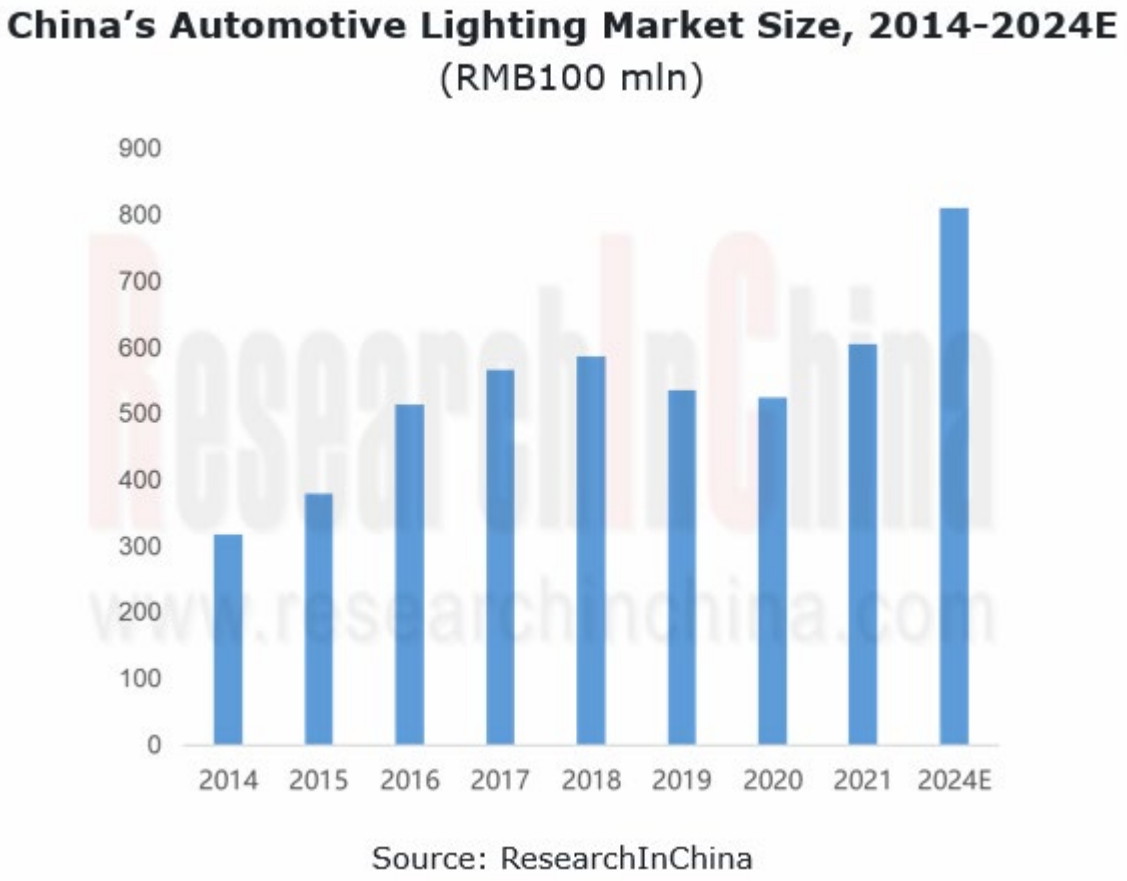
Automotive lighting research: the penetration of ambient lights has reached 31%, and intelligent lighting is reshaping the third living space.

Favorable policies and consumption upgrade help automakers reshape their vehicles, a third living space in which technology, intelligence, comfort and emotion are the main themes. Automotive intelligent lighting components such as intelligent headlights and ambient lights will better meet the personalized needs of consumers. Intelligent and emotional automotive lighting systems open up a new space for vehicle intelligence.

Automotive lighting intelligence is not only reflected in the upgrade of people-vehicle interaction enabled by headlights and taillights, but also in the rapider penetration of automotive ambient lights and the intelligence of interior lighting for delivering better driving experience. This report aims to analyze the development trends of automotive lighting intelligence in China through introducing the intelligence routes of major automotive lighting manufacturers and the features of intelligent lighting systems for key vehicle models of OEMs.

China's automotive lighting market was worth RMB60.45 billion in 2021, jumping by 15.2% year on year. As the pace of automotive lighting intelligence accelerates and the value of intelligent lighting per vehicle rises, we predict that China's automotive lighting market will be valued up to RMB80.9 billion in 2024.



Global market: Chinese lighting companies have a long way to go overseas

In the global auto parts industry, automotive lighting is a highly concentrated segment. Leading manufacturers in Europe, America and Japan dominate the market. In 2021, two Chinese companies, HASCO Vision (a holding subsidiary of SAIC Group) and Changzhou Xingyu Automotive Lighting Systems edged into the club of leading global automotive lighting manufacturers. HASCO Vision grew out of nothing from 2016 to 2021 (Shanghai Koito Automotive Lamp Co., Ltd., a joint venture established by Shanghai Automotive Lamp Factory under SAIC and Japan's Koito. HASCO bought the shares of the company held by Koito in 2018. The company was then renamed HASCO Vision as a holding subsidiary of SAIC Motor); Xingyu's revenue multiplied by 126% during the same period. Yet in 2021 more than 90% of the revenues of the two companies came from the Chinese market, and foreign markets otherwise contributed low revenues, indicating that Chinese lighting companies still have a long way to go abroad.

Major Global Automotive Lighting Companies, 2021

Manufacturer	Revenue in 2016 (USD:mln)	Revenue in 2021 (USD:mln)
Koito	4933.0	5221.0
Valeo	2241.0	4616.0
Magneti Marelli	2977.0	4103.0
HELLA	1878.0	2820.0
Stanley	2180.0	2738.0
SL Corporation	1105.0	2624.0
HASCO Vision	-	1729.0
Varroc	762.0	1425.0
ZKW	1083.0	1254.0
Changzhou Xingyu Automotive Lighting Systems	542.0	1225.0

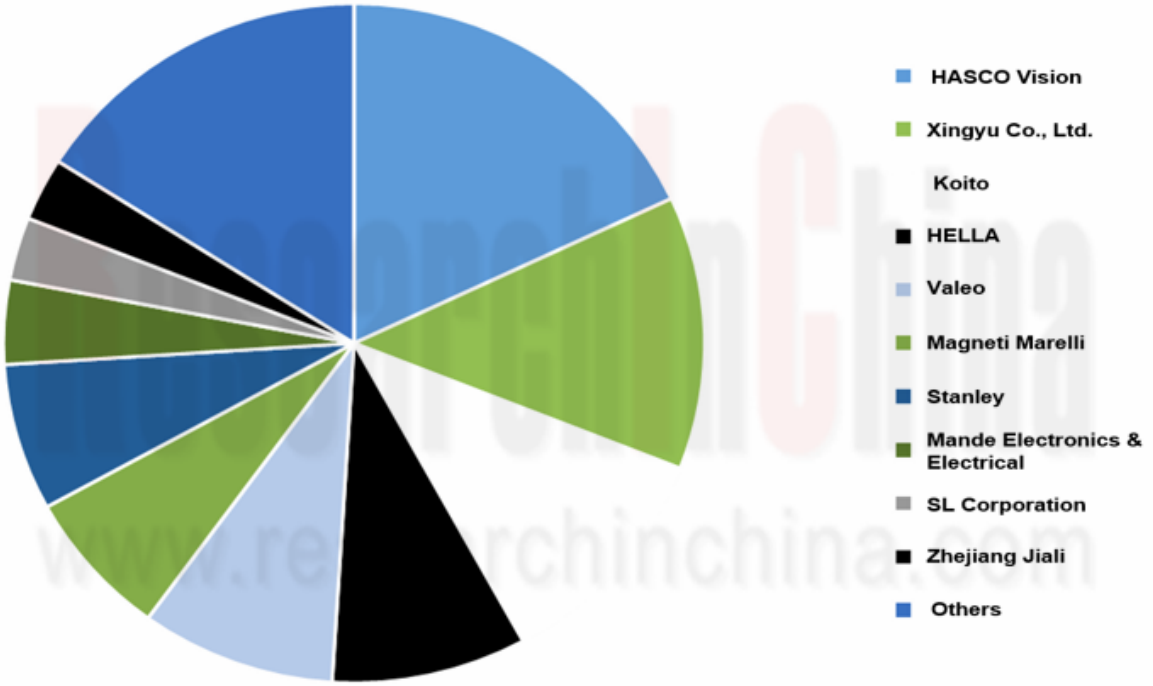
Note: revenue is translated to US dollars at the average exchange rate in 2021.

Source: Above companies

Competitive Pattern of China Automotive Lighting Industry

As with the global market, much of China's automotive lighting market is still commanded by a few industry bellwethers, with the total market share of the top four players exceeding 50%. The difference is that in the Chinese market, HASCO Vision and Changzhou Xingyu Automotive Lighting Systems are respectively positioned first and second, and of the top ten manufacturers, four are Chinese companies, taking a combined share of about 38%.

Competition Pattern of China Automotive Lighting Industry, 2021



Note: see detailed data in the report
Source: ResearchInChina

Lighting manufacturers: automotive lighting evolves from static shaping to dynamic interaction.

The rise of intelligent vehicles is a technological innovation booster to automotive lighting manufacturers. Multiple technology routes enable the evolution of automotive lighting from static shaping to dynamic interaction, allowing ordinary consumers to experience lighting systems that were once reserved for conventional high-end vehicle models.

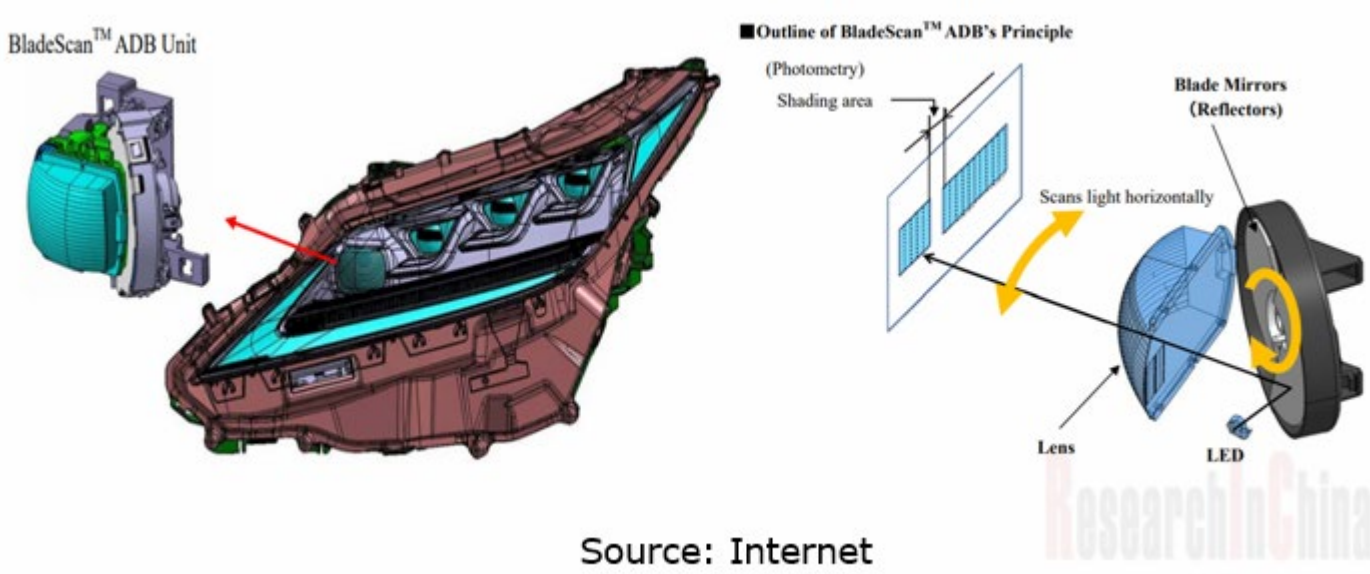
Intelligent Lighting Technical Solutions of Major Automotive Lighting Manufacturers and Their Supported Models

Automotive Lighting Manufacturer	Automotive Lighting Technology	Solution	Supported Model	Introduction
Koito	ADB	BladeScan®ADB	2019 Lexus RX, 2021 Lexus LS	The light distribution is controlled by the rotating reflective surface and the LED on and off, and then the area in front of the vehicle is further diffused through the lens
Magneti Marelli	Fusion of automotive lighting and sensor	Smart Corner	-	Integrate autonomous driving sensors into automotive headlights and taillights
HELLA	Through-type taillight	Through-type taillight	Volvo Polestar 2	Through-type taillight has a good visual extension effect compared with ordinary taillights, and is more recognizable after lighting at night
Valeo	HD lighting	PictureBeam™ Monolithic	SOP: 2022	Consists of 4,000 pixels that illuminate the road ahead while providing continuous high beam without dazzling other drivers, pedestrians or cyclists
Magna	Surface Element Lighting	Surface Element Lighting	2021 Volkswagen ID.4	Similar to OLED, the automotive light using Surface Element Lighting is very uniform, but at a much lower cost, which can subvert the existing design and personalized product constraints
Lumileds	Human Centric Lighting	SkyBlue® LED	-	Improve users' physical, mental and emotional health
Varroc	Surface LED	Surface LED	-	It is an alternative to OLED bulbs, using ultra-thin filters and traditional LED light sources, but can provide higher lighting brightness
HASCO Vision	DLP	DLP projection headlamp	HiPhi, IM Motor	That is, the influence signal is digitized first, and then the light is projected to a specific place
OSRAM	DMD	Oslon Boost HX	-	Enables automotive headlights to achieve ultra-megapixel resolution
	µAFS	EVIYOS	MetroSnap	An LED technology developed for multi-pixel intelligent headlight systems. Currently, OSRAM is developing the second generation of LED intelligent headlights EVIYOS, which is expected to be put into the market in 2023
Changzhou Xingyu Automotive Lighting Systems	ADB	ADB headlight	Hongqi H9	An intelligent anti-glare high beam system, which is mainly composed of automatic switching of high and low beam and adaptive extinguishing technology

Source: ResearchInChina

Koito BladeScan ADB system

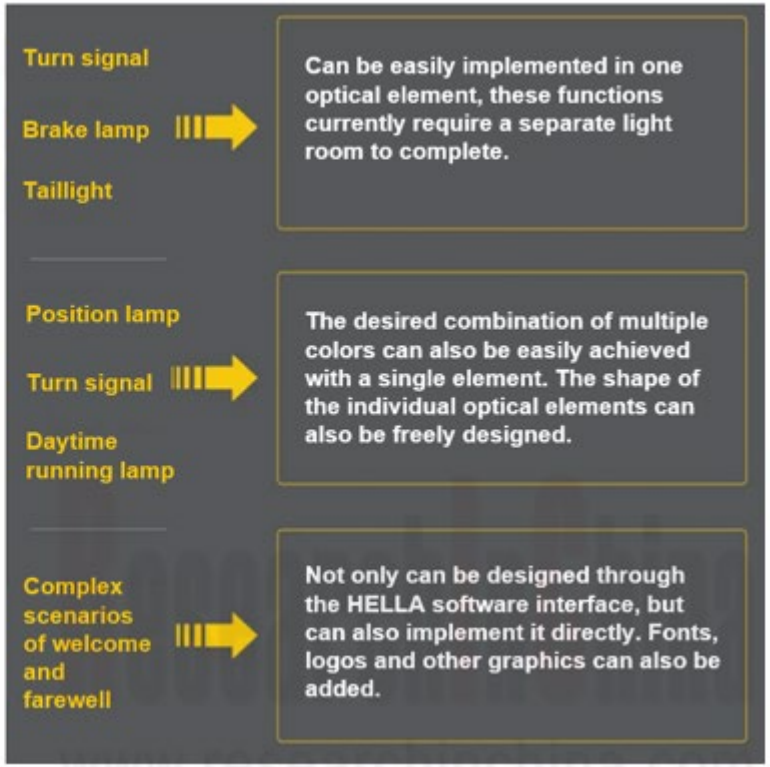
The system uses a pair of fast-revolving blade mirrors to change the shape and depth of the beam. Each headlight has 10 LEDs contained in the compact modules at the corners of the joints. The light from the system-controlled LEDs all pass through the mirror blades, the light is then continuously reflected out, and the light distribution is precisely controlled by synchronizing the rotation of the mirror blades and turning on/off the headlight LEDs. BladeScanTM ADB ensures high-resolution light distribution equivalent to the use of 300 LEDs and minimizes the shading area to maximize the lighting area.



Source: Internet

HELLA rear combination lamp concept: FlatLight

HELLA presented an innovative light guide concept based on micro-optics in early 2021. It enables particularly homogeneously illuminated surfaces with an extremely low module depth of only 5 millimeters. The technology will change the known functional characteristics of signal lights, and implement indicator, brake and tail light in just one optical element. The FlatLight concept requires about 80% less energy compared to conventional LED taillights.



OEMs: the cooperation + self-development dual approach sets the trend for intelligence.

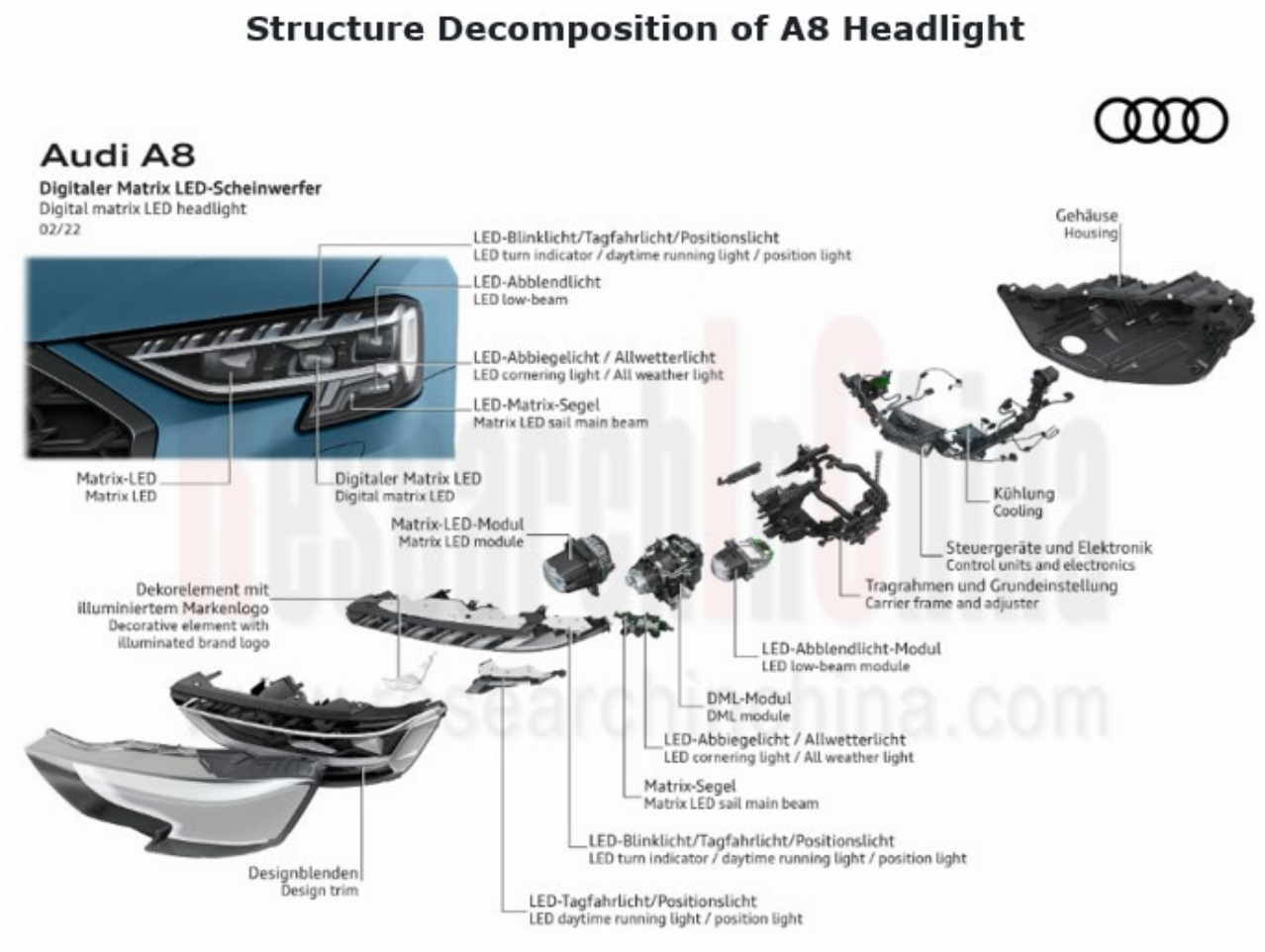
To meet consumers' needs for automotive lighting systems, OEMs enhance automotive lighting intelligence by way of working with lighting manufacturers and independently developing, a dual approach setting the trend for automotive lighting.

Automaker	Intelligent Automotive Lighting Solution	Supported Model	R&D Mode	Supplier	Development Trend of Automotive Lighting
Audi	Digital light processing (DLP)	2021 e-tron and e-tron Sportback	Self-developed	-	Flexible digital OLEDs under development can effectively fully integrate the "display area" on both sides of the vehicle, expand the usable area of lighting design, and increase communication and coordination with the surrounding environment.
	Digital OLED taillight technology	New Audi Q5			
BYD	Through-type taillight	BYD e2, New Tang EV	Self-developed	-	For the field of OLED technology, BYD Lighting is studying cross-border integration, such as light-screen integration, grille lights, etc.
HiPhi	PML intelligent headlights + ISD intelligent interactive lamps	HiPhi X	Cooperation	HASCO Vision	-
IM	DLP headlight + ISD intelligent interactive lamps	IM L7	Cooperation	HASCO Vision	-
GWM WEY	Intelligent ADB headlight, intelligent laser headlight, and intelligent pixel headlight	WEY VV6	Cooperation	Mande Electronics & Electrical	-
Mercedes-Benz	DMD headlight	2018 Maybach, 2020 Mercedes-Benz S-Class	Cooperation	TI	High-resolution headlamp technology under development, which includes digital mirror device technology (DMD) and light processing (DLP).
Buick	Third-generation intelligent Matrix Pixel headlight	Envision S, LaCrosse GS	Self-developed	-	-
FAW Hongqi	Matrix LED + OLED taillight	New Hongqi H9	Cooperation	Changzhou Xingyu	-
Ford	Spot Lighting intelligent lighting system	-	Self-developed	-	Intelligent and predictive headlights under development.
Mazda	Matrix Adaptive LED Headlight (ALH)	ATENZA	Self-developed	-	-
Lexus	BladeScan LED	Lexus RX	Cooperation	Koito	-
Volvo	Through-type taillight	Polestar 2	Cooperation	HELLA	-
Geely	Through-type taillight	Geometry C	Cooperation	Zhejiang Ginye Auto Parts	-

Source: ResearchInChina

Digital Matrix Headlights for 2022 Audi A8

The new 2022 Audi A8 offers technical upgrades on the headlights. The digital matrix LED headlights use digital micro-mirror device (DMD) technology, similar to video projectors. Each headlight comprises some 1.3 million micromirrors that refract the rays into tiny pixels, thus ensuring high-precision light control. This headlight system also illuminates the driver's lane in especially bright light, ensuring no departure from the lane. When unlocking and exiting the car, the digital Matrix LED headlights can cast projections onto floors or walls. This is known as the dynamic coming home/leaving home animations.



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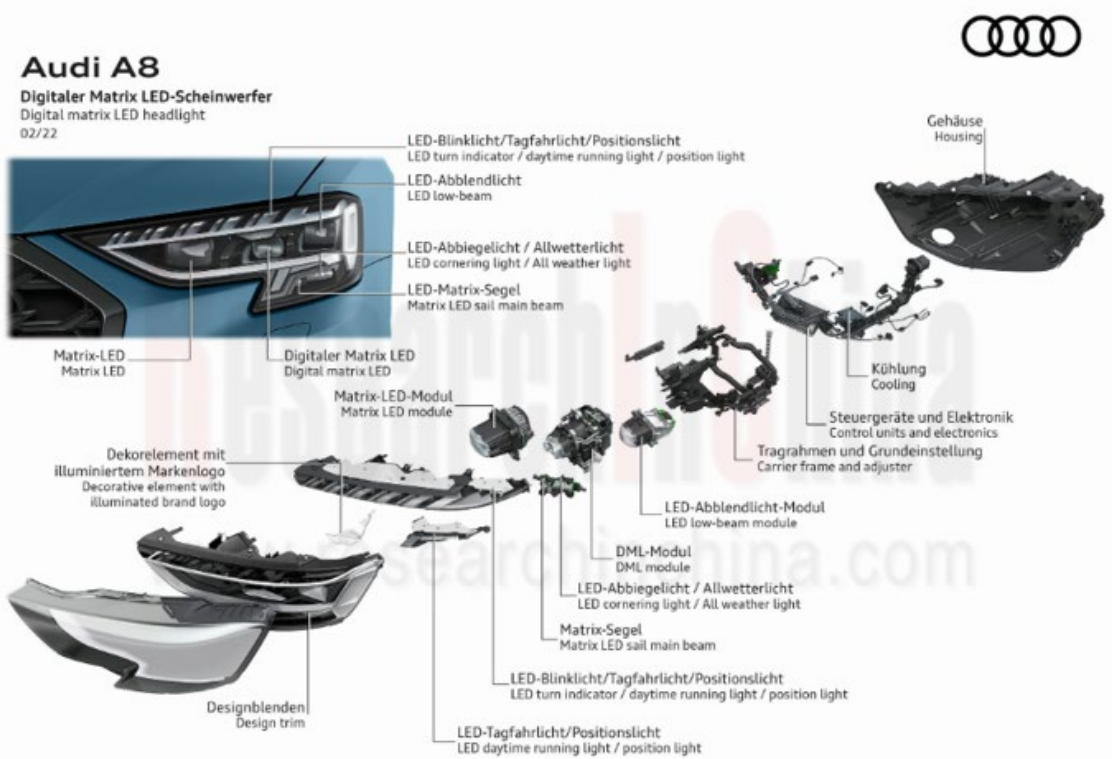
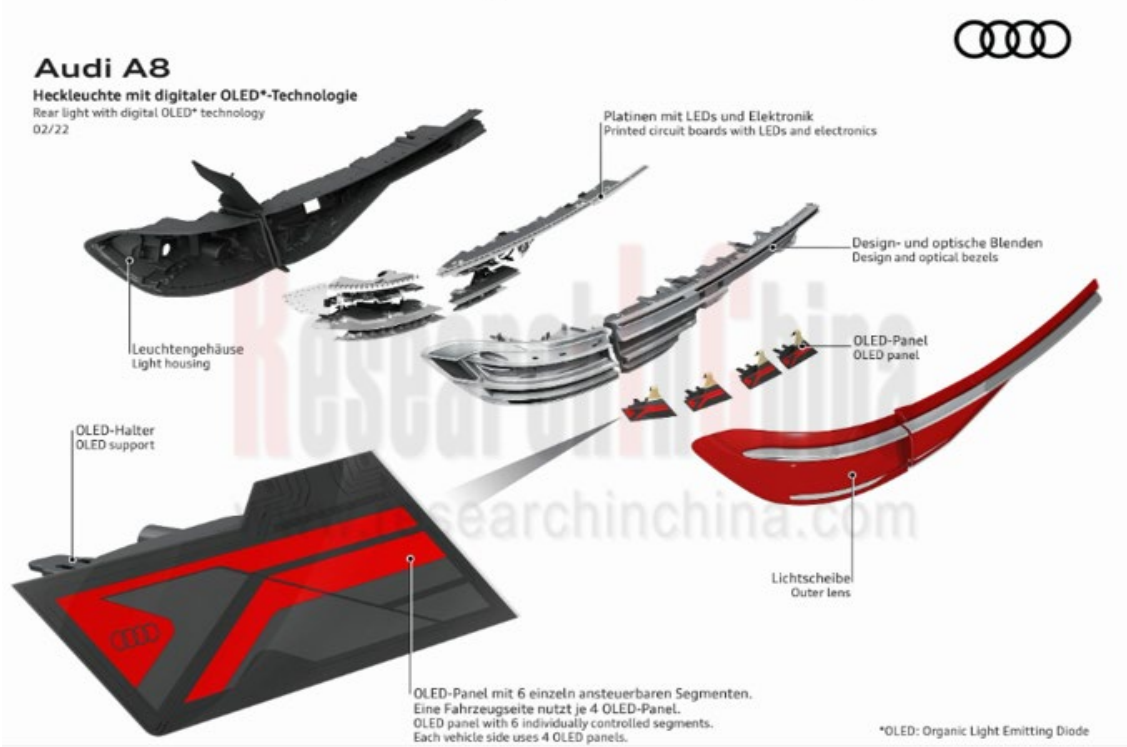
Structure Decomposition of A8 Headlight



Source: Internet

Structure Decomposition of A8 Rear Light



Source: Internet

IM Motors' intelligent lighting system

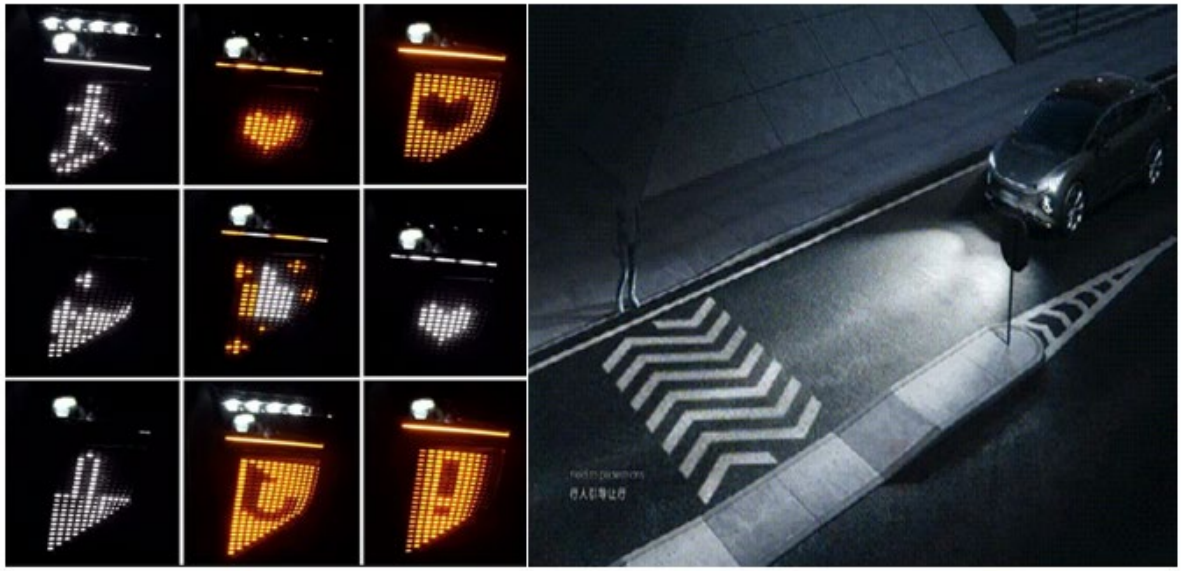
IM L7 carries HASCO Visio's intelligent lighting system composed of second-generation 2.6MP DLP and 5,000 LED ISCs. The intelligent interactive signal light system consisting of 5,000 LEDs makes the car a large interactive screen, displaying user-defined information on the rear interactive screen.

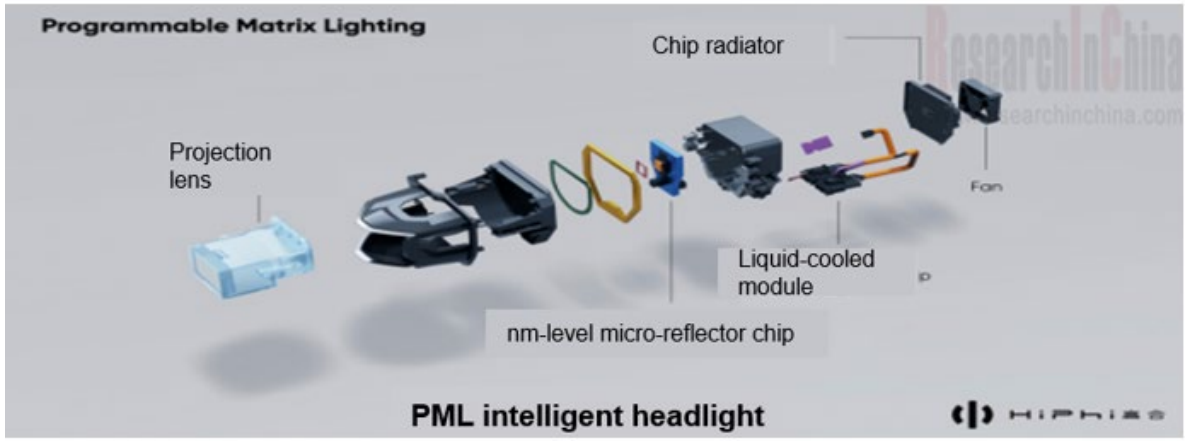
Source: Internet

The 2.6MP DLP headlights can project clear guidance signs onto the road in navigation mode, so that the driver can more intuitively know where the car goes. When driving at night, the light moves with the driver's line of sight, bringing a clearer view.

Intelligent interactive lighting system for HiPhi X

Developed by HASCO Vision, the system is comprised of PML intelligent headlights and ISD intelligent interactive combination lights. It can perceive the road environment and make decisions on its own, thus realizing all-scenario adaptive lighting and intelligent tracking and interaction with external people and vehicles. The ISD lights are deployed at the front fog lamps and the area below the taillights. The main body of the ISD intelligent interactive lights is four LED matrix panels with 1,712 LED light sources.





The PML headlight includes 2.6 million independently controllable nanoscale micro-reflectors that deliver stepless deflection every +/-12°. It also bears an infrared night vision camera, an independent customized ECU chip and an intelligent computing platform to ensure computing capacity and speed, judge road conditions, calculate distance, and output images. The PML intelligent headlight allows intelligent light pattern adjustment with speed and can automatically switch 4 driving lighting modes (standard low beam, urban high beam, standard high beam, and centralized high beam). In addition, it can also intelligently recognize driving scenarios and enable 6 intelligent lighting functions (vehicle tracking in obscuration, driving trajectory prediction, lane departure warning, blind-spot lane change warning, low-speed steering assistance, and active horizontal adjustment).

Ambient light: with a penetration up to 31%, it is a promising market.

Before 2017, except luxury models of Mercedes-Benz, BMW and Audi which were directly pre-installed with ambient lights, other models packed this function in the aftermarket. Yet since the second half of 2017, OEMs have begun to equip their mid-end models with ambient lights. In 2021, the penetration of ambient lights hit 31%. From the models with ambient lights as a standard configuration in 2021, it can be seen that 36% of them carried monochrome ambient lights, and the 64-color, 7-color, and 11-color followed, accounting for 13%, 8%, and 6%, respectively.

Automaker	Manufacturer Type	Model	Sales Volume in 2021	Price (RMB: 10,000)	Ambient Light
FAW-Volkswagen Automotive Co., Ltd.	Joint Venture	Sagitar	237,941	10-20	10 colors
Tesla (Shanghai) Co., Ltd.	Foreign Investment	Model Y	170,586	30-40	Monochrome
SAIC-Volkswagen Automotive Co., Ltd.	Joint Venture	Tiguan	155,328	20-30	30 colors
FAW-Volkswagen Automotive Co., Ltd.	Joint Venture	Bora	144,361	10-20	Monochrome
BMW Brilliance Automotive Co., Ltd.	Joint Venture	BMW 5 series	133,015	40-50	11 colors
SAIC-Volkswagen Automotive Co., Ltd.	Joint Venture	Passat	126,465	20-30	10 colors
SAIC-Volkswagen Automotive Co., Ltd.	Joint Venture	Tharu	124,588	10-20	Monochrome
Chongqing Chang'an Automobile Group Co., Ltd.	Independent Brand	Chang'an CS55	123,035	10-20	64 colors
Beijing Benz Automotive Co., Ltd.	Joint Venture	Benz E-Class	122,736	40-50	64 colors
FAW-Volkswagen Automotive Co., Ltd.	Joint Venture	Tayron	122,172	20-30	10 colors
FAW-Volkswagen Automotive Co., Ltd.	Joint Venture	Audi Q5L	115,264	40-50	30 colors
BMW Brilliance Automotive Co., Ltd.	Joint Venture	BMW 3 series	106,798	30-40	11 colors
FAW-Volkswagen Automotive Co., Ltd.	Joint Venture	Audi A6L	102,659	40-50	Multi-color
SAIC General Motors Co., Ltd.	Joint Venture	Regal	97,723	10-20	Monochrome
SAIC-Volkswagen Automotive Co., Ltd.	Joint Venture	Lavida	96,967	10-20	Monochrome
Chery Automobile Co., Ltd.	Independent Brand	Ruihu	95,604	10-20	7 colors
Li Auto Inc.	Independent Brand	Lixiang ONE	91,304	30-40	Monochrome
Beijing Benz Automotive Co., Ltd.	Joint Venture	Benz GLC	88,951	40-50	64 colors
BYD Automobile Co., Ltd.	Independent Brand	Song PLUS New Energy	88,459	10-20	31 colors
Tesla (Shanghai) Co., Ltd.	Foreign Investment	Model 3	86,174	30-40	Monochrome

Source: ResearchInChina

As OEMs are committed to building cars into a third space other than home and workplace and make continuous efforts to improve the intelligence and comfort levels of cars, the penetration of ambient lights will go higher in the future.

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Contact

Beijing Headquarters
TEL: 13718845418
FAX: 010-82601570
Email: report@researchinchina.com

Website:
www.researchinchina.com

WeChat: zuosiqiche

zuosiqiche

Chengdu Branch

TEL: 028-68738514
FAX: 028-86930659