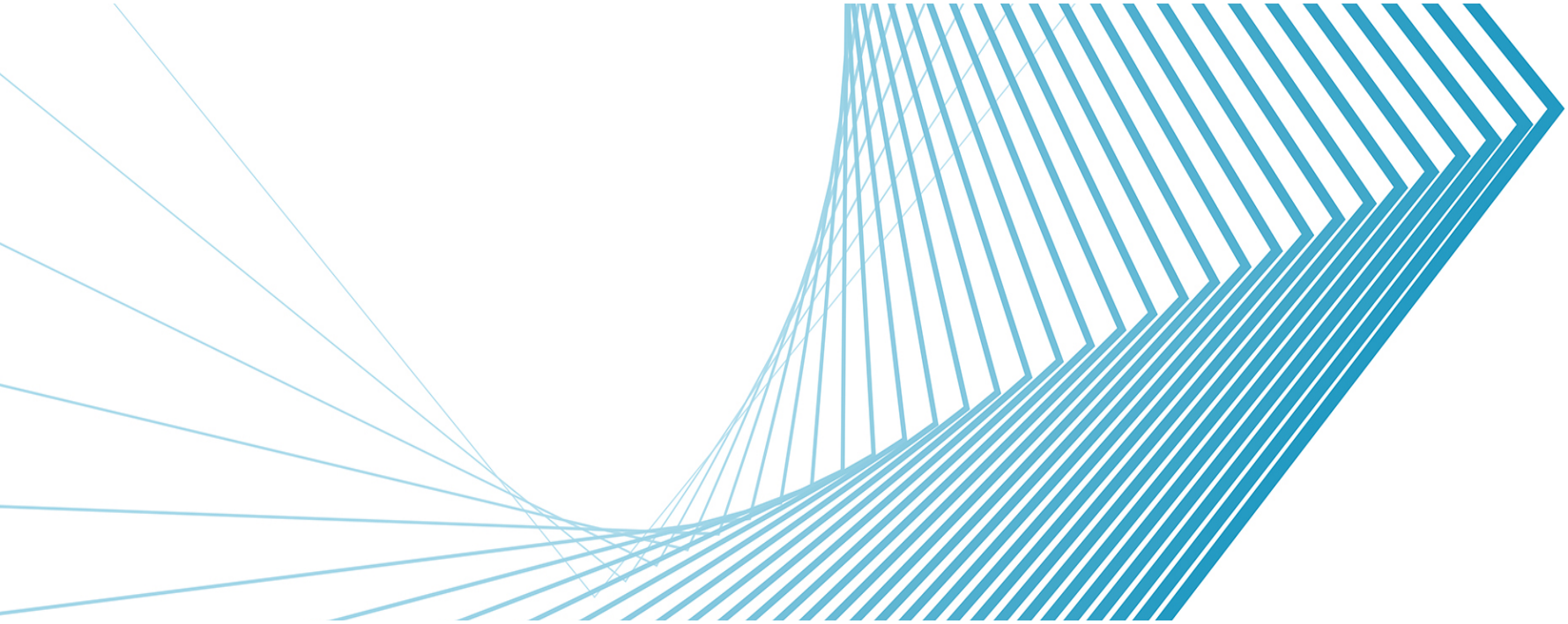


Lighting Technologies in SVW, challenges and solutions上汽大众灯具技术创新，挑战和应对

Dr.-Ing. Henning Kiel, Jiang Wei, Jin Lijun, Zheng Zhijun ,Fan Xingjia（Kiel博士，姜维，金立军，郑志军，范兴佳）

SAIC Volkswagen Automotive Co., Ltd （上汽大众汽车有限公司）

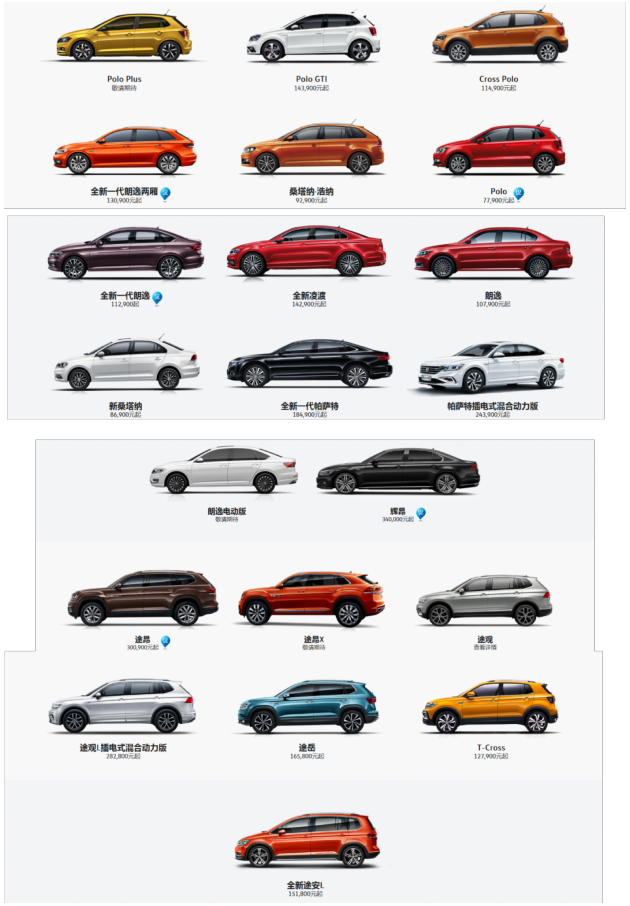
DVN Symposium, Shanghai, April 2019 （DVN学术报告会）

Agenda
目录

1. „Looking back“: Recent developments, strategy and technical challenges
   “回顾”：当前开发产品，战略及技术挑战

2. „Looking forward“: New lighting systems and regulation
   “展望”：新的光学系统及法规

SAIC Car Models in China 上汽大众车型



Lavida – A Main

Lamando – A plus

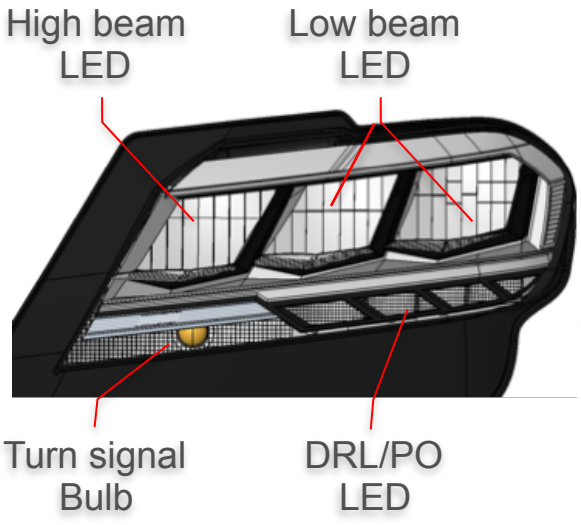
Tharu – A SUV

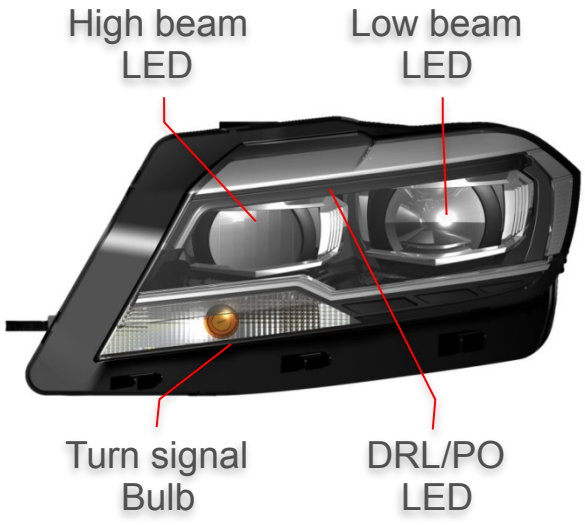
Passat – B Main

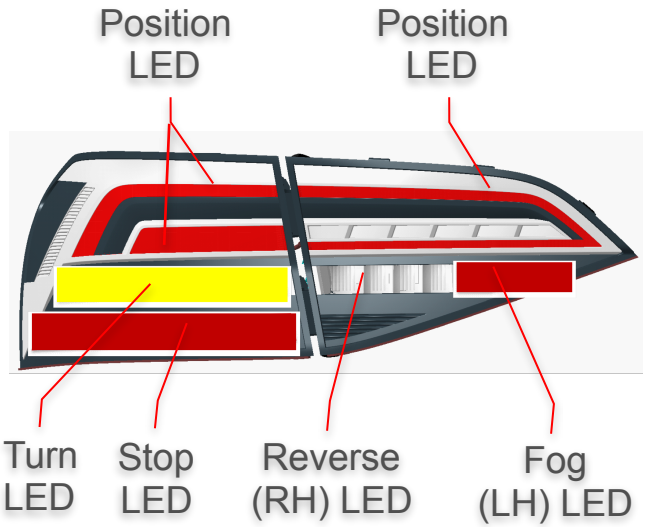
Look into the past
回顾过去

Volkswagen Lavida
大众朗逸

- Headlamp all versions with LED Main functions
  全系LED大灯（主功能）
- Tail lamp full LED
  全LED大灯





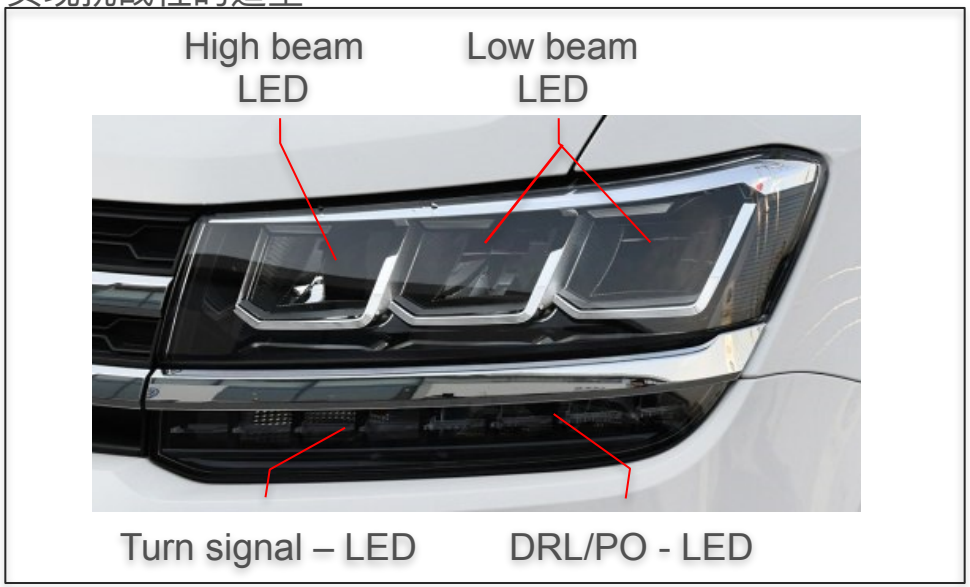


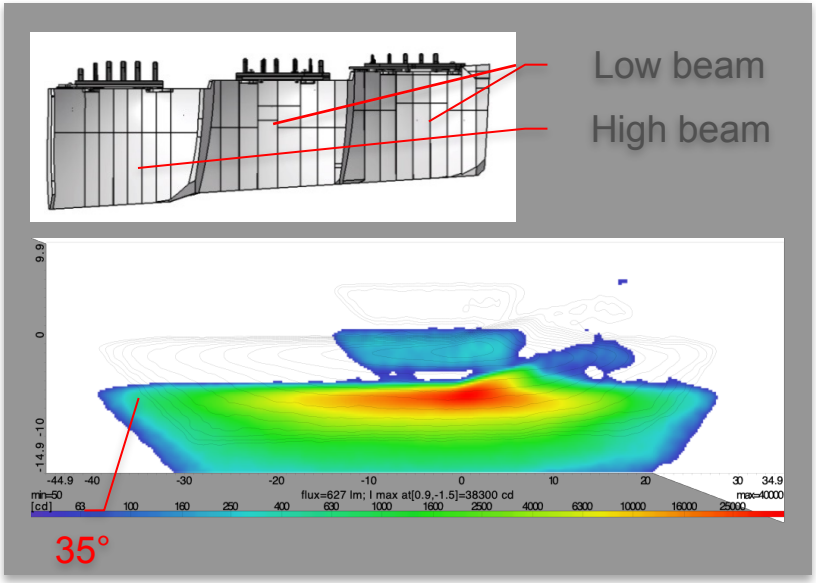
in A-Main segment, Halogen technology is replaced with LED technology
在主流A级车领域，卤素灯具技术被LED灯具技术替代

Look into the past
回顾过去

Volkswagen Tharu
大众途岳

- Headlamp all versions with LED Main functions
  全系LED大灯（主功能）
- Challenging Styling to be managed
  实现挑战性的造型



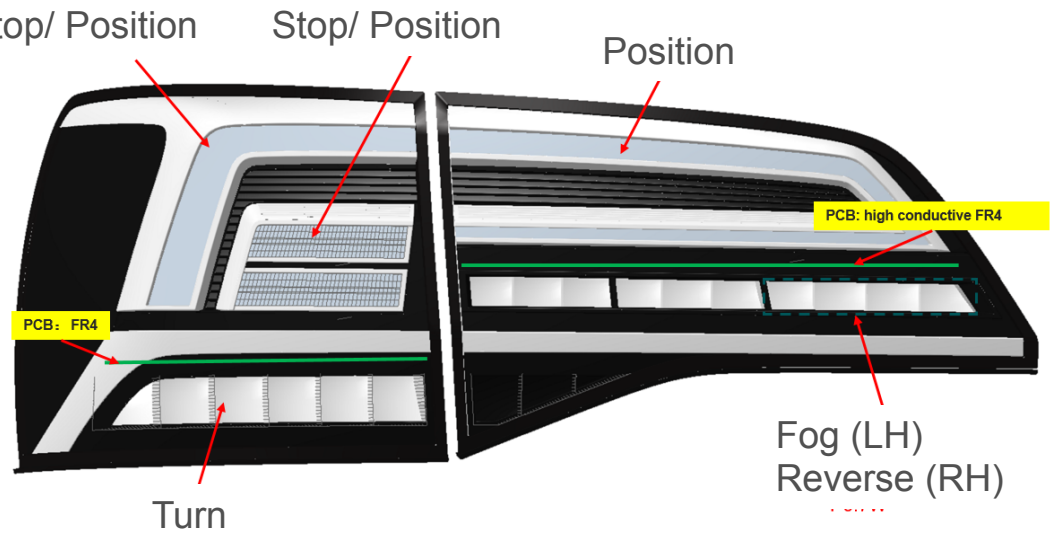


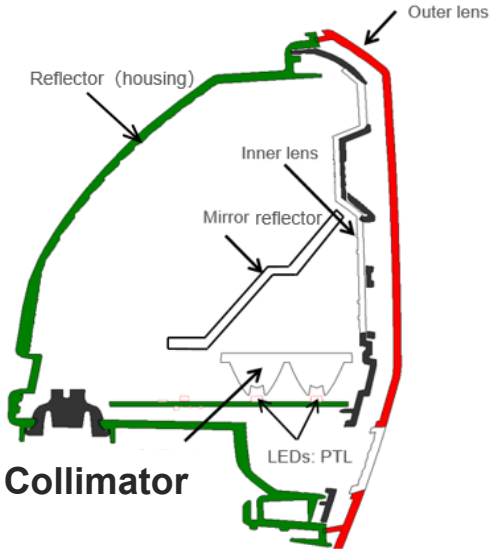
in A-SUV segment, challenges to apply ECO LED concept in Tharu styling was managed
在A级SUV领域，成功应对高效LED方案应用于途岳造型的挑战

Look into the past
回顾过去

Volkswagen Tharu
大众途岳

- Tail lamp with LED 全LED尾灯
- Challenging Styling to be managed with only 1 PCB per part 只用一块PCB实现了非常有挑战的造型。





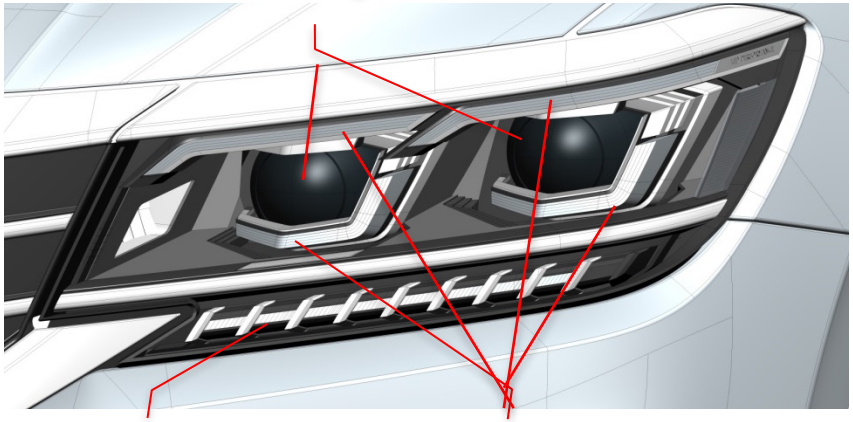
in A-SUV segment, challenges to apply ECO LED concept in Tharu styling was managed
在A-SUV领域，完成了用ECO LED方案实现非常有难度的造型的挑战。

Look into the past
回顾过去

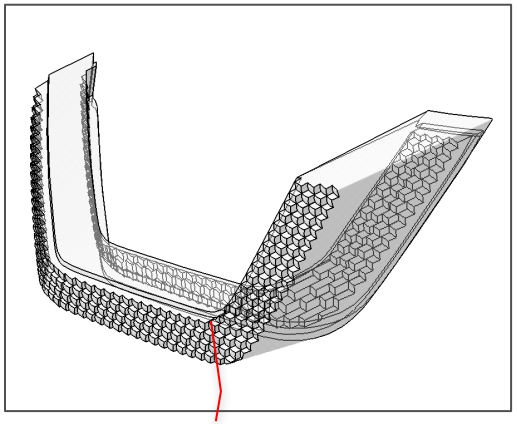
Volkswagen Passat
大众帕萨特

- Headlamp with 900lm LED ADB (local)
  本土化900lm LED 自动远光大灯
- Challenging DRL / PO Styling to be managed
  实现复杂的日行灯/位置灯造型

Low beam / High beam



Turn signal – LED



DRL/PO - LED

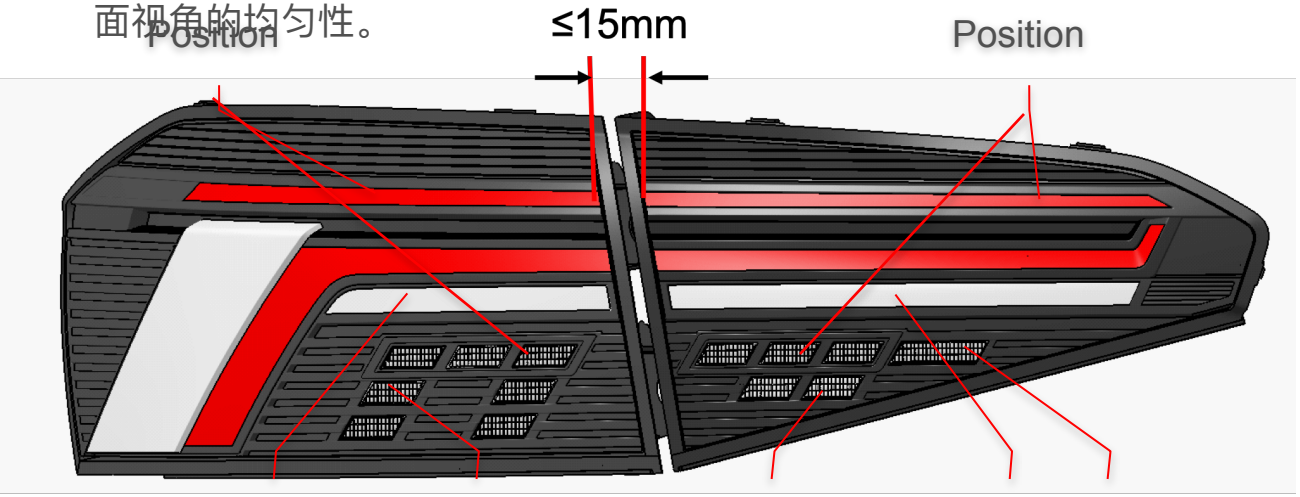
DRL optic element - CAD

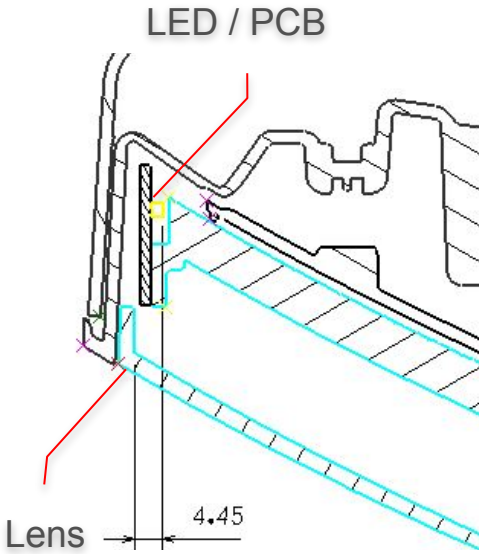
DRL optic element - part

in B-Main - segment, Local 900lm LED MDF was applied, complex DRL signature was realized
在B级主流车领域，成功实现900lm本土自动远光大灯的开发，实现了复杂的日行灯造型特征

Volkswagen Passat
大众帕萨特

- Tail lamp LED, wiping TI and click – clack graphic 全LED尾灯，并带有动态转向灯和click-clack效果
- Graphic connection and side homogeneity to be managed 独特光导设计使保证位置灯连贯的同时保证了侧面视角的均匀性。





in B-Main - segment, challenging styling wishes could be realized even in cost efficient way
在B级主流车领域，采用性价比非常高的方案实现了富有挑战性的造型期望。

Look into the past
回顾过去

Volkswagen Passat
大众帕萨特

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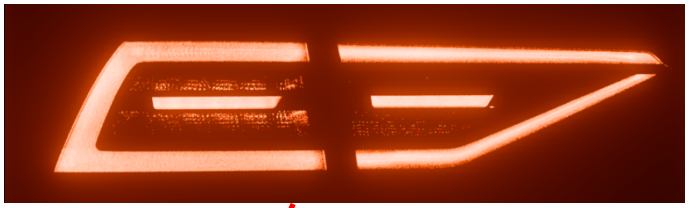
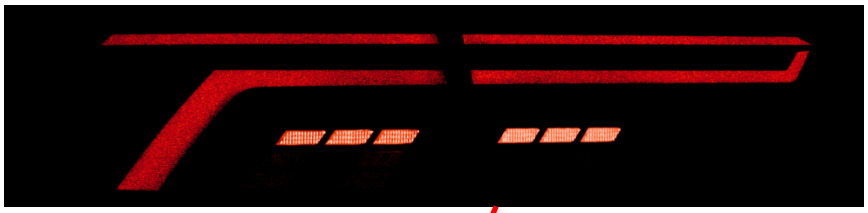
Previous Model



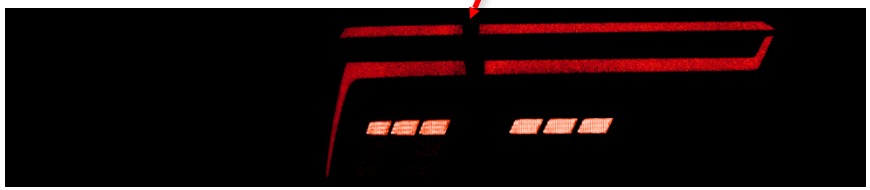
Direct view

Side view

Current Model



Direct view



Side view

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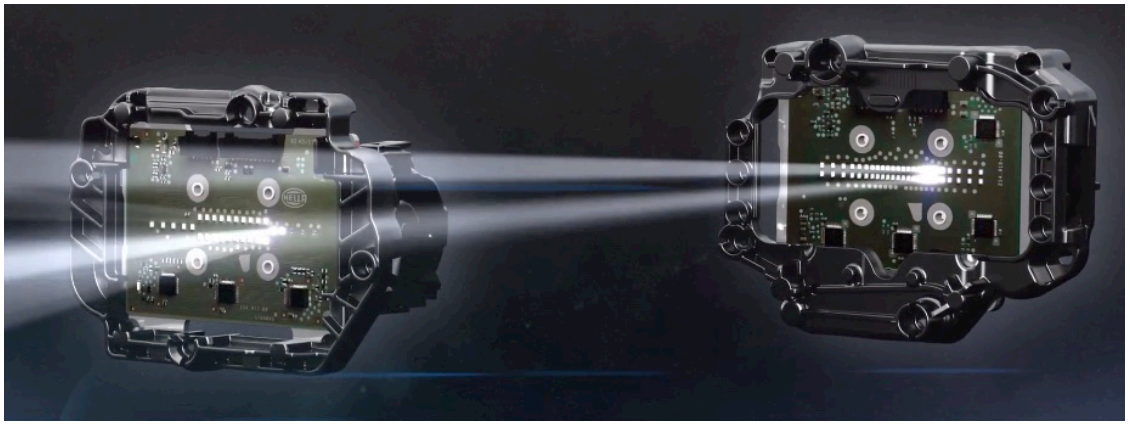
Volkswagen Matrix Technology 大众矩阵大灯技术

- VW Touareg System released in 2018
  大众途锐系统，2018年批产
- 3 Row Matrix
  3排矩阵
- 2 Modules
  2个模组

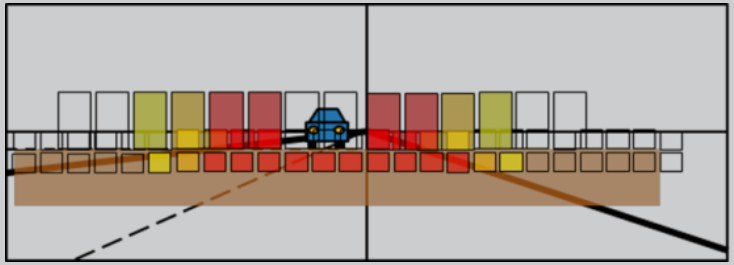
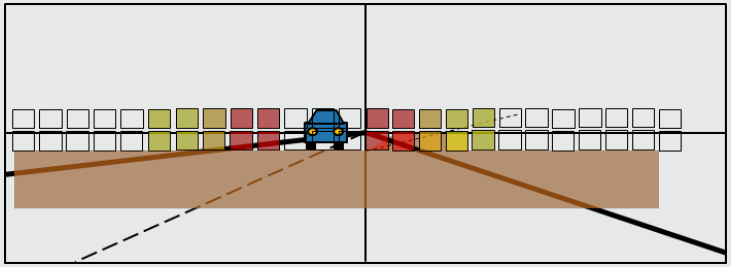


- ADB and LB electronic swiveling
  自动远光及近光电子旋转

Volkswagen Matrix Technology 大众矩阵大灯技术

in VW Matrix Technology, the low beam functions of mechanical systems must be maintained
在大众的矩阵大灯技术中，近光功能的机械系统需要保留

Volkswagen Matrix Technology 大众矩阵大灯技术

Class 级别	Technology 技术	Features / Images 特征/图像
C (Touareg) C(途锐)	Part: 2 Lens Modules 零件：双透镜模块 LED: 3 Row, 84(76) Sectors LED: 3排，84（76）分区	
B (Passat) B(帕萨特)	Part: 2 Lens Modules: Bi-LED + Matrix 零件： 双透镜模组，双-LED+矩阵 LED: 2 Row, 32 Sectors LED：双排，32分区	

in VW Matrix Technology, the low beam functions of mechanical systems must be maintained
在大众的矩阵大灯技术中，近光功能的机械系统需要保留

Information and Communication in projected light distribution
信息和交互利用到投影灯来显示

Light projection in urban areas must handle high traffic density and brightness levels
在城市道路中，投影灯必须应对高交通密度和亮度水平

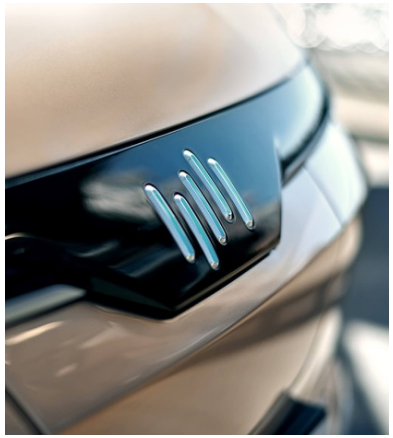
Information and Communication in projected light distribution
信息和交互利用到投影灯来显示

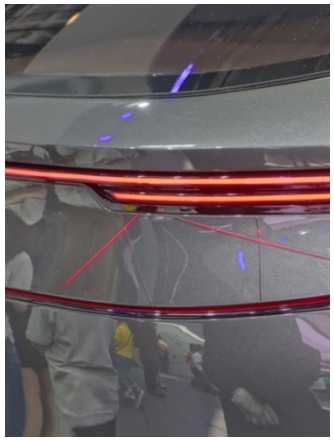
VW investigation for urban areas focus on near field applications
VW对城市道路的研究聚焦在近场的应用

Information and Communication in direct signal lighting
信号灯、显示屏方案用于信息交互

VW investigation in combination with general activities, working groups and standardization
德国大众同一般机构、工作组和法规组织一起进行研究

Exterior illumination elements 外部氛围灯



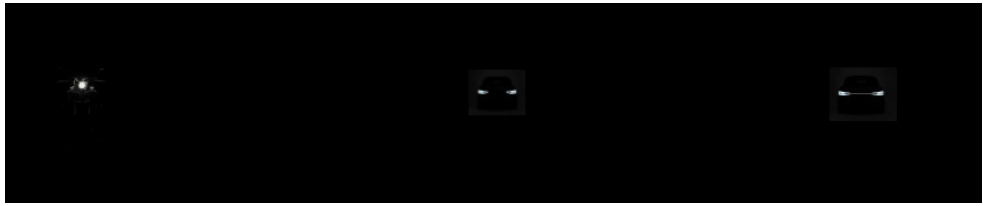


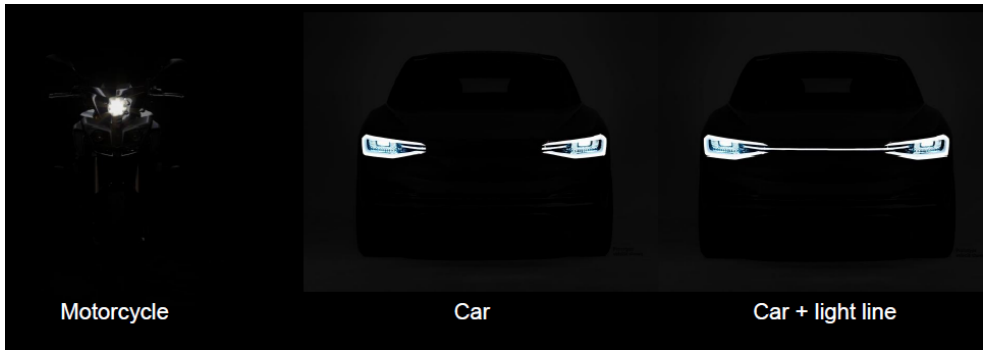
New exterior illumination part - often shown as styling element
新的外部氛围灯——通常为了凸显造型特征。

Exterior illumination elements 外部氛围灯

Ambiente Exterior Illumination to be regulated – reduce distraction and preserve safety (IFAL 2018)
外部氛围灯需要法规来约束——减少干扰保证道路交通安全。

Exterior illumination elements 外部氛围灯





Ambiente light can support safety… **…and can improve the signal image**

外部氛围灯运用得当可以提升车辆安全，并且可以提升信号特征的可识别性

Exterior illumination investigation
外部氛围灯法规研究

Influence factors on Exterior Illumination

- Color
- Issue: which color at which car direction

Investigation by the “working group for photometry for exterior ambient ”
外部氛围灯要求框架

Exterior illumination investigation
外部氛围灯法规研究

Influence factors on Exterior Illumination

1

- Color
- Issue: which color at which car direction

Investigation by the “working group for photometry for exterior ambient ”
外部氛围灯要求框架

Exterior illumination investigation
外部氛围灯法规研究

Influence factors on Exterior Illumination

2
- Color

1
- Issue: which color at which car direction

Investigation by the “working group for photometry for exterior ambient ”
外部氛围灯要求框架

Exterior illumination investigation
外部氛围灯法规研究

Influence factors on Exterior Illumination

2
- Color

1
- Issue: which color at which car direction

3

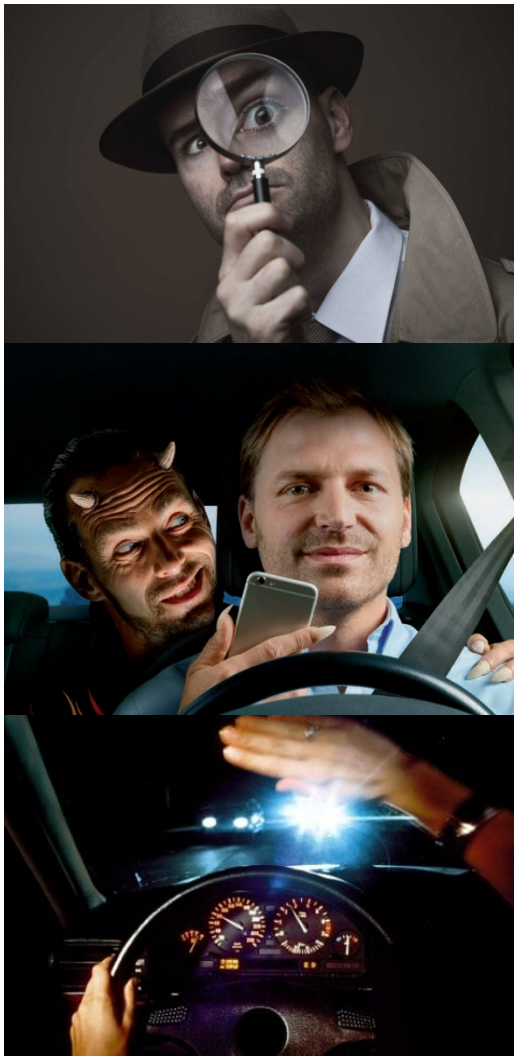
Investigation by the “working group for photometry for exterior ambient ”
外部氛围灯要求框架

Exterior illumination investigation – basic assumtions
外部氛围灯标准研究——基础

- Recognition
  可识别
  “Ambiente light shall be seen…
  可以被看见

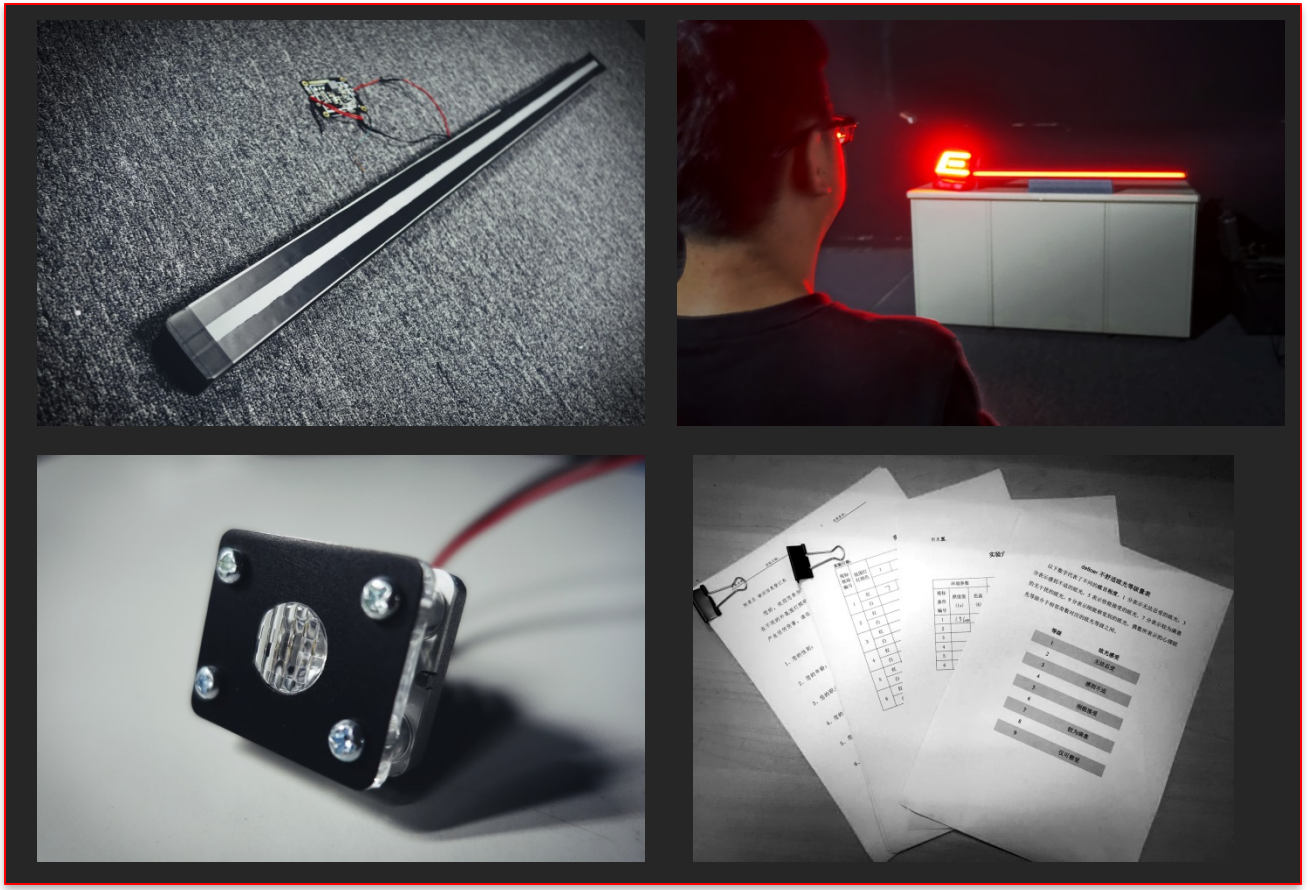
- Reaction speed?
  functions”
  信号功能开启，反应速度
  …but not distract from signal
  不应影响法规定义信号功能
  的识别

- Glare
  眩目
  …or worse: to feel glared
  不应眩目



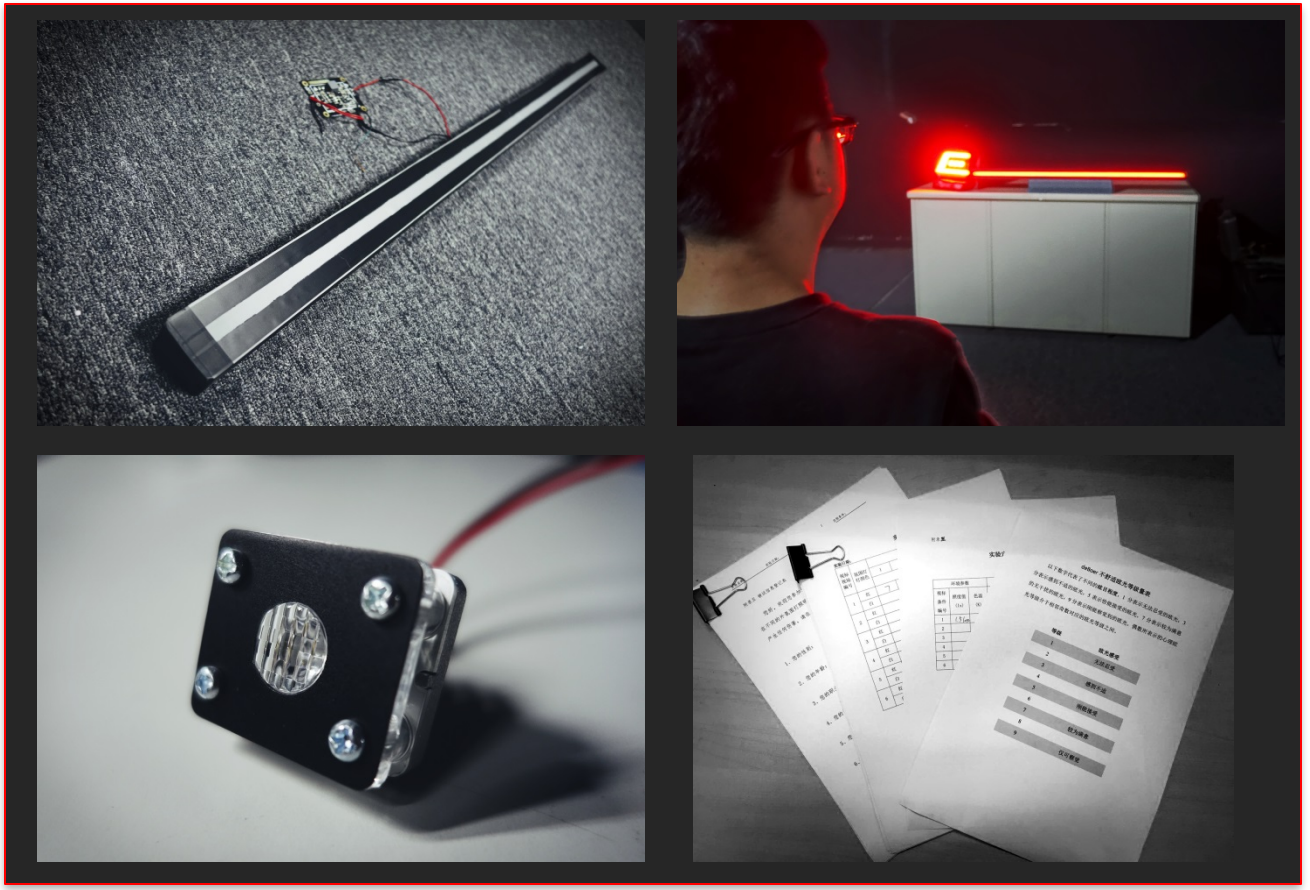
Exterior illumination investigation – Outlook
外部氛围灯标准研究——后续

- Performing Main Tests
- 完成主要实验
- Add Intermediate conditions
- 增加更多不同环境光条件的实验
- Add further colors, further shapes and non homogeny lit appearance
- 增加更多氛围灯颜色、不同造型、不均匀发光效果的研究
- Add further distances for driving and dynamic condition
- 增加不同观测距离的研究，增加动态氛围灯的研究



Exterior illumination investigation - Timeline
外部氛围灯法规研究——时间计划

- Pre-Test Q2/2019
- 预实验Q2/2019
- Full Test Q4/2019
- 完成所有实验Q4/2019
- Regulation input 2020
- 法规草案2020



Take away messages

- SAIC Volkswagen follows a top down LED strategy
- 上汽大众实行全LED车灯从高端车型向低端车型延申的策略
- Matrix Systems are implemented with ADB and AFS low beam functionality
- 矩阵系统实现ADB和AFS近光功能
- Communication and information in light distributions needs to be investigated for urban areas
- 城市道路V2X信息交互需要深入研究
- New Ambient exterior lighting elements are under investigation towards regulation
- 新的各种外部氛围灯已经在研究，最终制定外部氛围灯标准