



LIGHT TECHNOLOGY  
for automotive industry

ZIZALA Lichtsysteme GmbH



# Trends in der Automobilbeleuchtung

## *Trends in Automotive Lightsystems*

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lighting functions

legal requirements

OEM

SUPPLIER



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## halogen double-headlamp system





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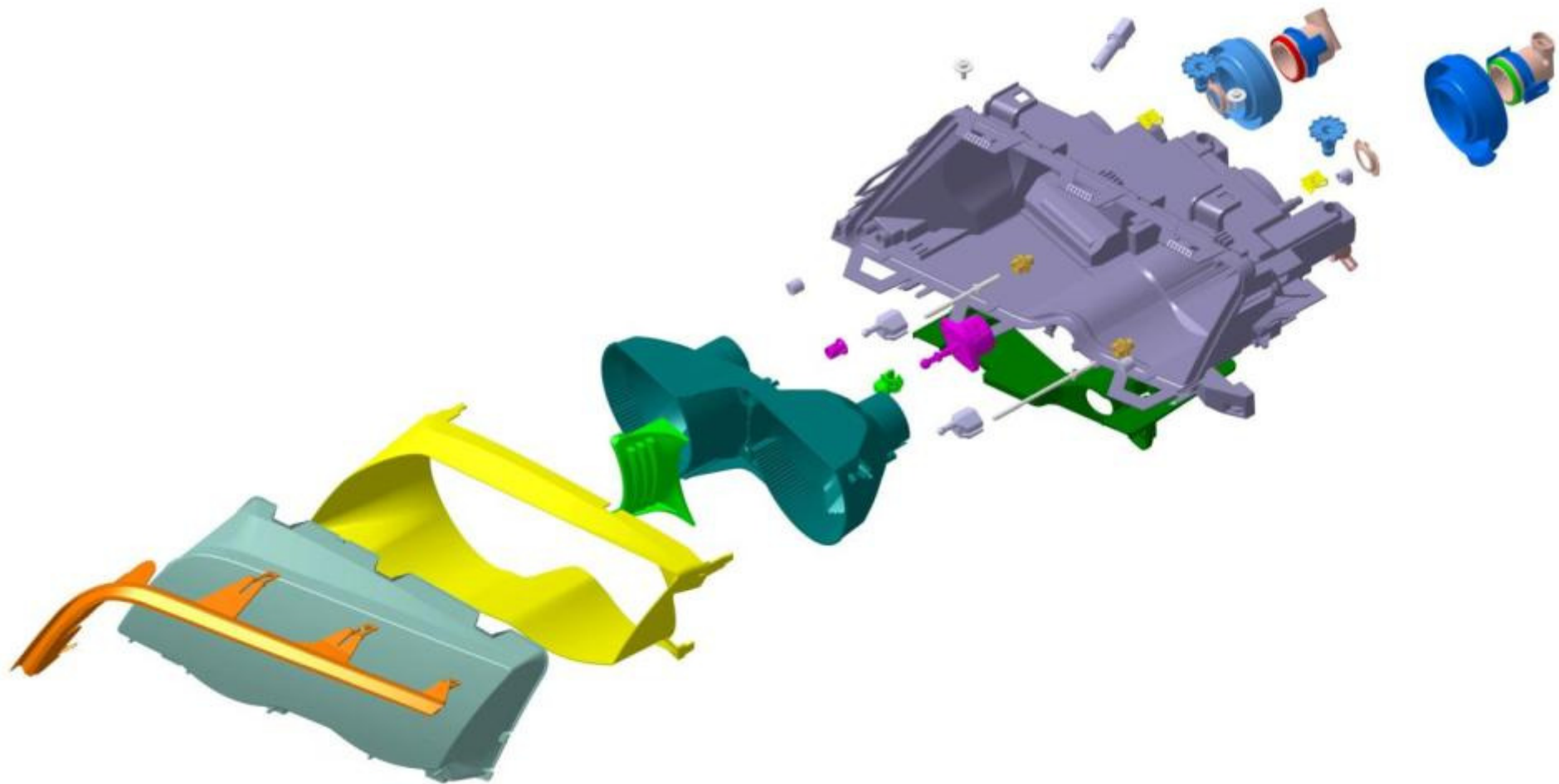
## LED headlamp





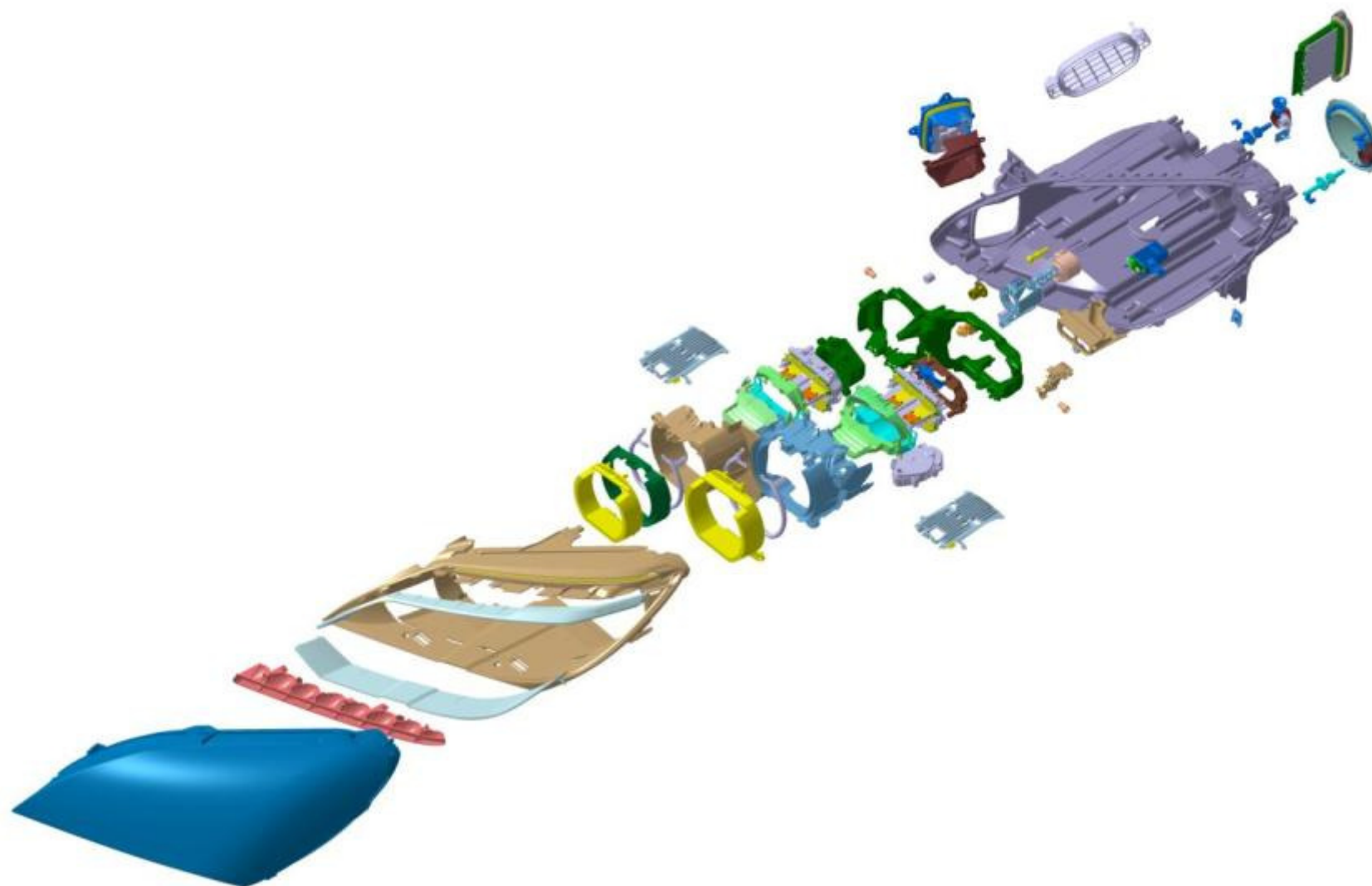


## halogen double-headlamp system



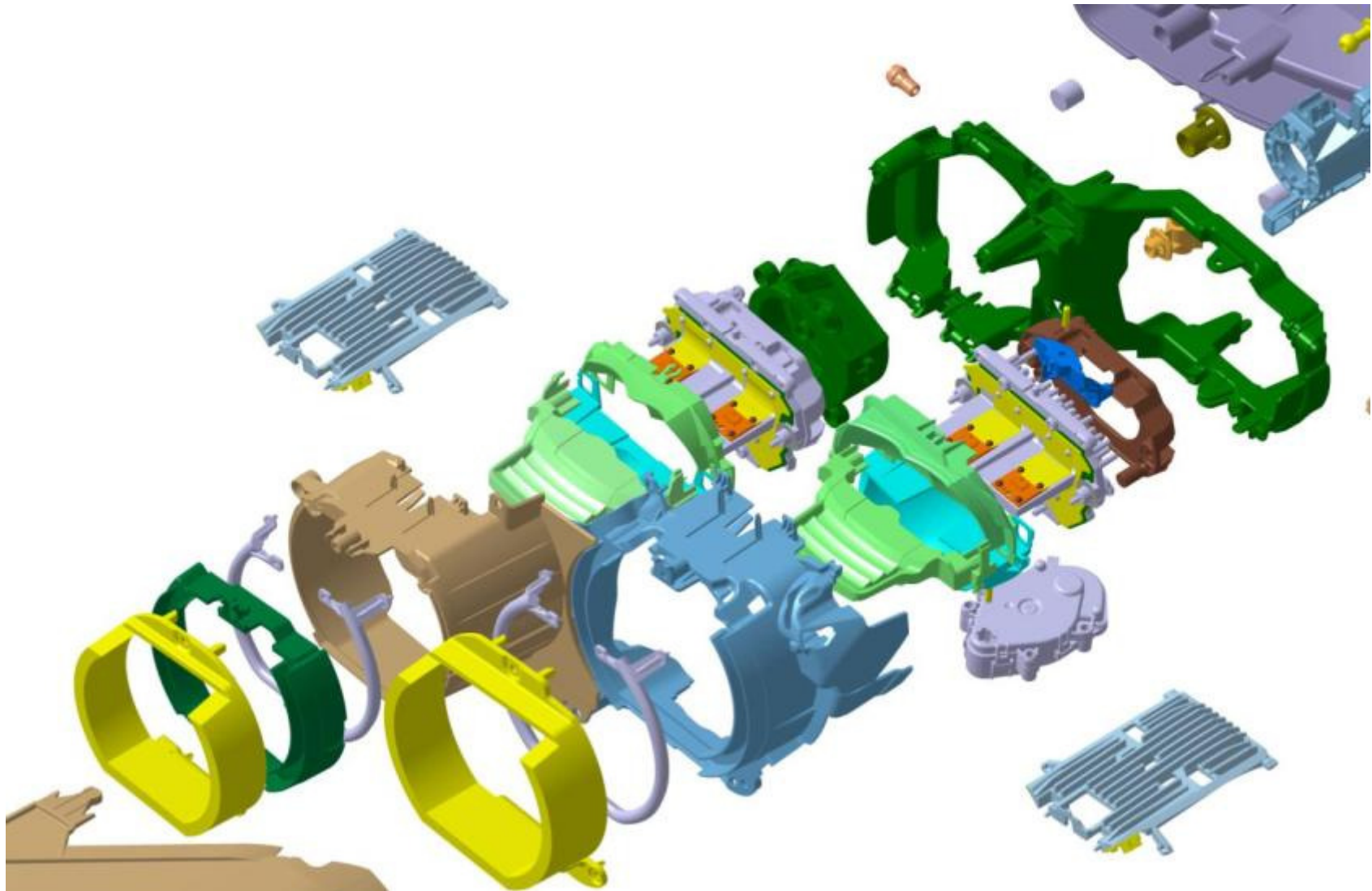


## LED main headlight



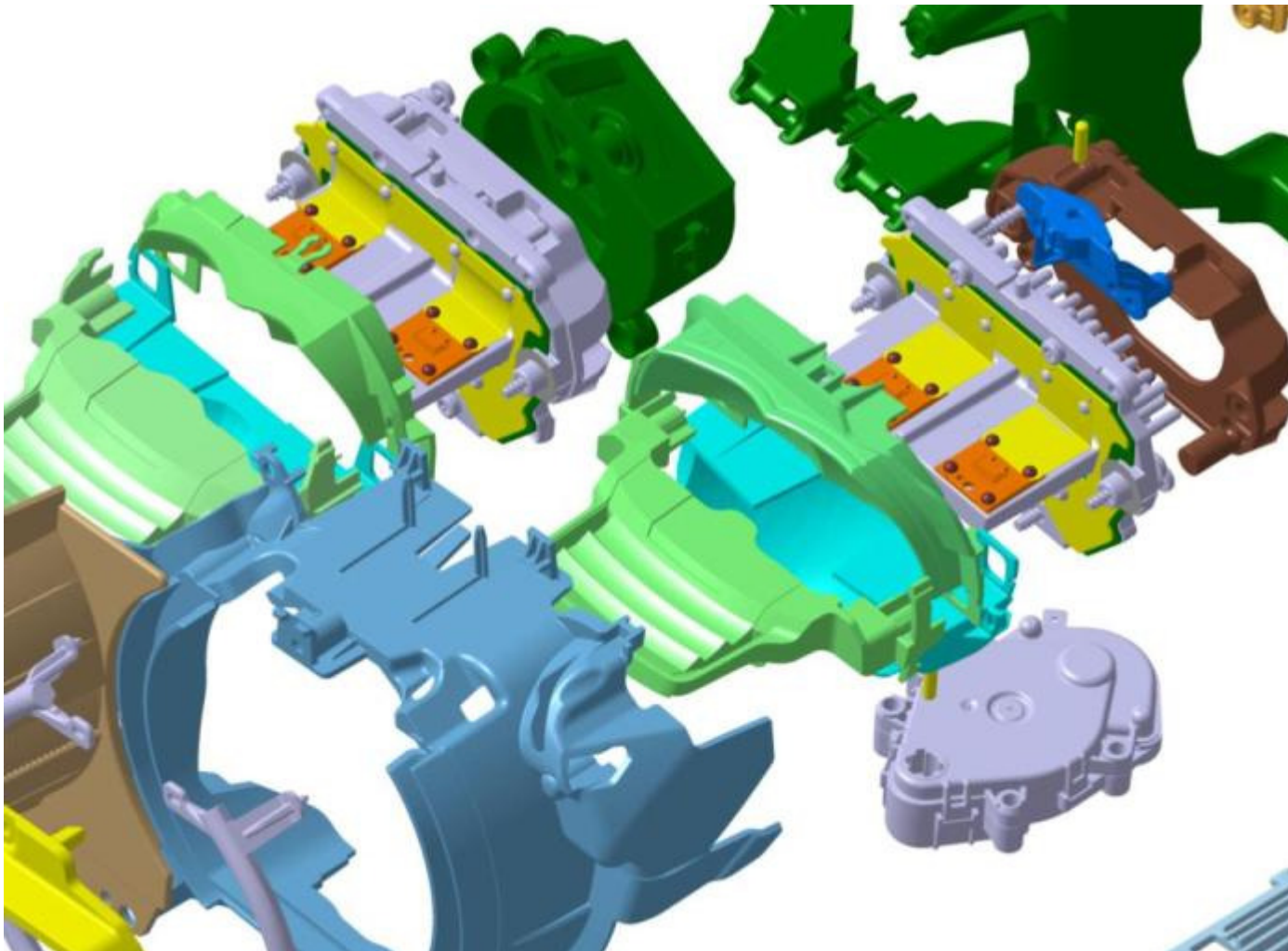


## LED headlamp





## LED headlamp







## LED headlamp - modul



requirements from the past and today

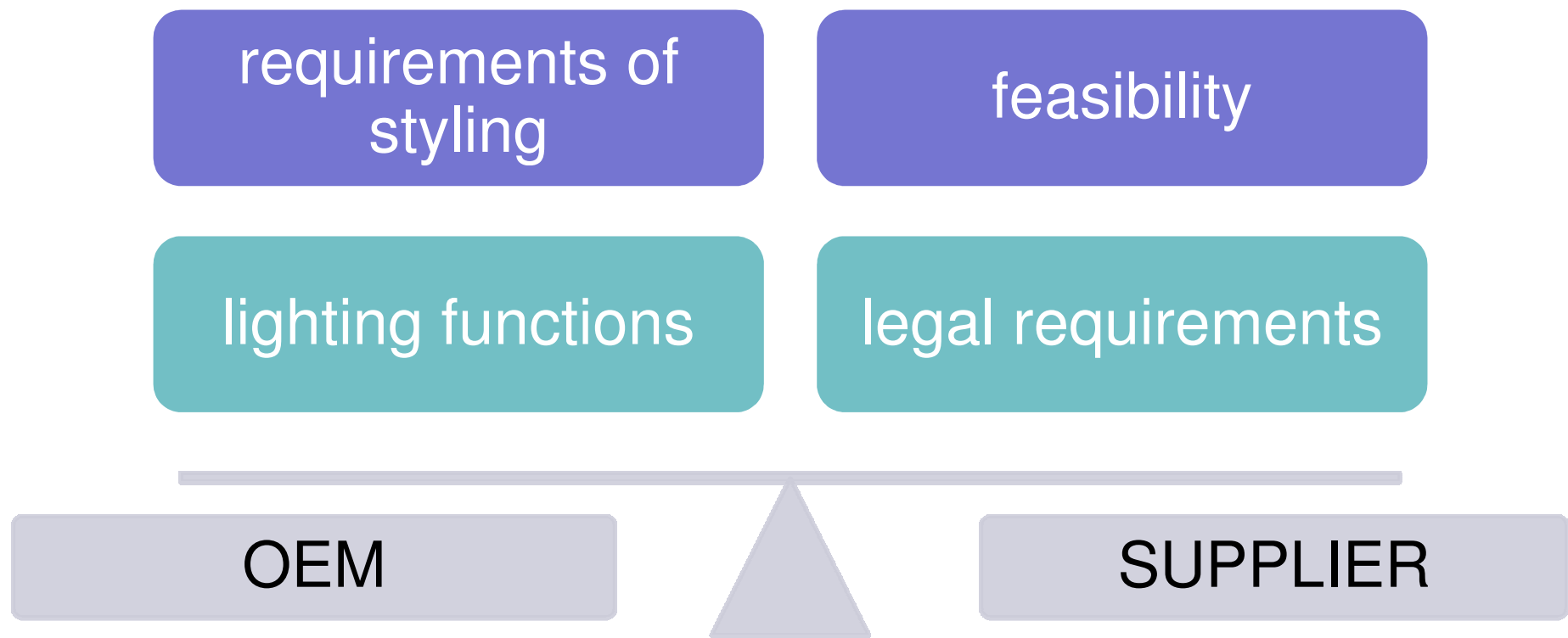
- simple shapes
- less styling elements
- simple lighting technology



- complex shapes
- many features inside
- ambitious lighting technology





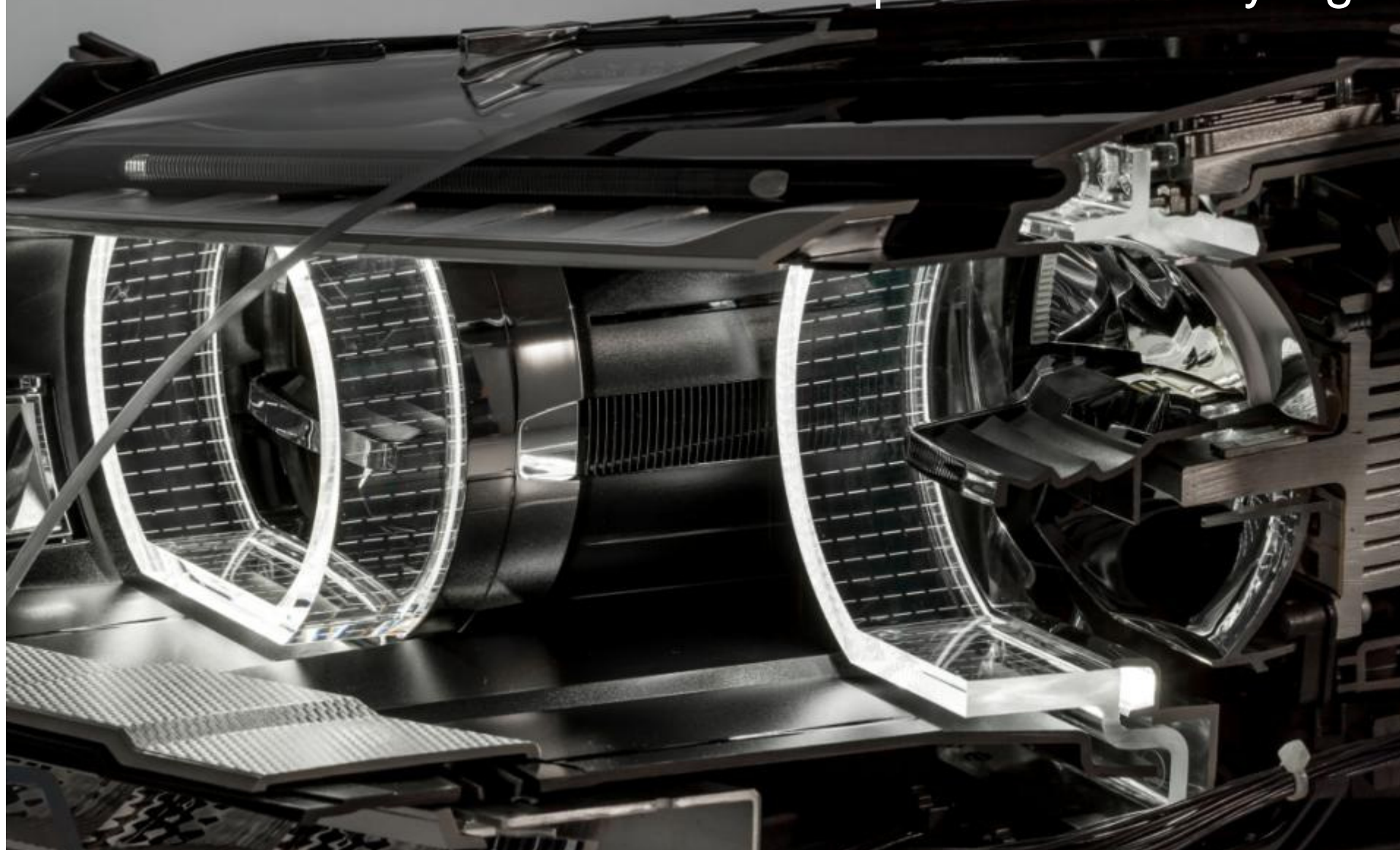




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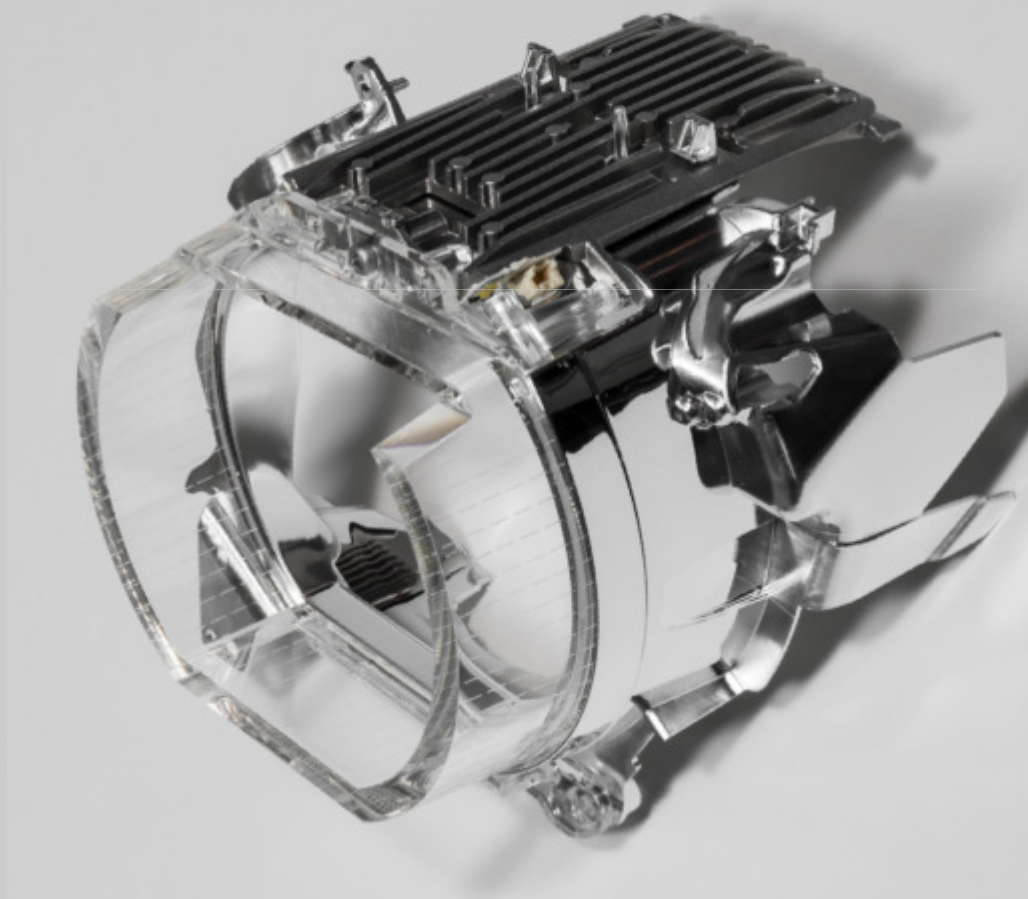
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ambitious requirements of styling





## modul for daytime running light





## thick-walled optics





reduced  
development time

frontloading

requirements of  
styling

feasibility

lighting functions

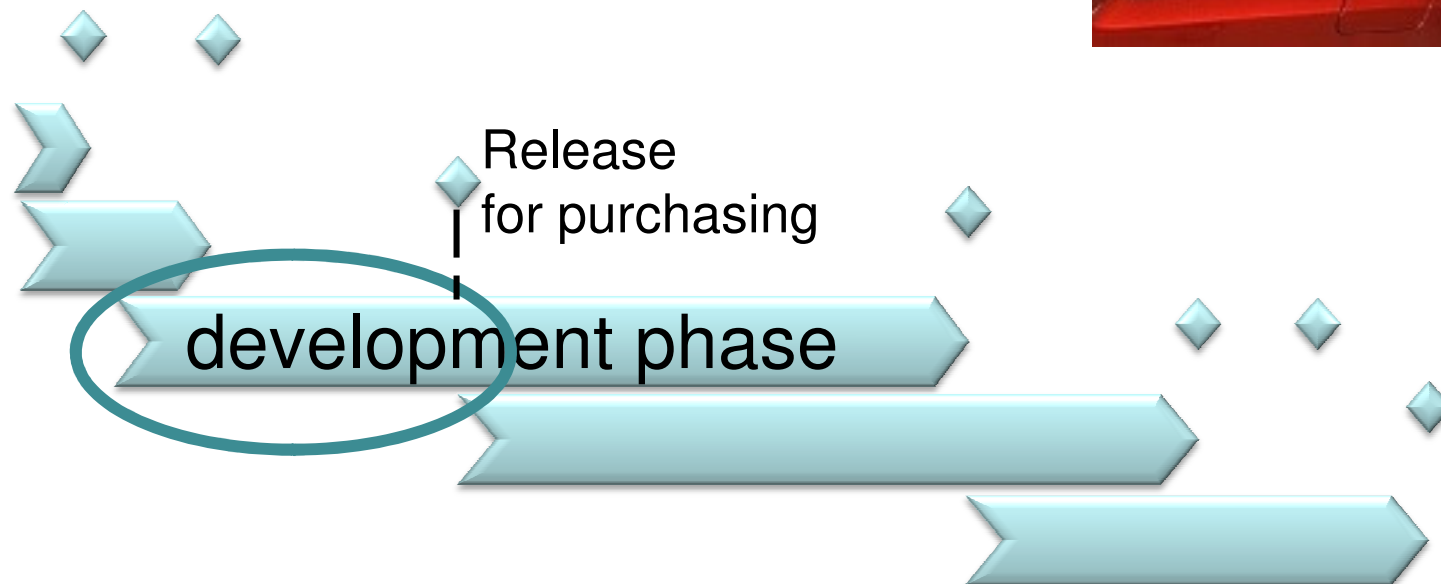
legal requirements

OEM

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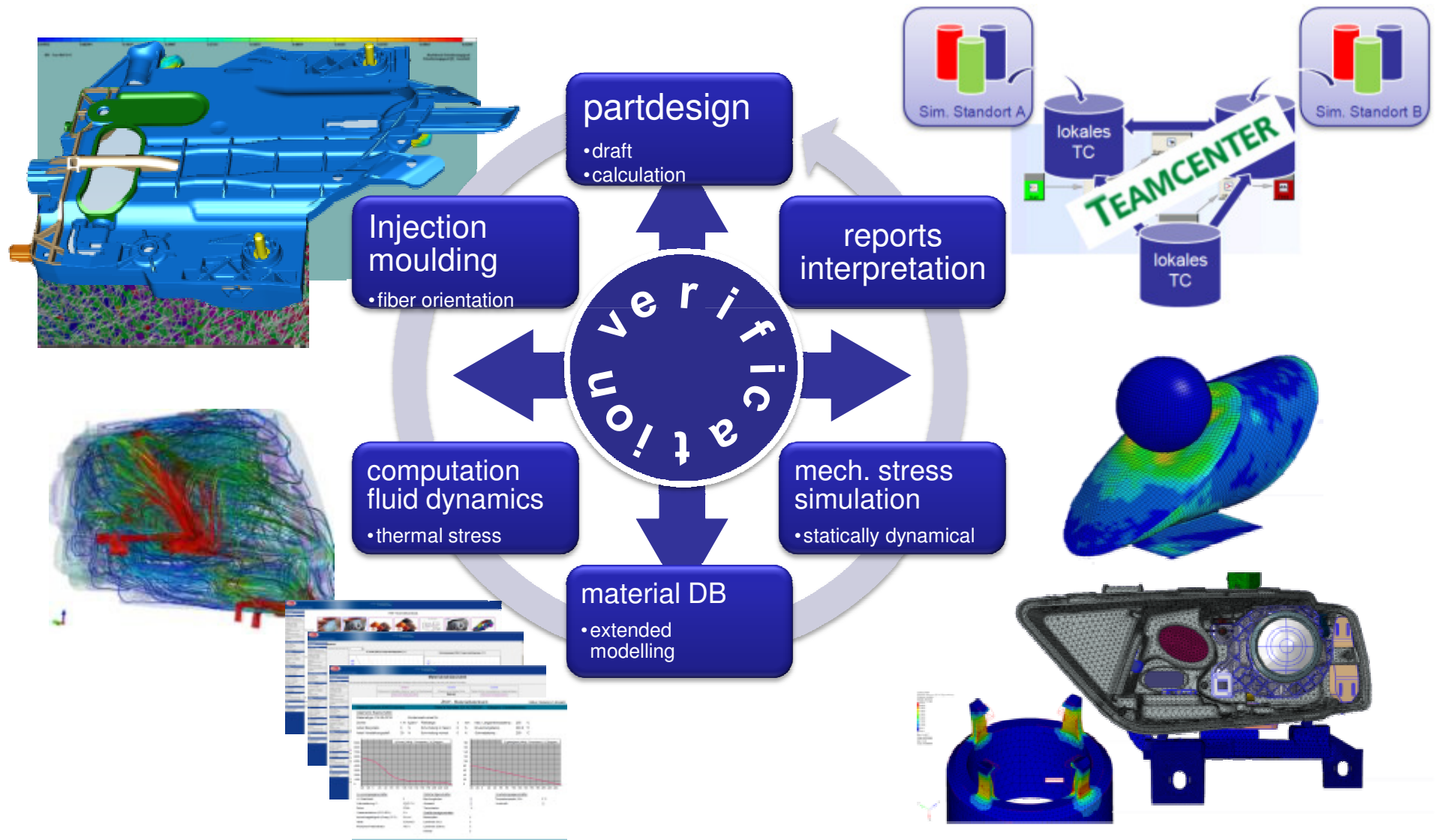


reduced development time





# Frontloading – combination of simulation methods



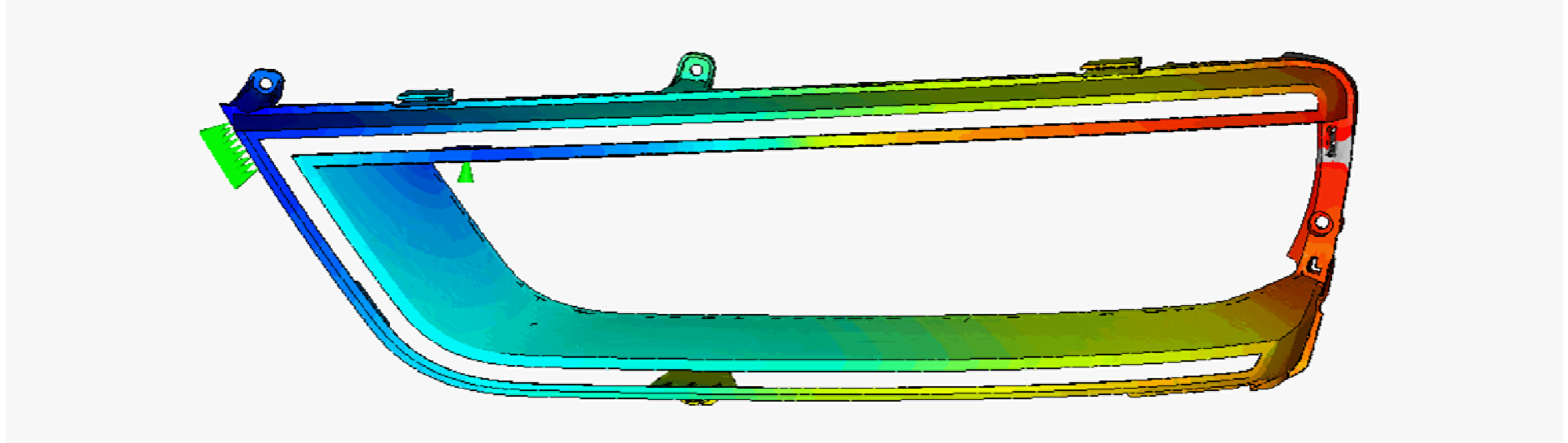


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injection moulding

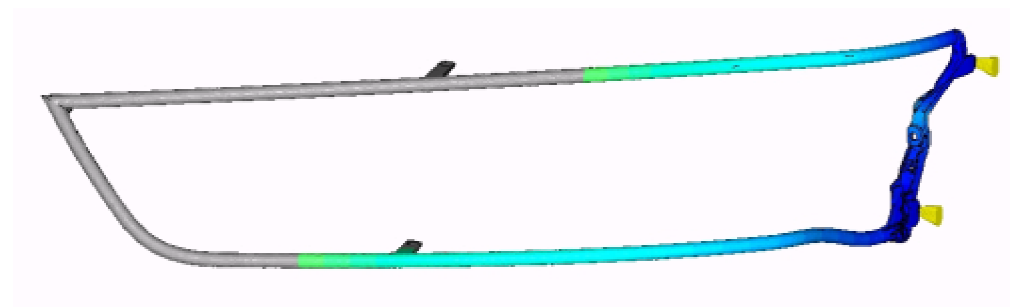
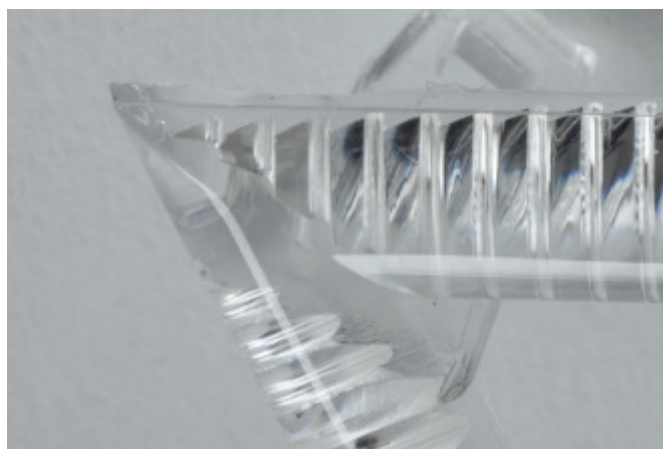
Frontloading





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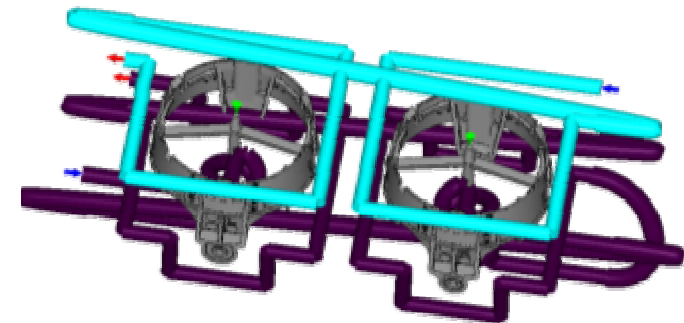
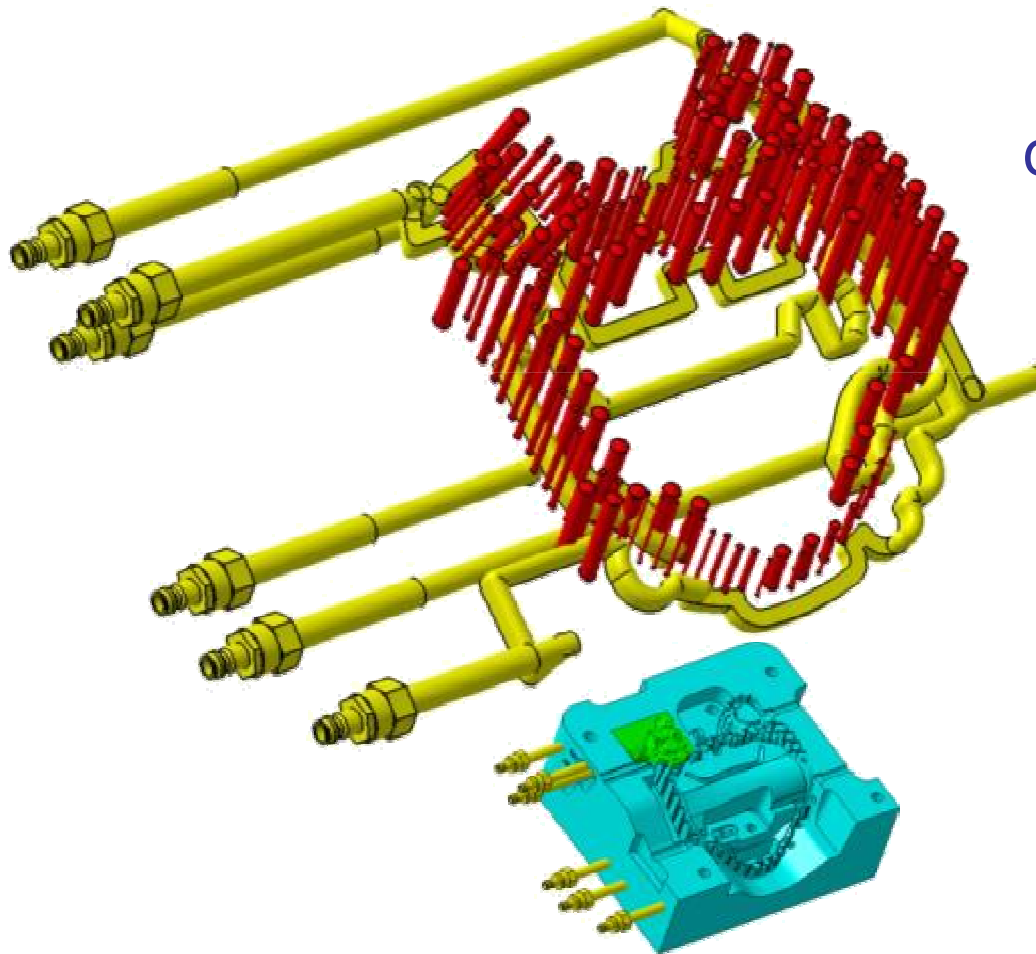
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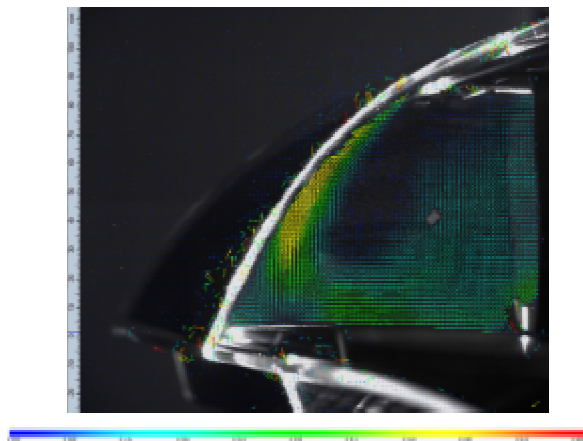
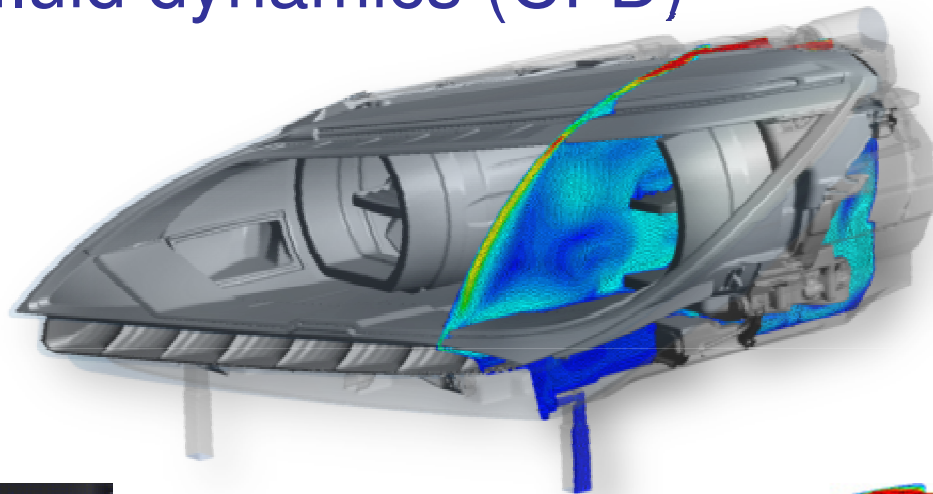
# Frontloading

conformal cooling

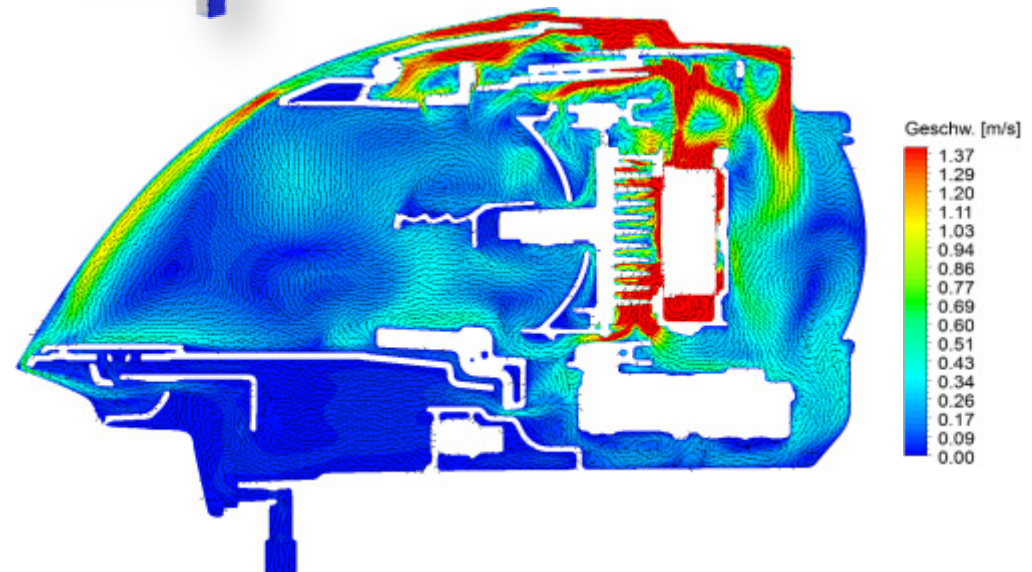


# Strömungssimulation computation fluid dynamics (CFD)

## Frontloading



Particle Image Velocimetry (PIV)

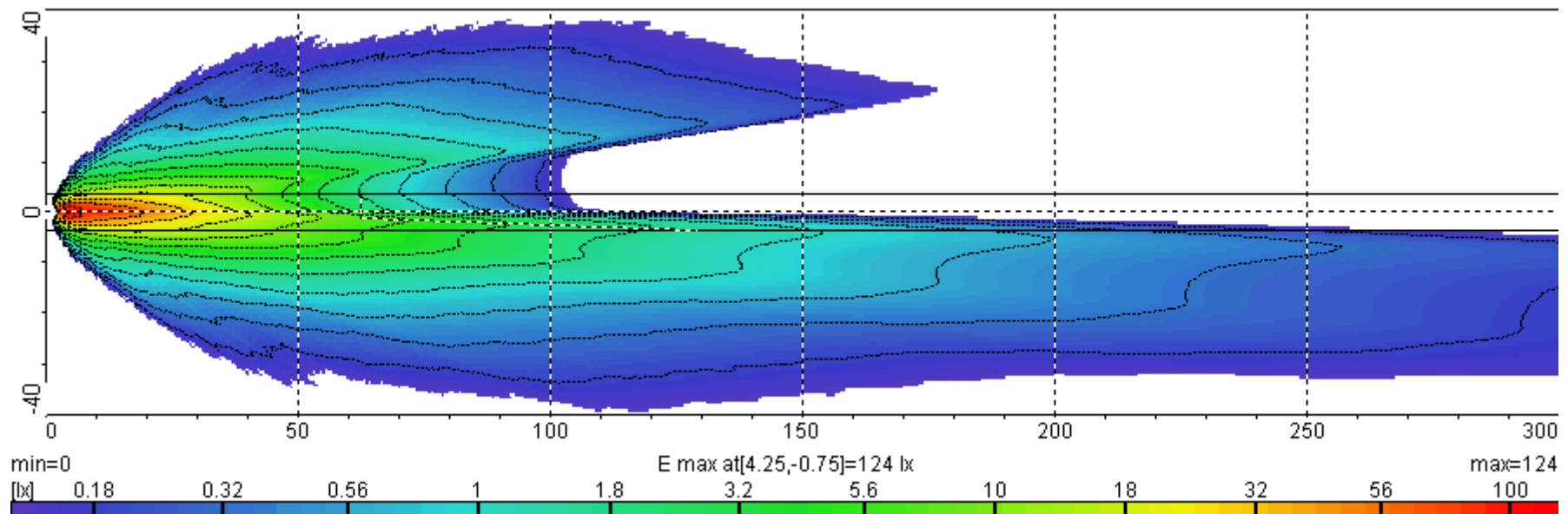
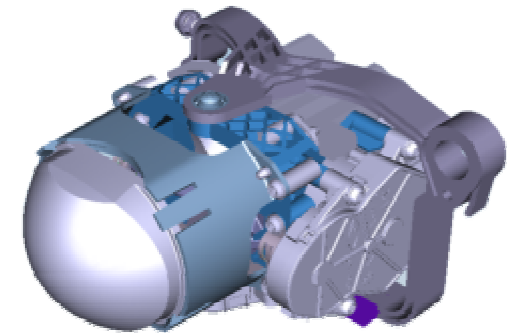
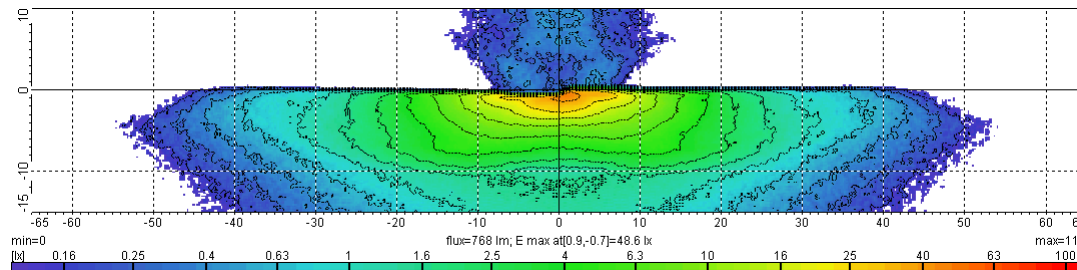






# light simulation

## Frontloading

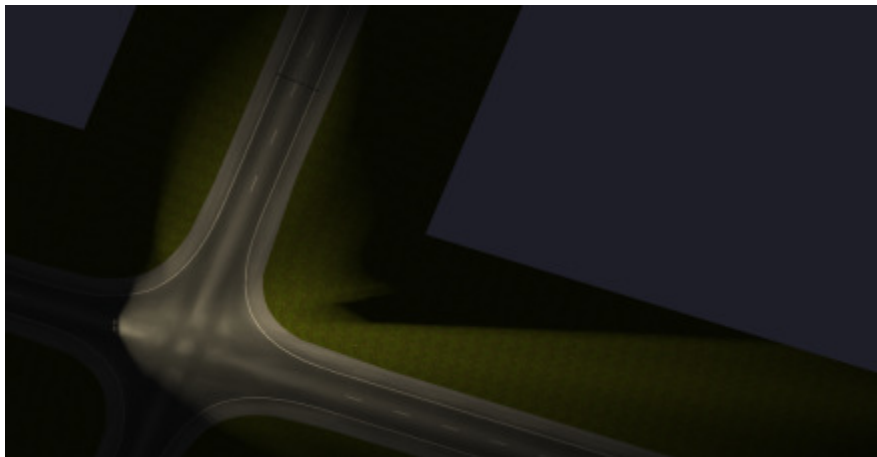




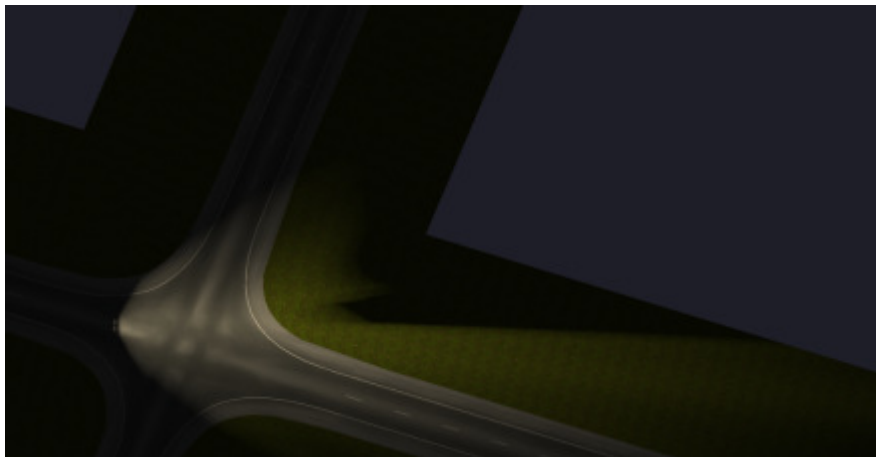


## Frontloading

### visualisation of the lighting



cornering light / enabled

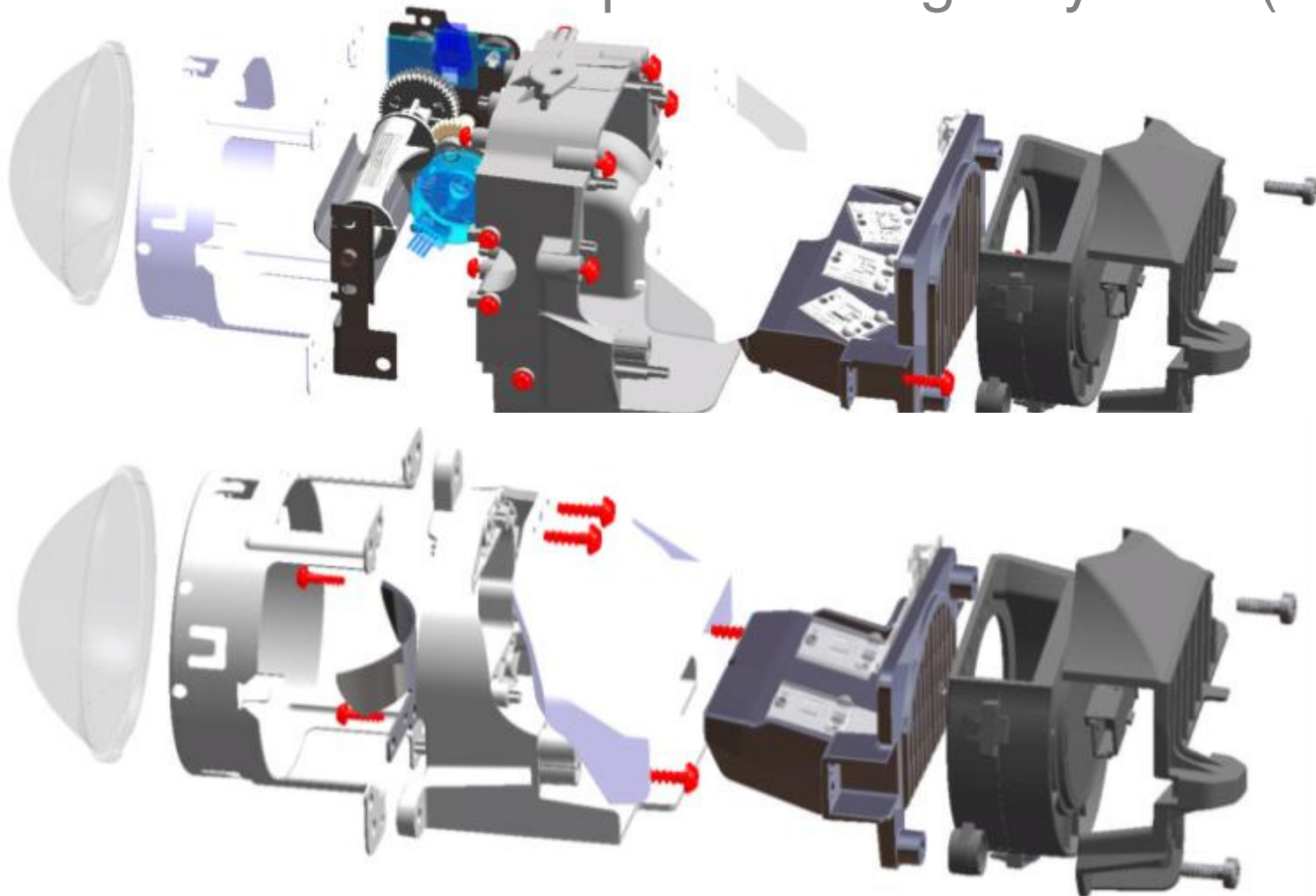


cornering light / disabled



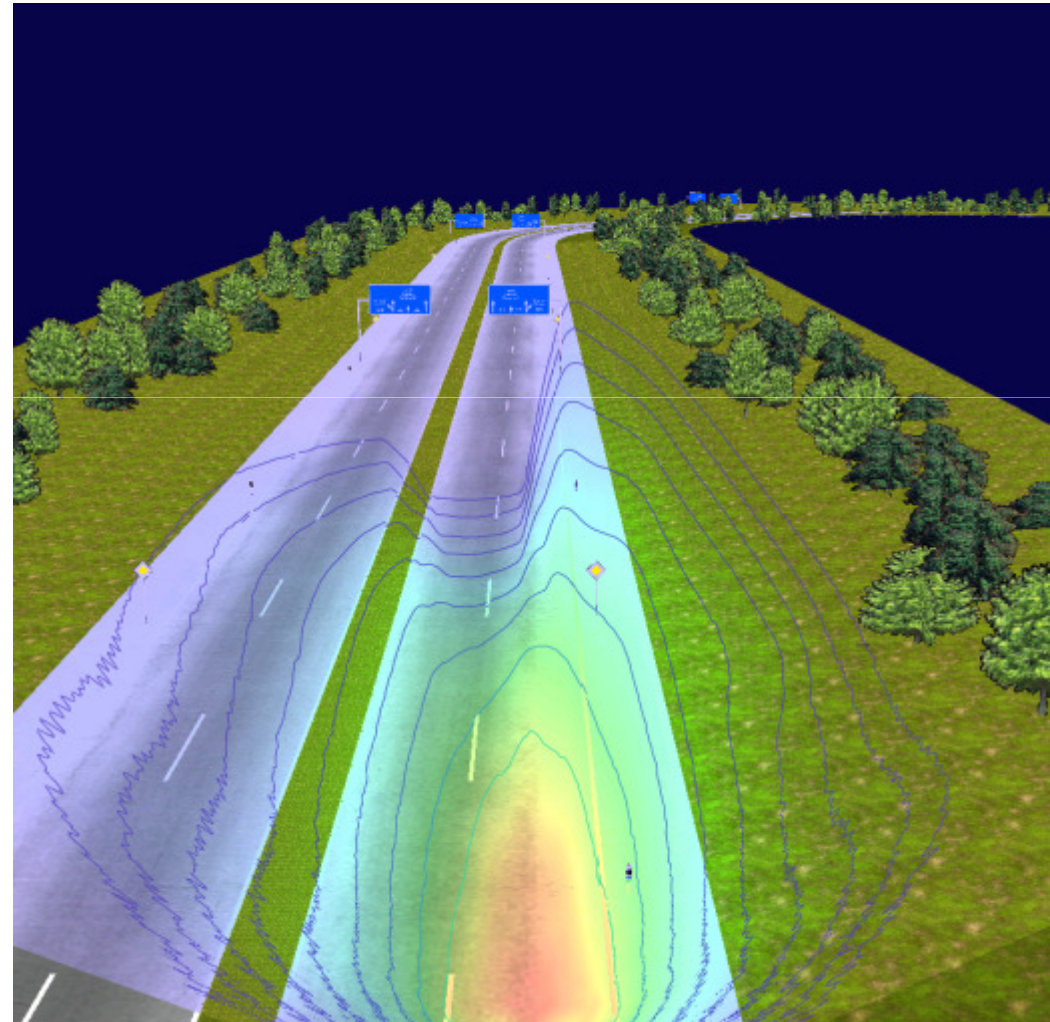
# LED Lichtmodule mit adaptiven Lichtfunktionen

## LED adaptive frontlight system (AFS)



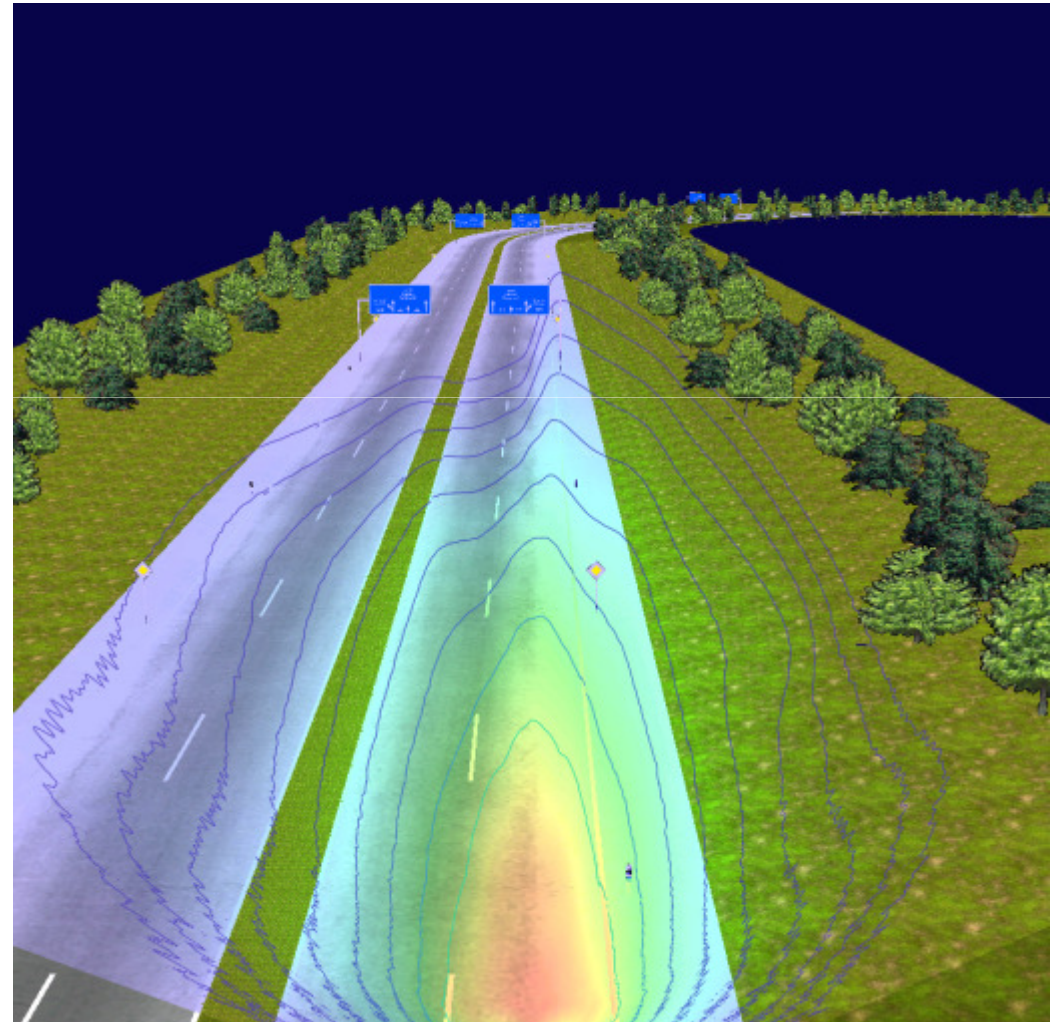
## LED adaptive frontlight system - Countrylight

- standard lowbeam



## LED adaptive frontlight system - highway

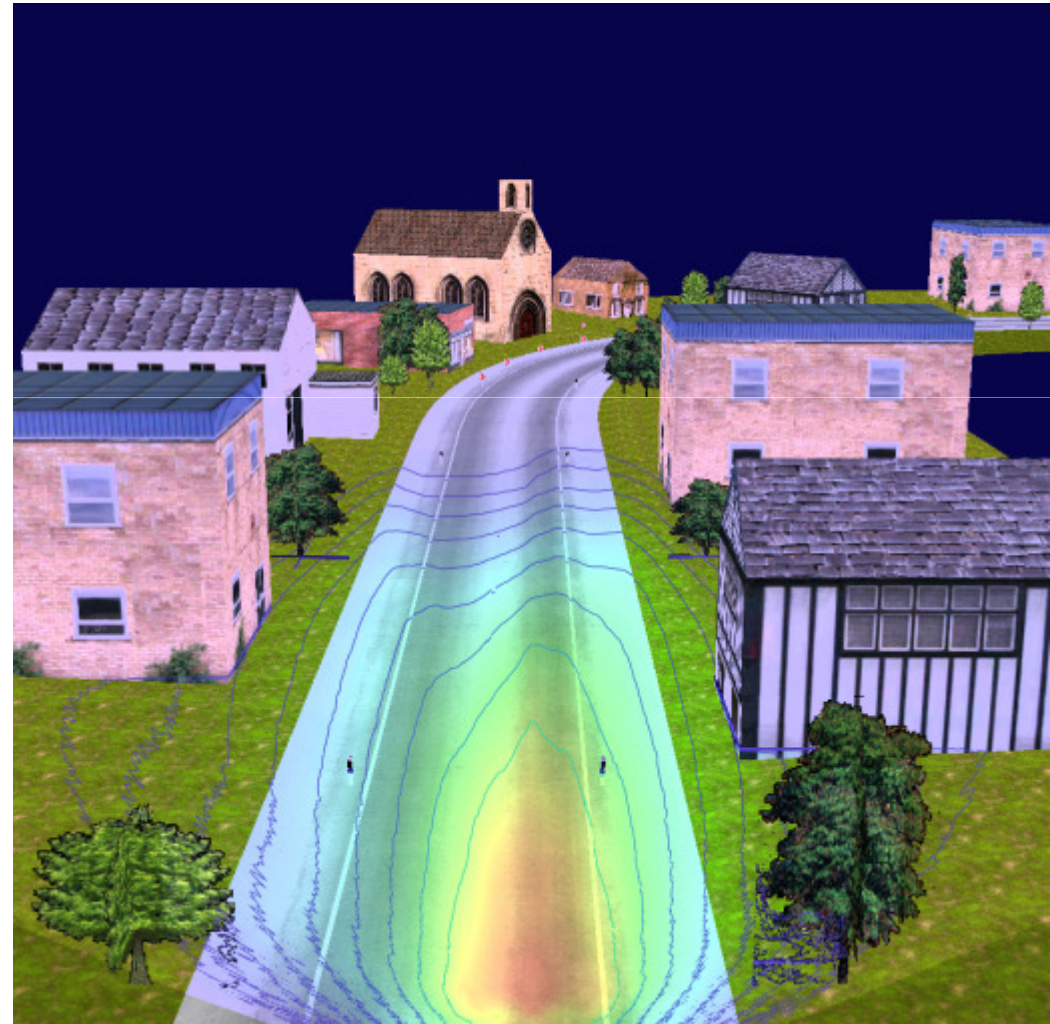
- max. intensity
- max. range





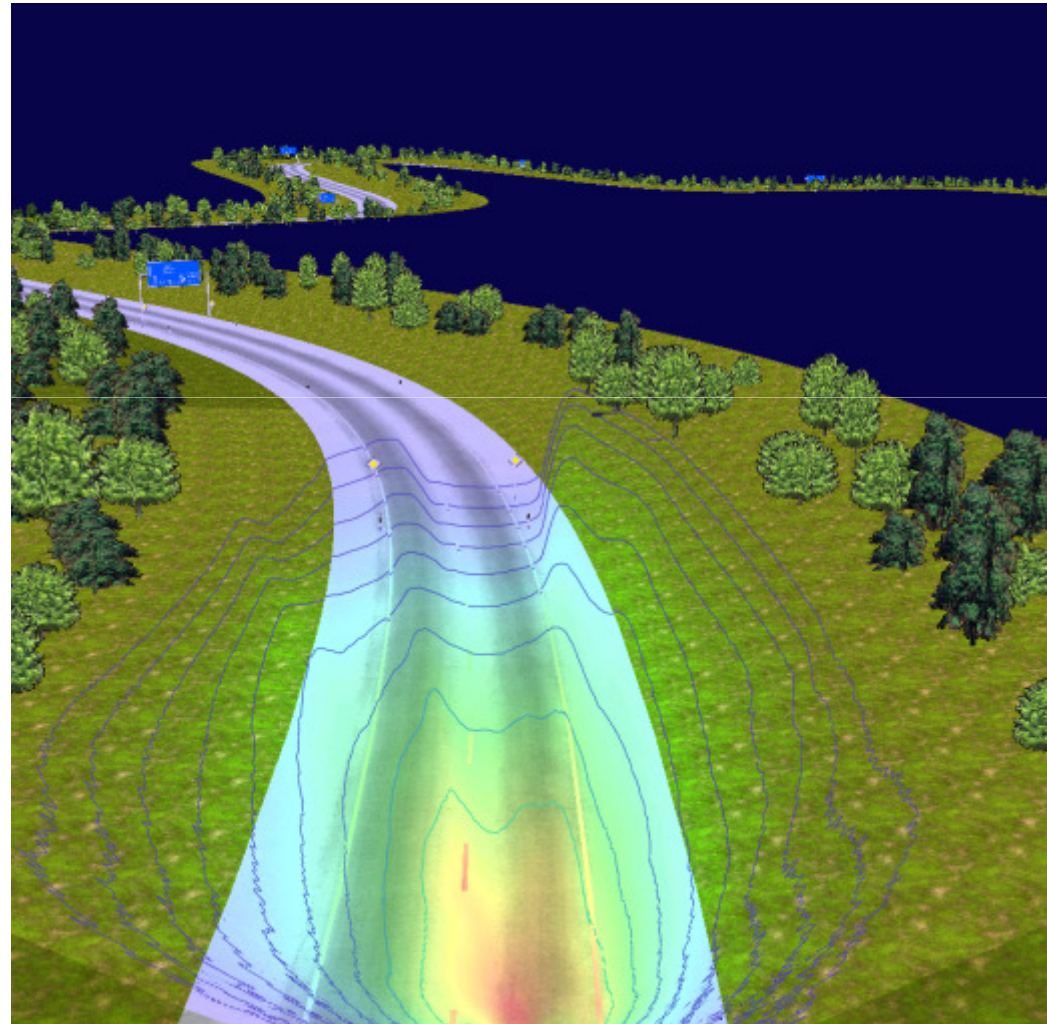
## LED adaptive frontlight system– townlight

- higher contrast
- less glare
- less maximum
- sidewalks



## LED adaptive frontlight system - Rainlight

- less glare  
direct, indirect
- less self glare
- roadside







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# Matrix Light





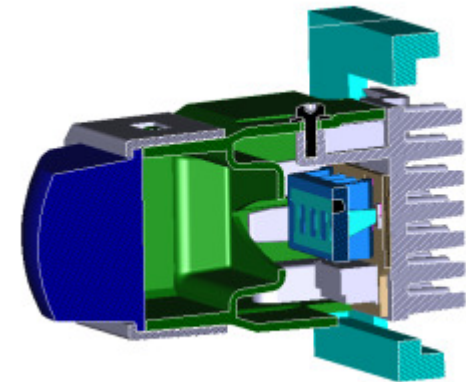
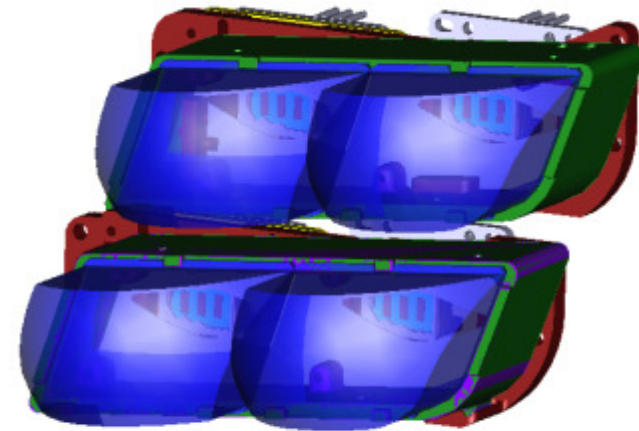
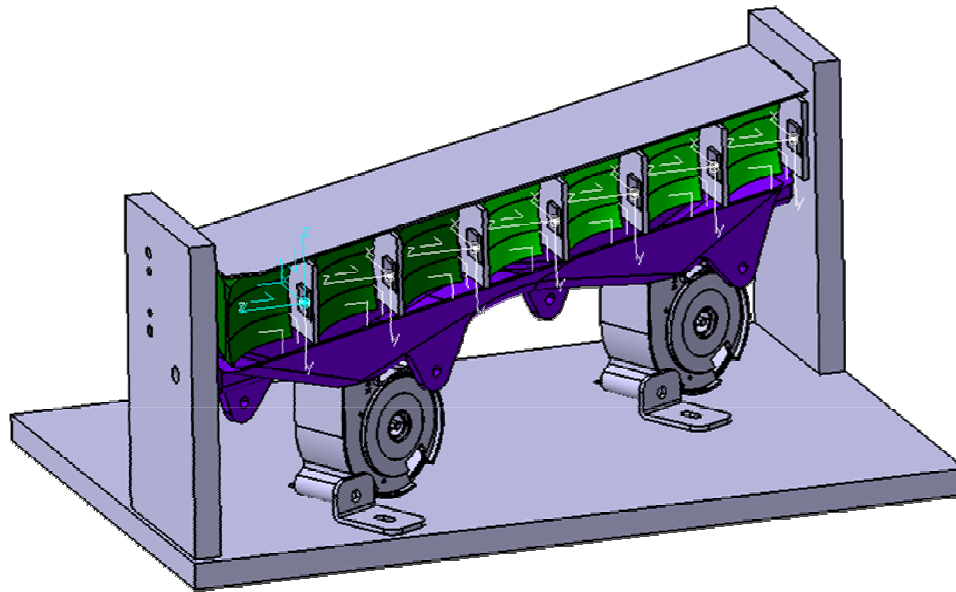
## functionality

- segmented high beam distribution
- glare free high beam
- dynamic high beam
- object illumination

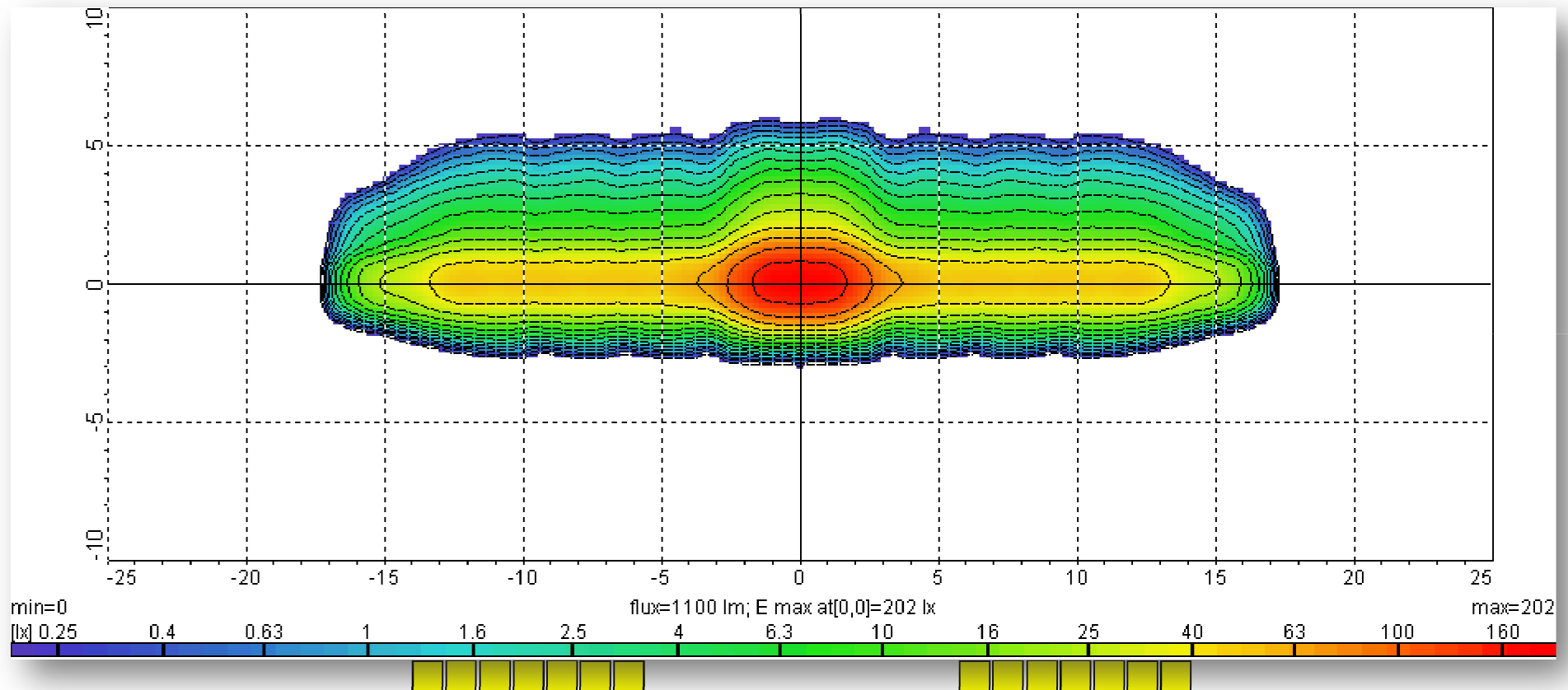




## Optical concepts

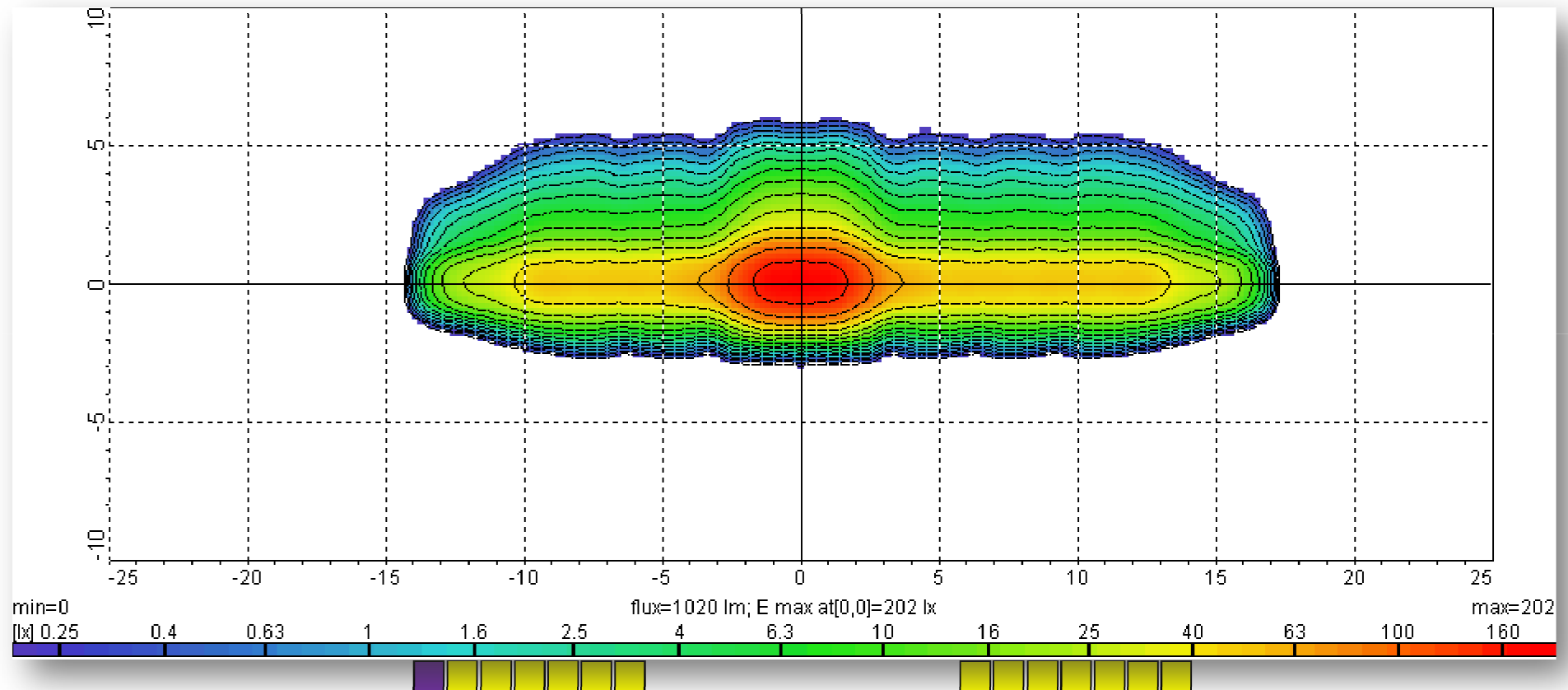


# selective masking



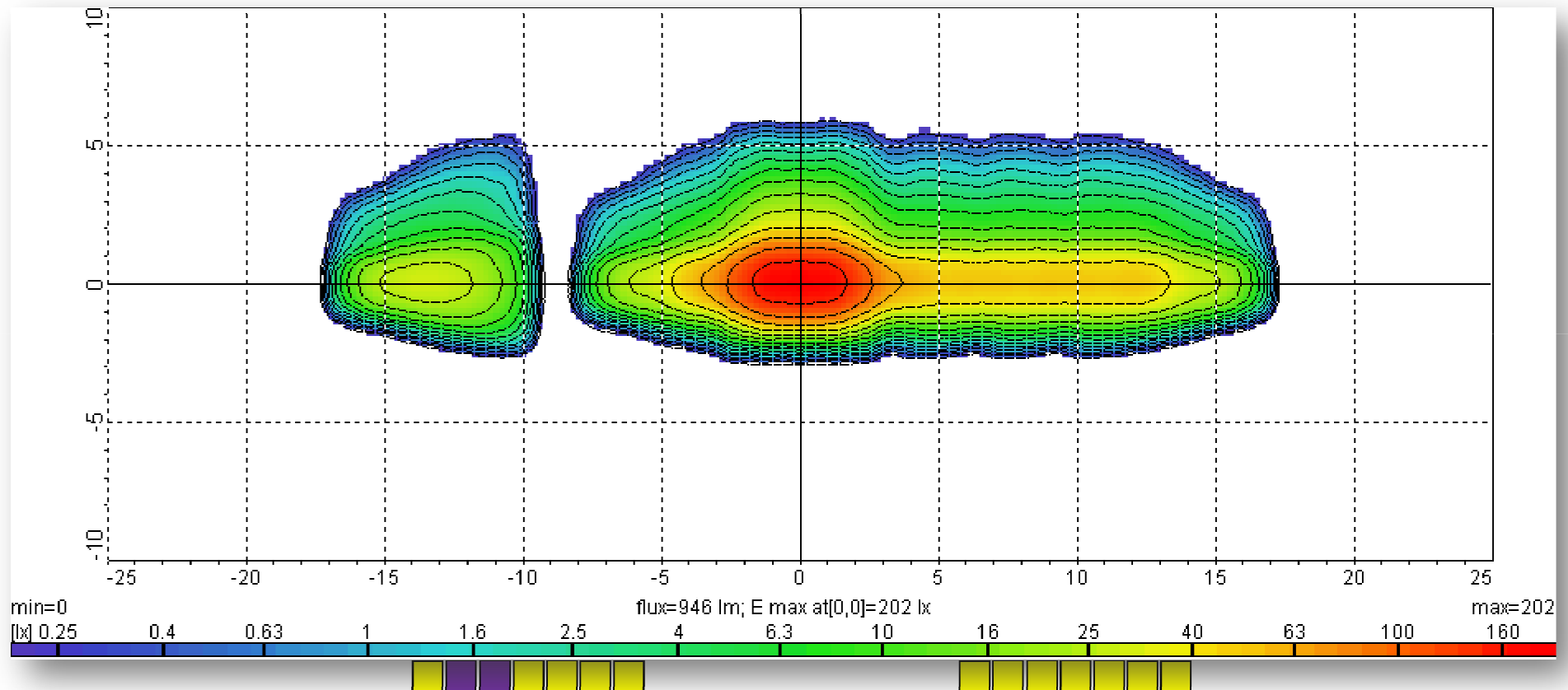


## selective masking





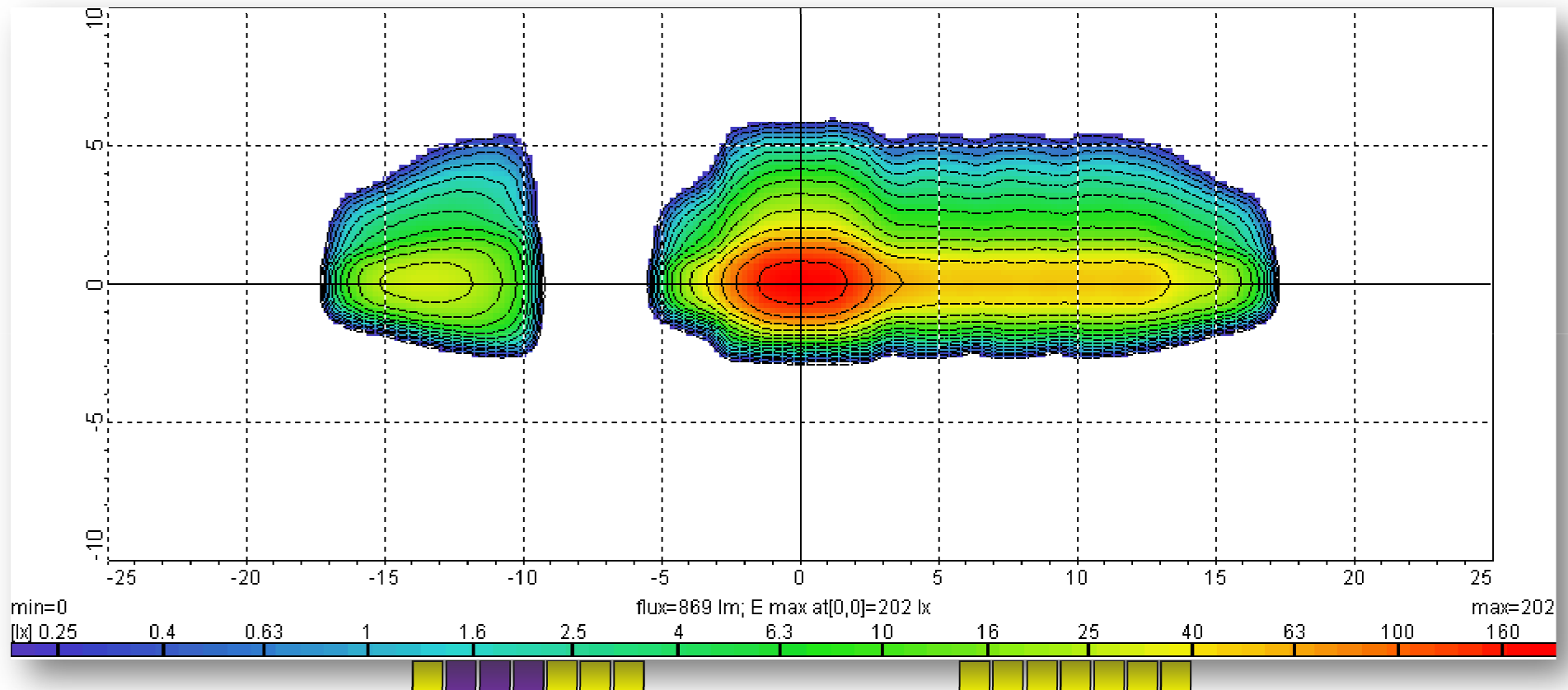
# selective masking



alle LEDs 100%

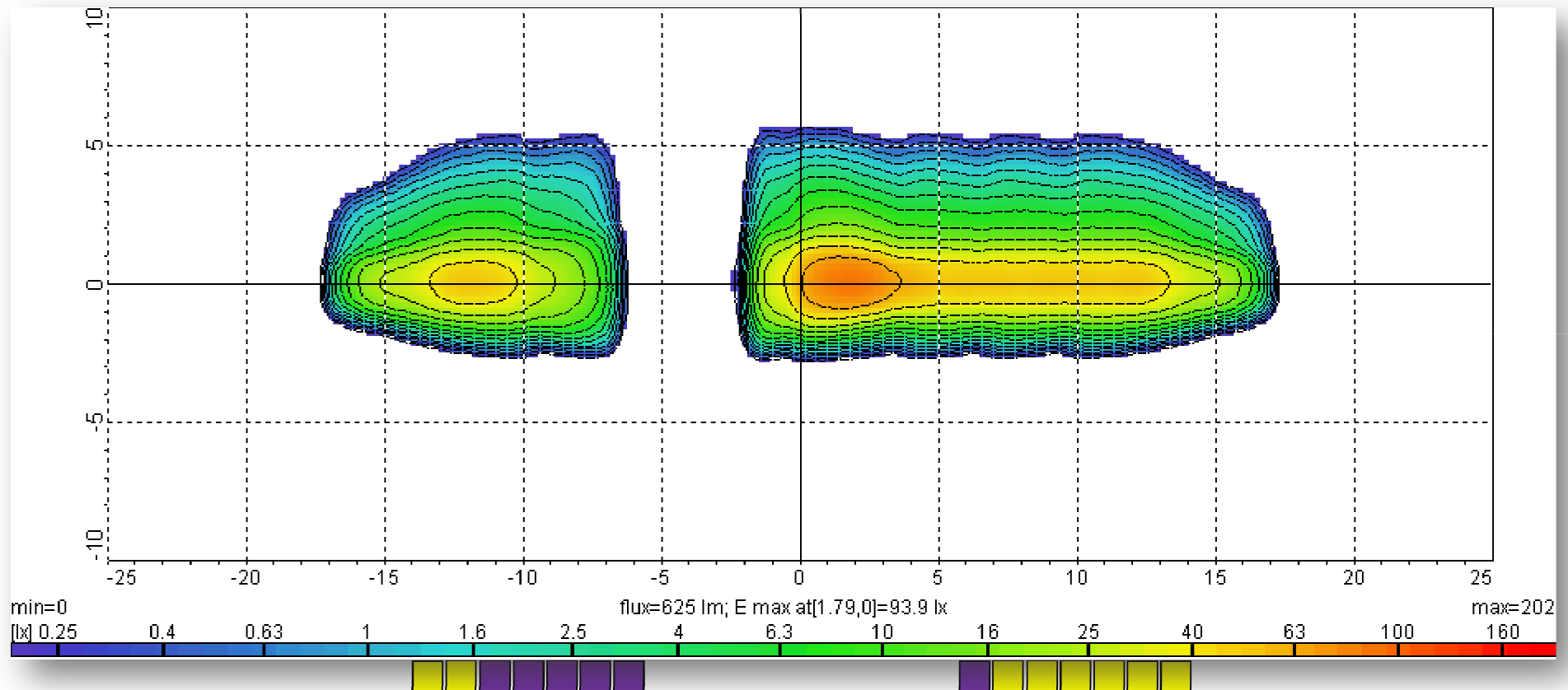


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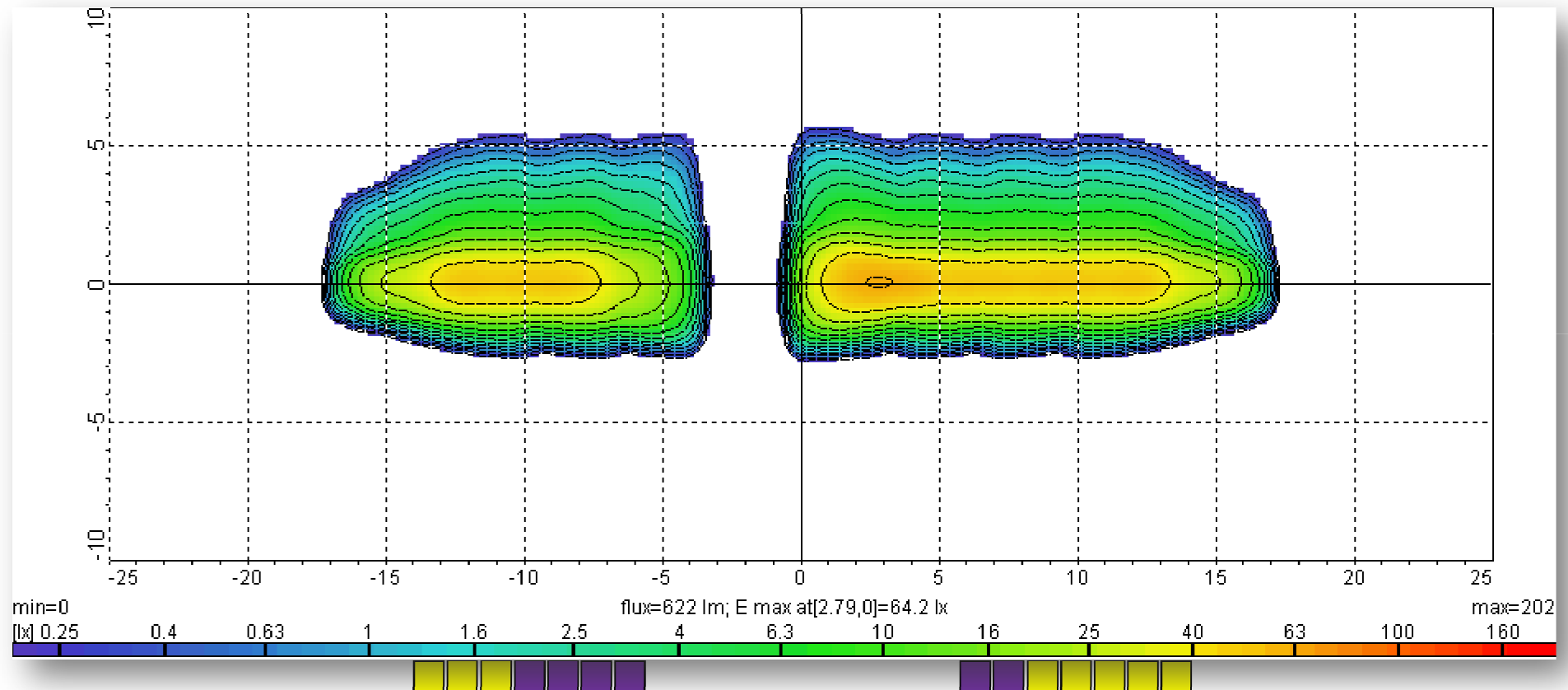


## selective masking



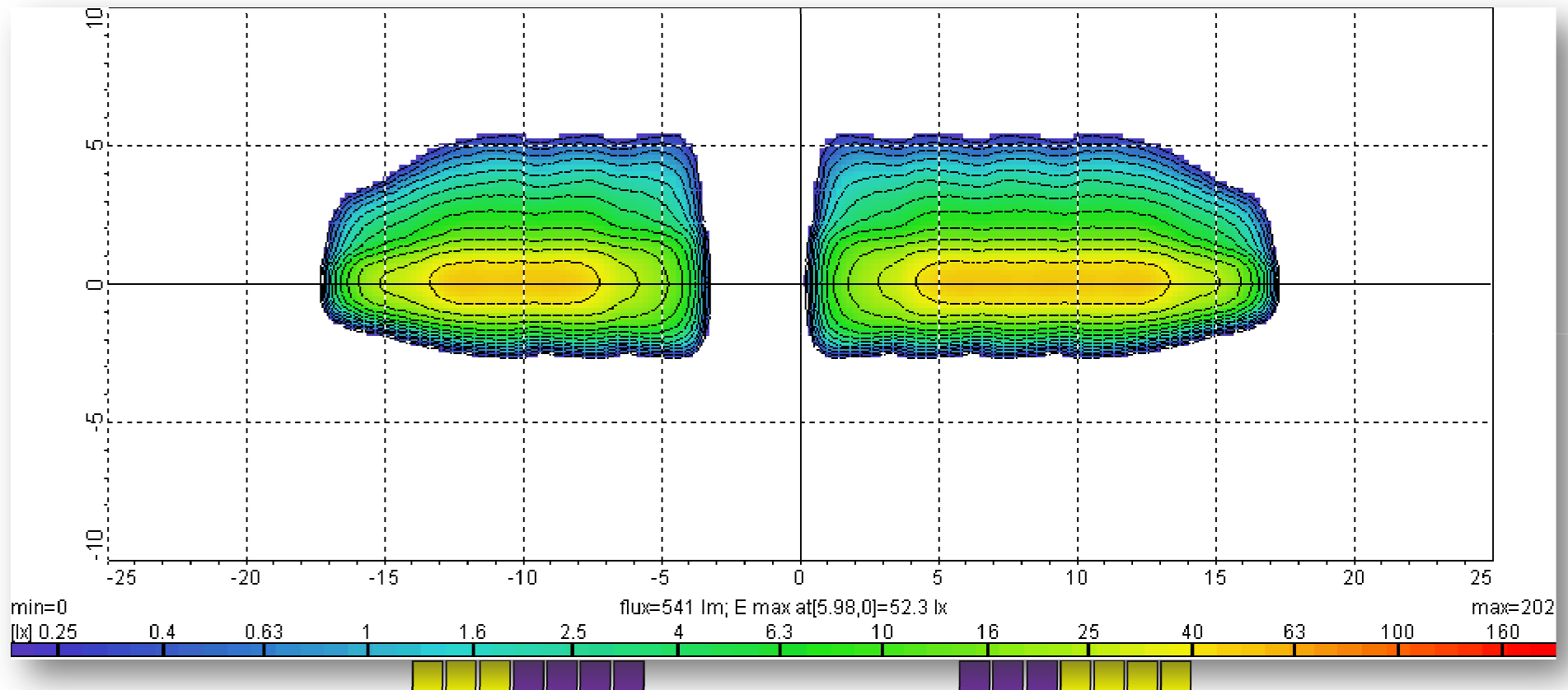


## selective masking





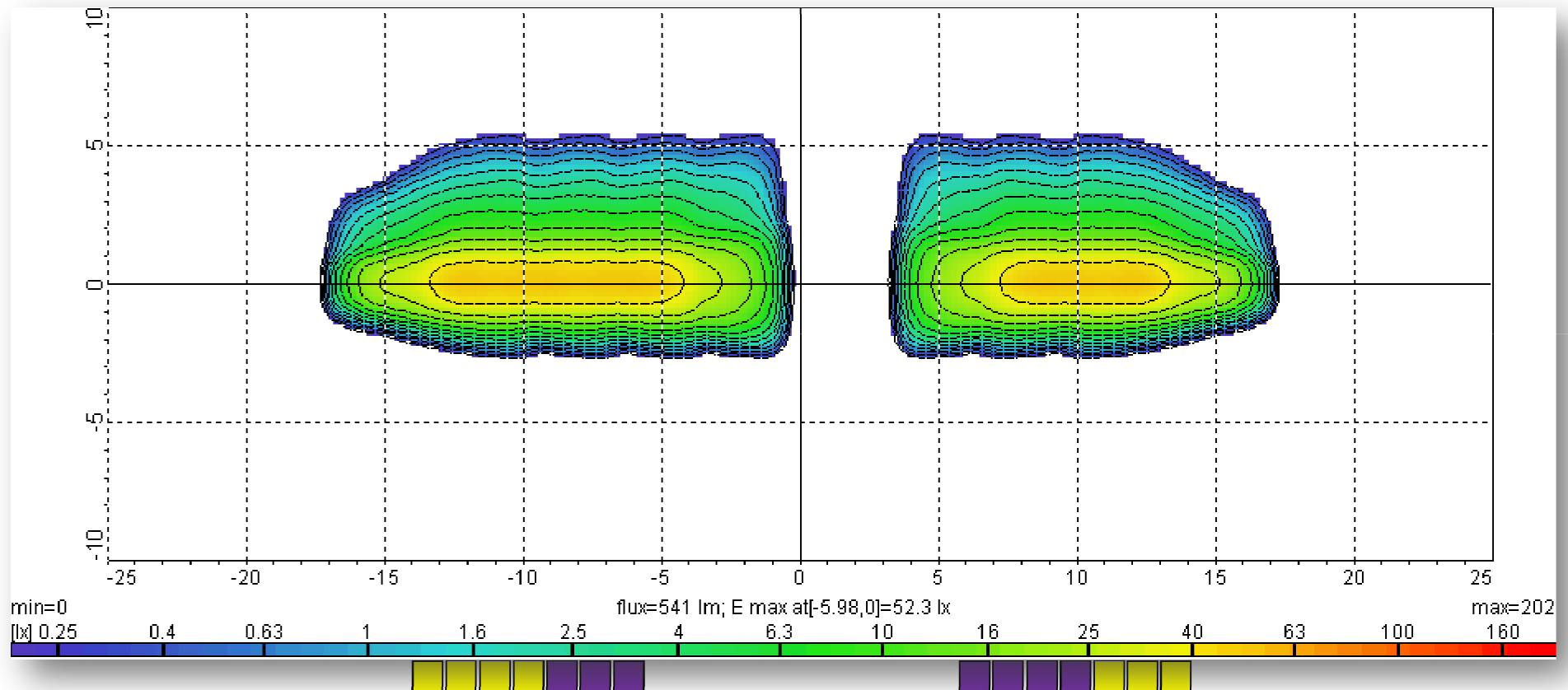
## selective masking





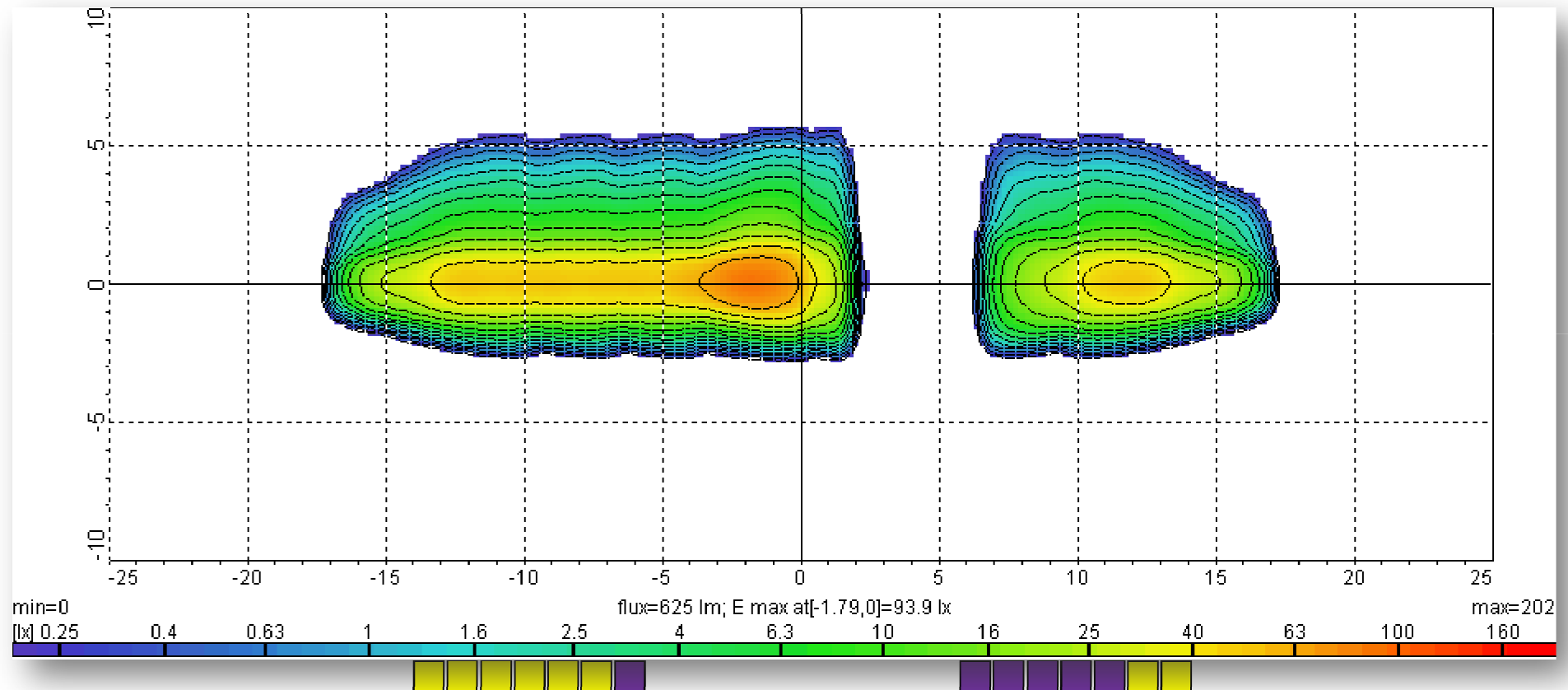


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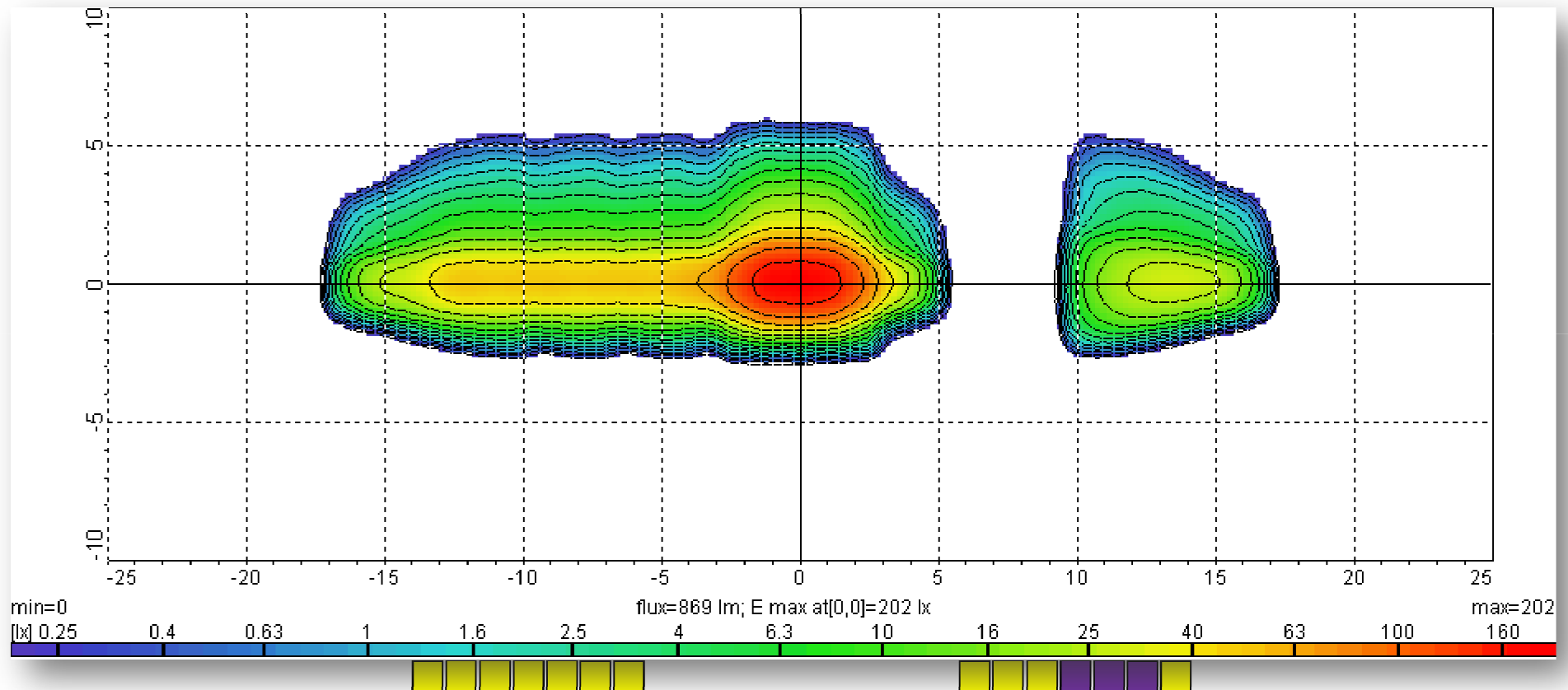


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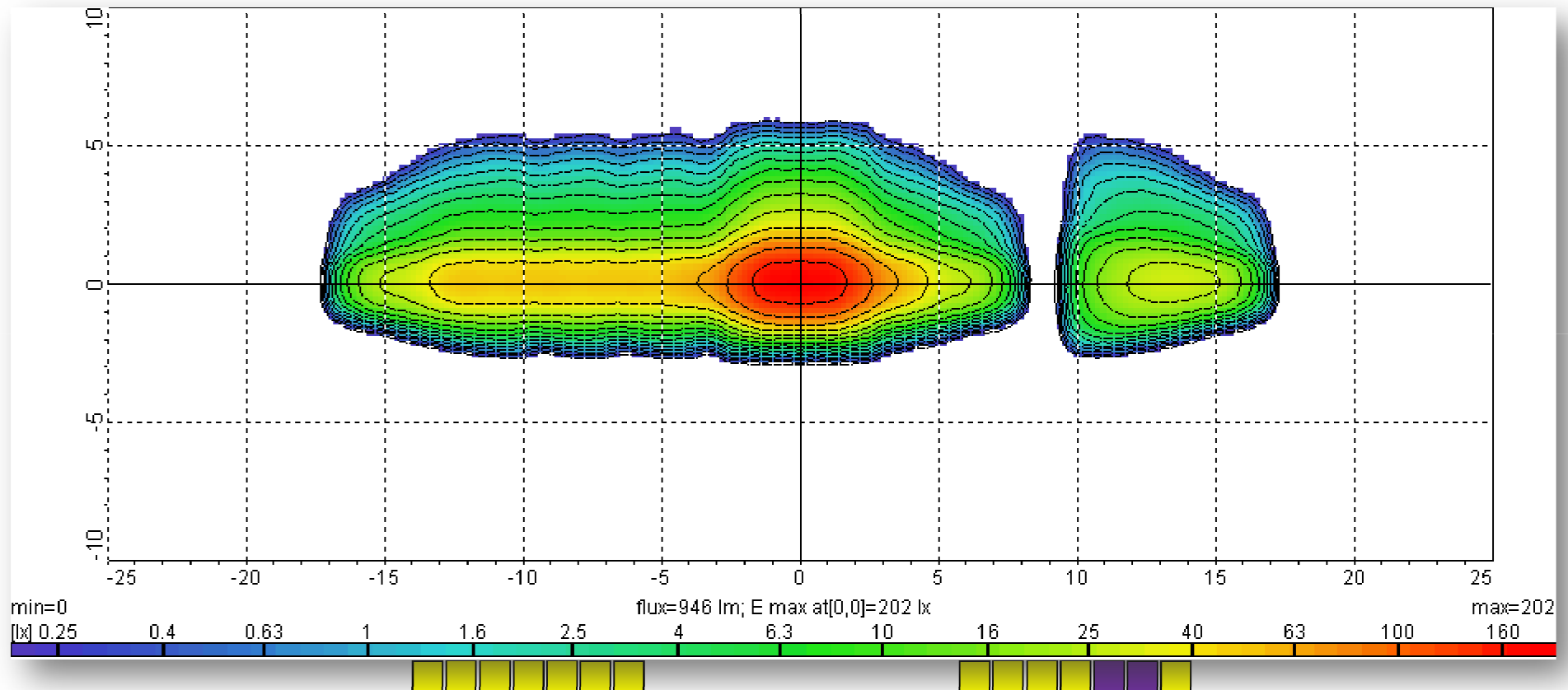


## selective masking





## selective masking





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## outlook

### matrix lowbeam

- next logical step
- segmented lowbeam distribution
- no moveable parts
- dynamic lightdistributions by dimming

### pixel-light

- masterclass
- high resoluted segmented high- / lowbeam
- max degree of freedom in lightdistribution design
- information projection on the road