

# Night demonstration: H4 Halogen Reflector headlamp versus representative LED headlamp

Geneva, 26.10.2016  
Dr. Rainer Neumann

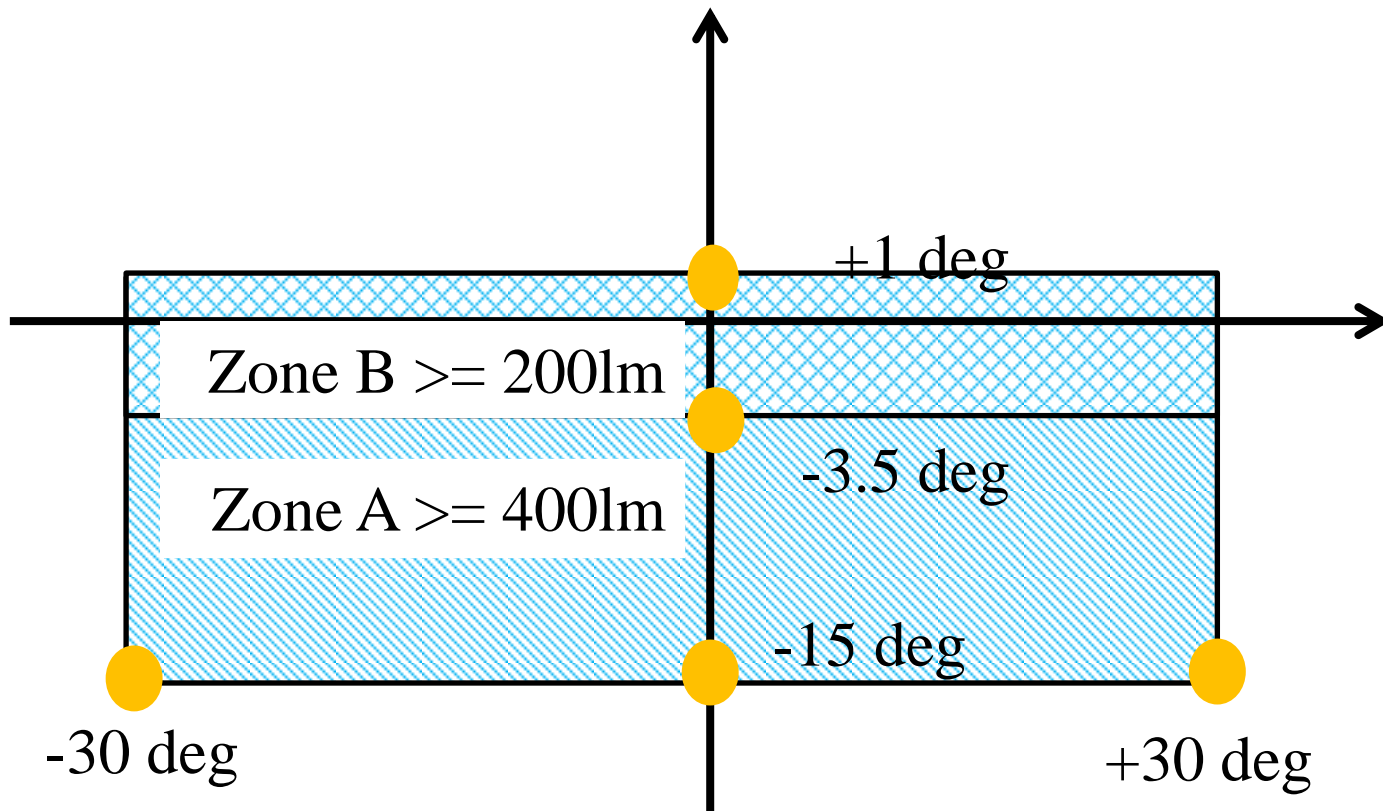
# LED Headlamps : Advantages

- Low energy consumption
- Reduced CO<sub>2</sub>
- Effective solutions also with small sized headlamps
- Long life time
- Flexibility in styling solutions keeping safe light output
- Colour temperature leads to a well accepted light by consumers

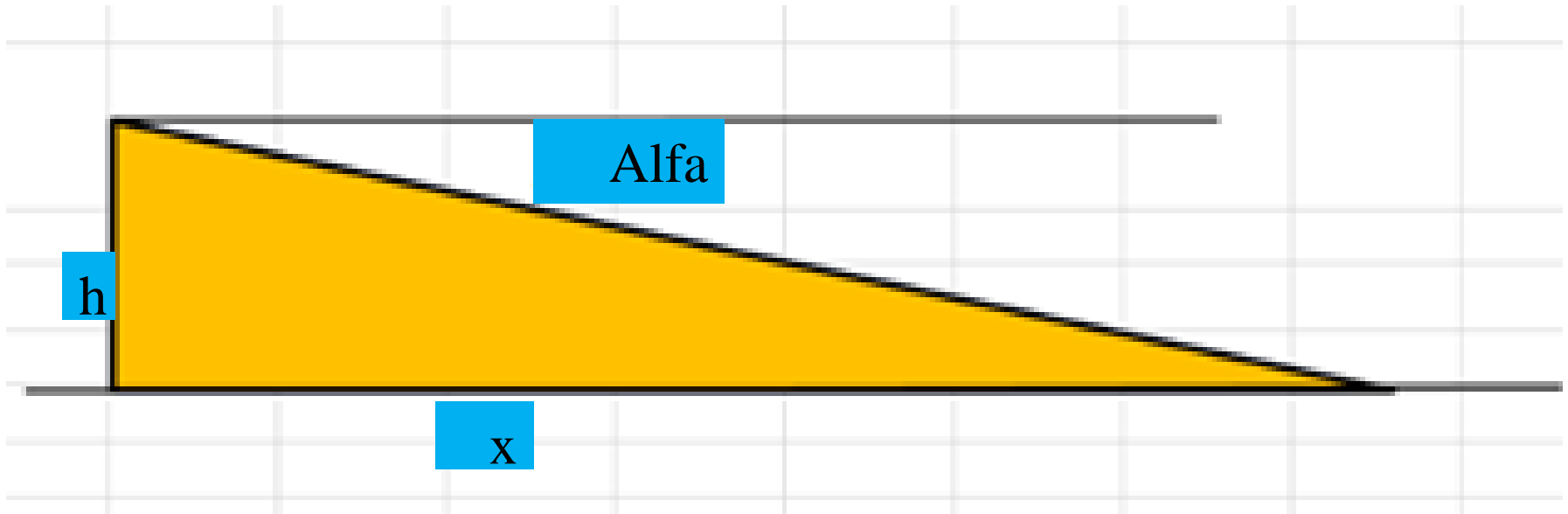
# Proposal for Future Halogen & LED Headlamps

- Intention: Target to demand a good light pattern on the road rather than requiring a certain number of lumens emitted by the light source
- Introduction of a performance based requirement alternatively to the existing 1000 lm objective luminous flux for LED and halogen light sources
- Take into account the given state of the art globally

# New Performance Proposal for LED Headlamps



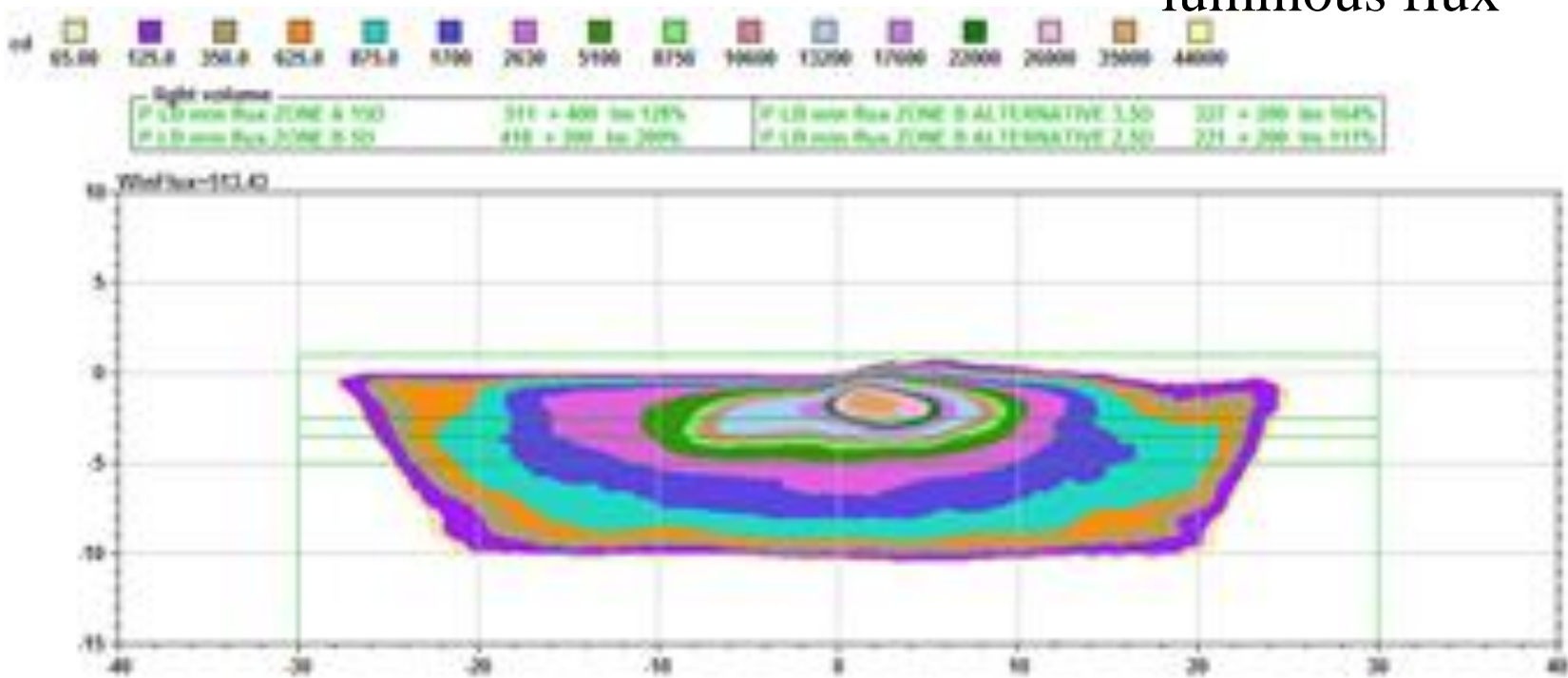
# Mounting Height (h), Inclination (alfa), distance (x)



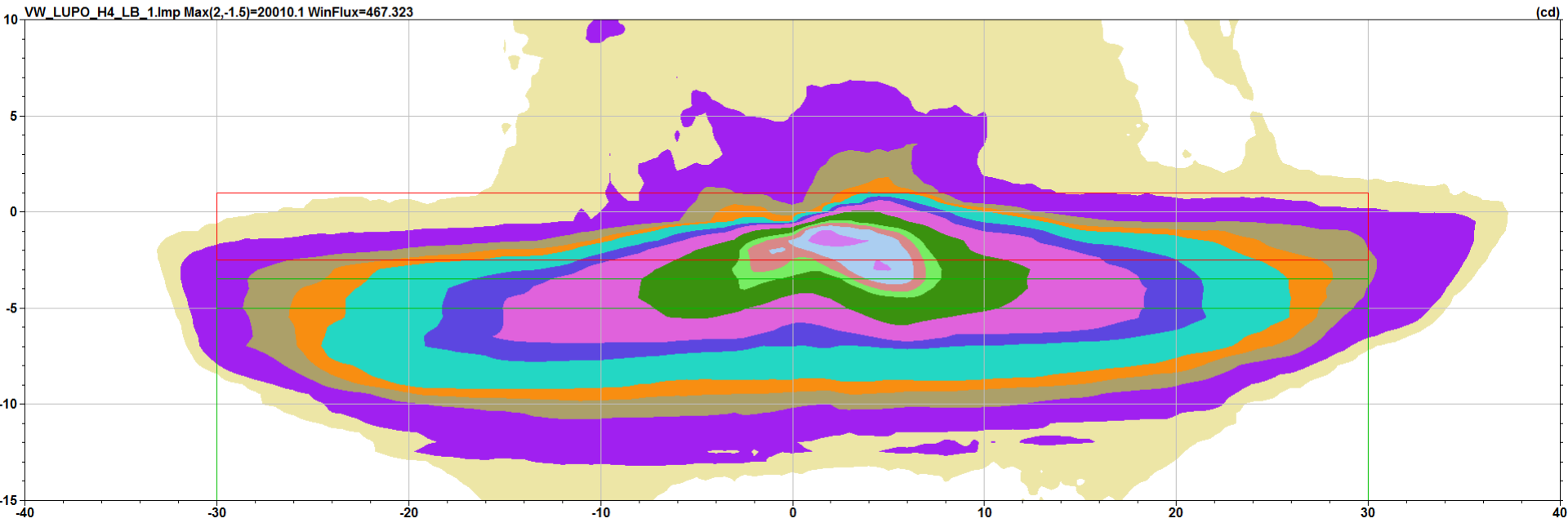
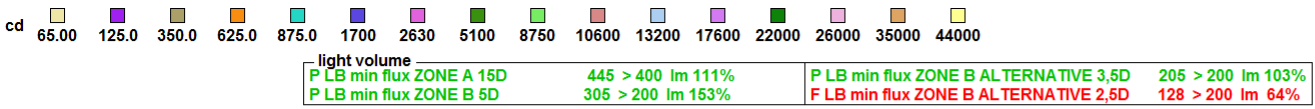
Headlamp mounting height [cm]	Ray inclination [deg]	Distance on the road [m]
85	0.57	85.4
	2.50	19.5
	3.50	13.9
	5.00	9.7

Headlamp mounting height [cm]	Ray inclination [deg]	Distance on the road [m]
65	0.57	65.3
	2.50	14.9
	3.50	10.6
	5.00	7.4

# Representative LED Headlamp (out of 60) , 513 lm total luminous flux



# Reflector Headlamp H4 , 155mm diameter , 467 lm





# Photometric Results

Representative LED Headlamp :

total luminous flux : 513 lm

Zone A : 511 lm

Zone B : 327 lm

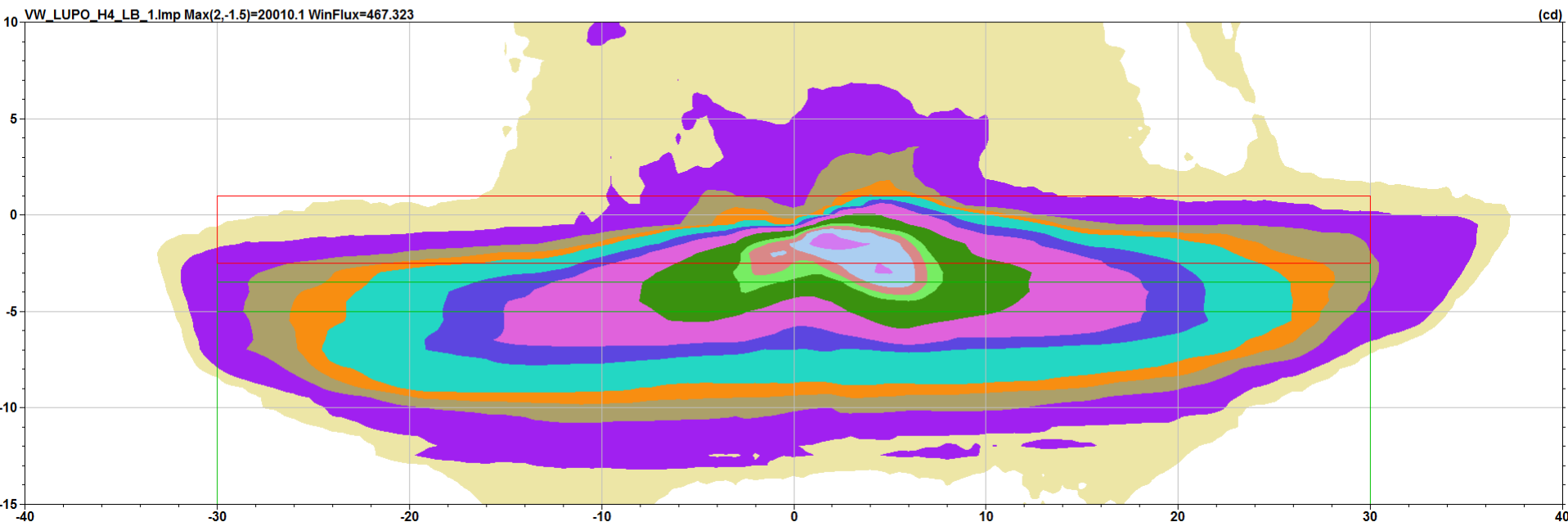
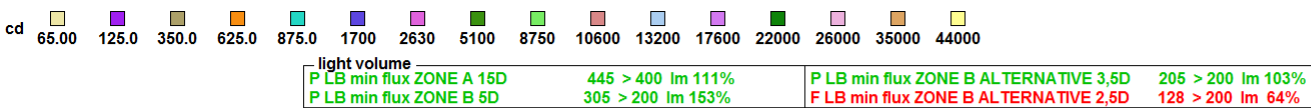
Reflector H4 Headlamp, 155mm diameter :

total luminous flux: 467 lm

Zone A : 445 lm

Zone B : 206 lm

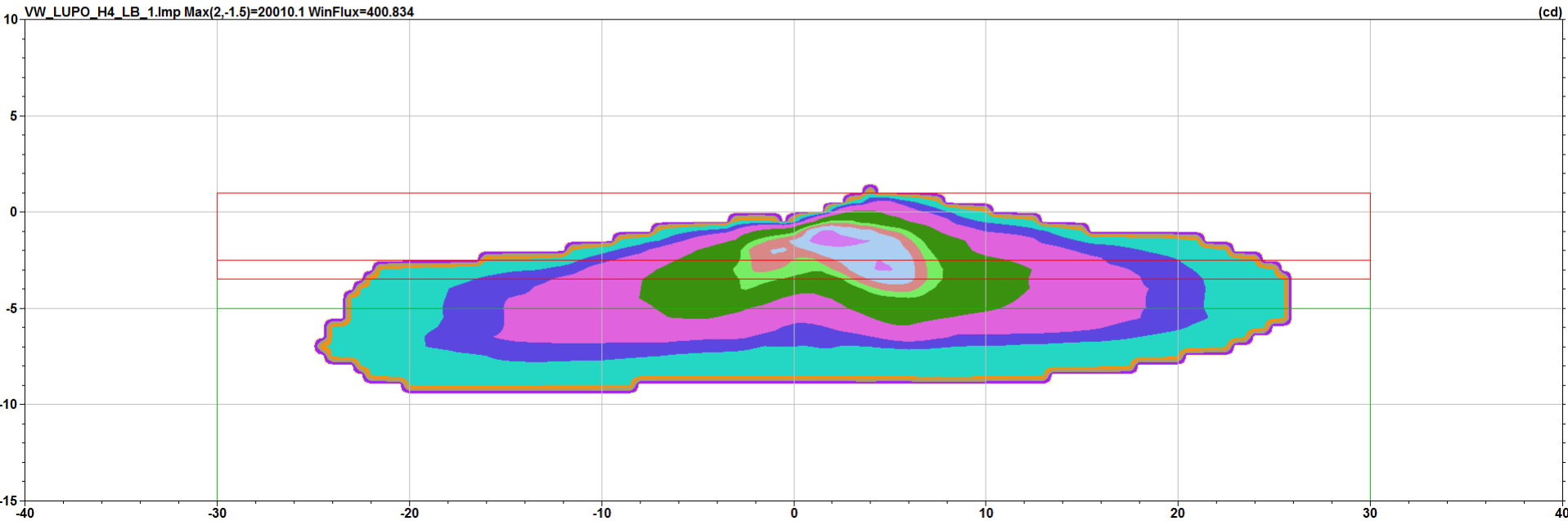
# Reflector Headlamp H4 , 155mm diameter , 467 lm



# Reflector Headlamp H4 , 155mm diameter, 400 lm



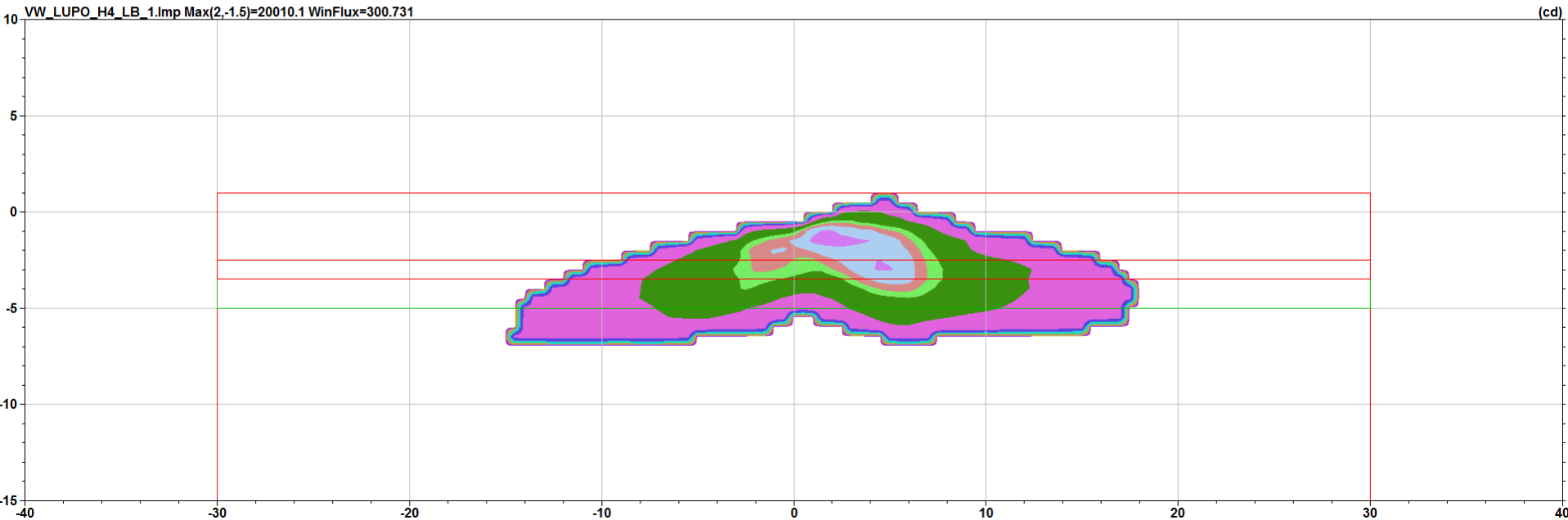
light volume					
P LB min flux ZONE A 15D	401 > 400 lm	100%	F LB min flux ZONE B ALTERNATIVE 3,5D	191 > 200 lm	95%
P LB min flux ZONE B 5D	288 > 200 lm	144%	F LB min flux ZONE B ALTERNATIVE 2,5D	116 > 200 lm	58%



# Reflector Headlamp H4 , 155mm diameter, 300 lm



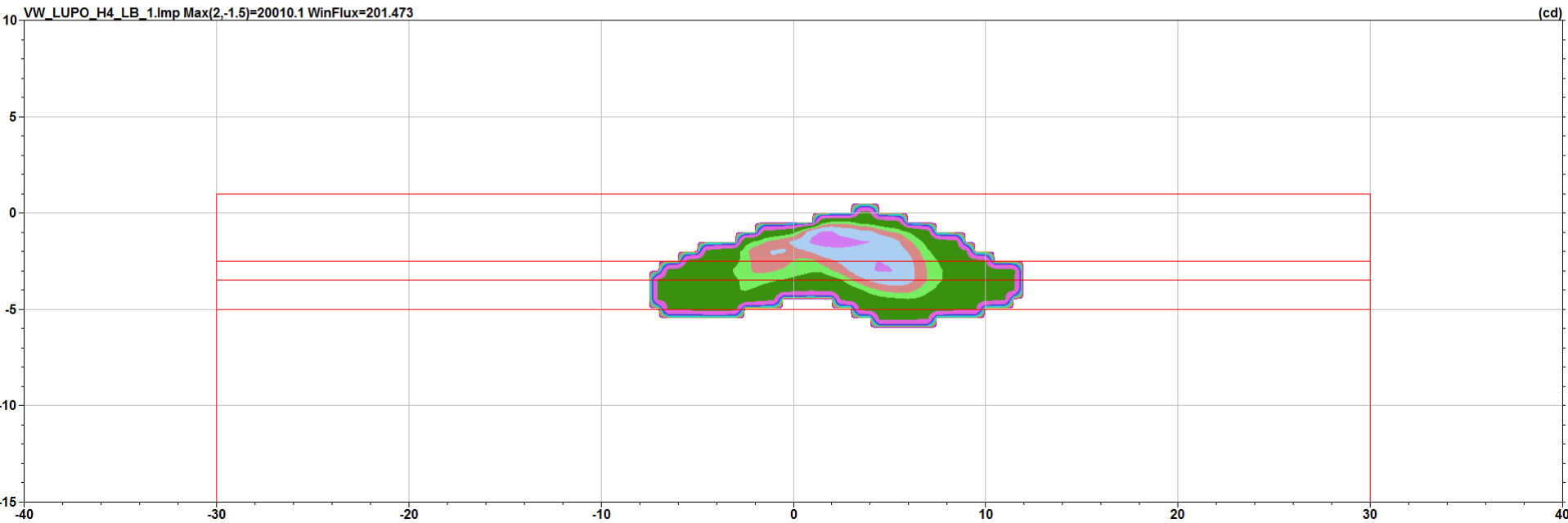
light volume		
F LB min flux ZONE A 15D	301 > 400 lm 75%	F LB min flux ZONE B ALTERNATIVE 3,5D 166 > 200 lm 83%
P LB min flux ZONE B 5D	249 > 200 lm 125%	F LB min flux ZONE B ALTERNATIVE 2,5D 100 > 200 lm 50%



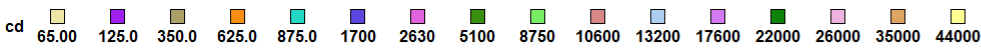
# Reflector Headlamp H4 , 155mm diameter, 200lm



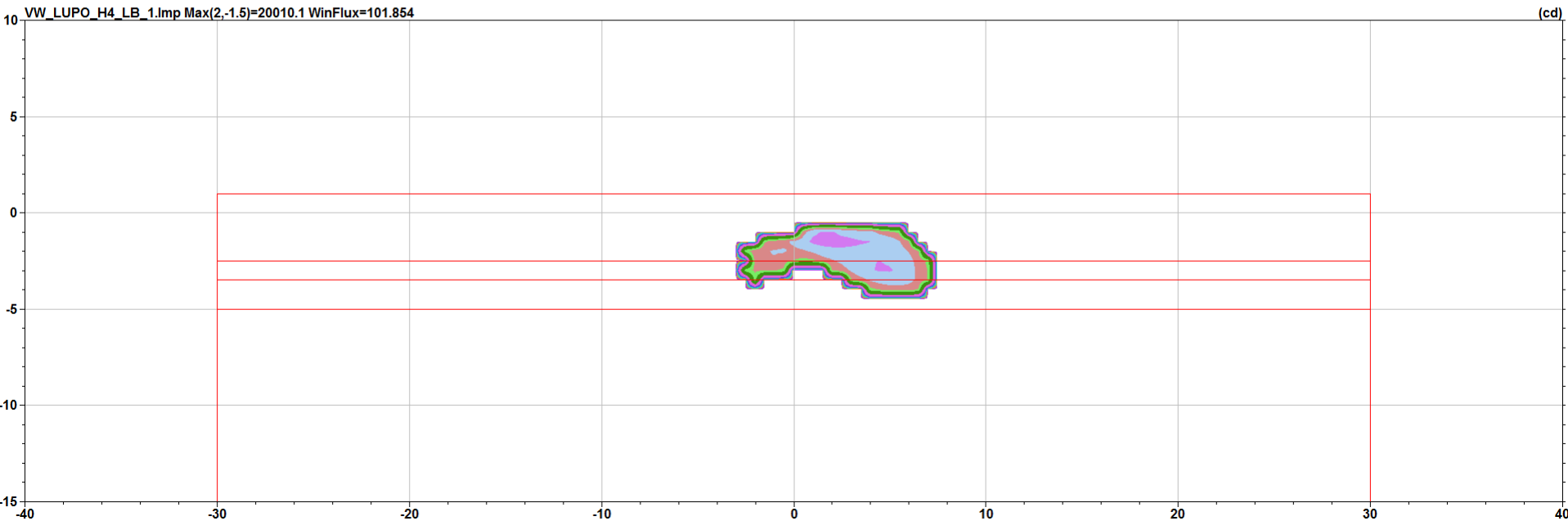
light volume		
F LB min flux ZONE A 15D	201 > 400 lm 50%	F LB min flux ZONE B ALTERNATIVE 3,5D 138 > 200 lm 69%
F LB min flux ZONE B 5D	194 > 200 lm 97%	F LB min flux ZONE B ALTERNATIVE 2,5D 83.4 > 200 lm 42%



# Reflector Headlamp H4 , 155mm diameter, 100lm

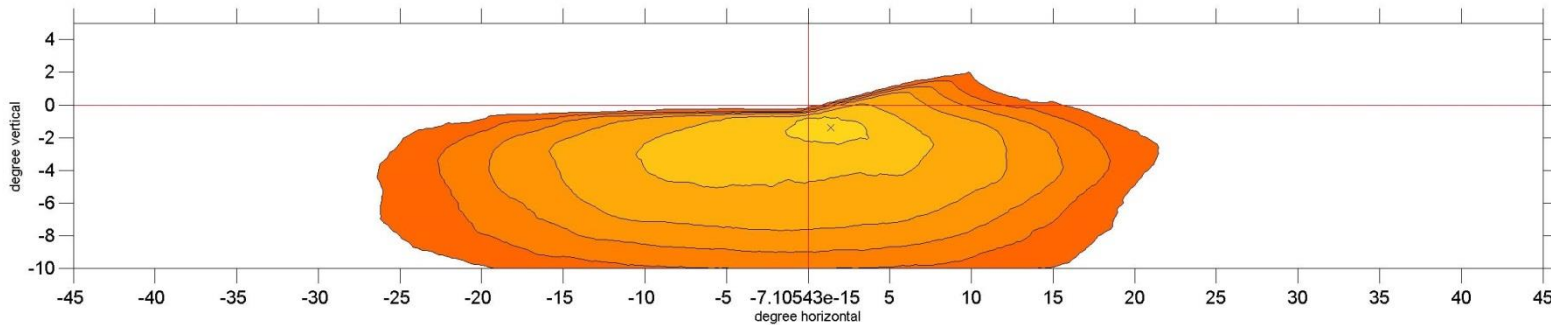


light volume			
F LB min flux ZONE A 15D	102 > 400 lm 25%	F LB min flux ZONE B ALTERNATIVE 3,5D	92 > 200 lm 46%
F LB min flux ZONE B 5D	102 > 200 lm 51%	F LB min flux ZONE B ALTERNATIVE 2,5D	61.3 > 200 lm 31%



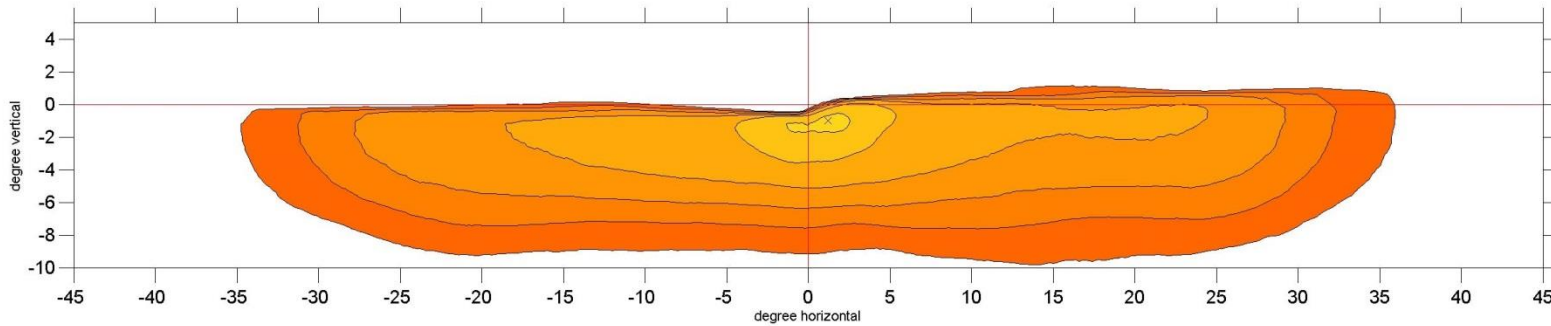
# Comparison: different 400lm light distributions

Typical H4 nearfield focused



# Comparison: different 400lm light distributions

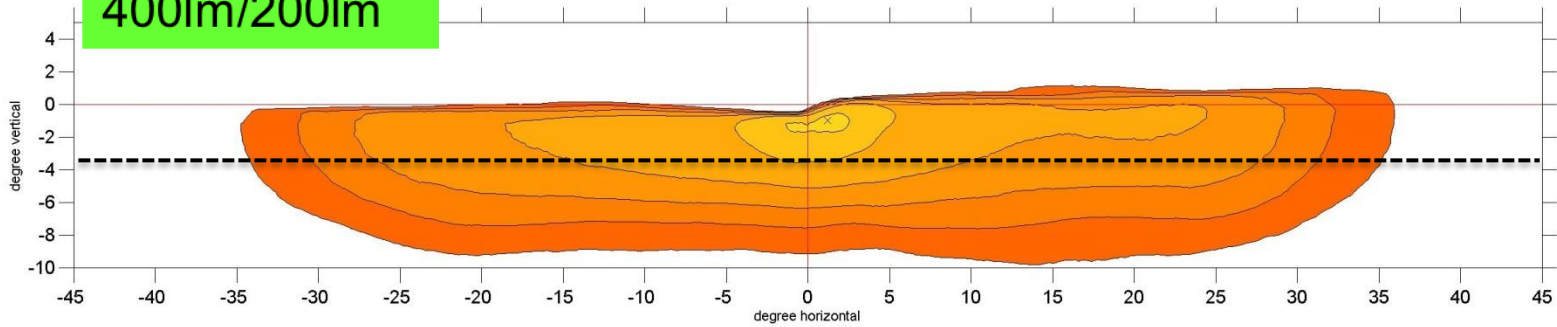
good performing



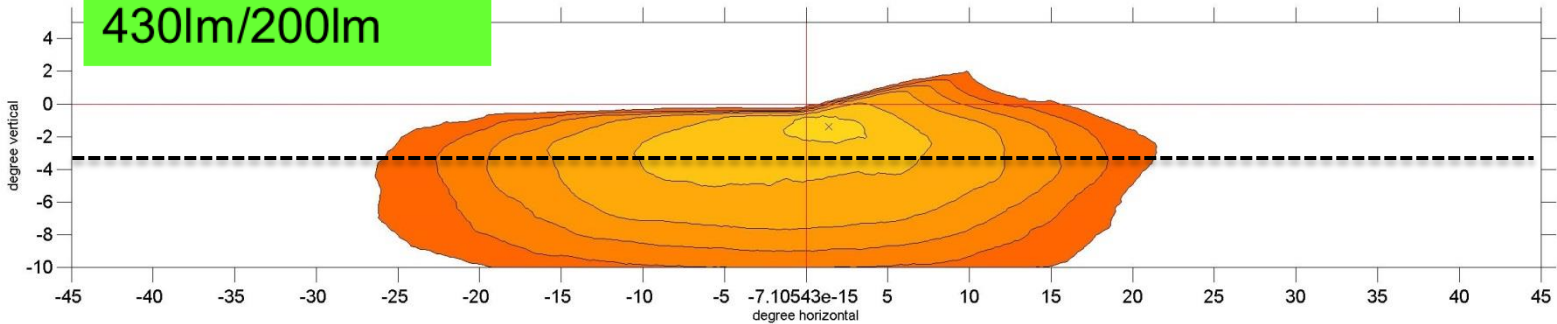


# Comparison: different 400lm light distributions

Well balanced  
400lm/200lm

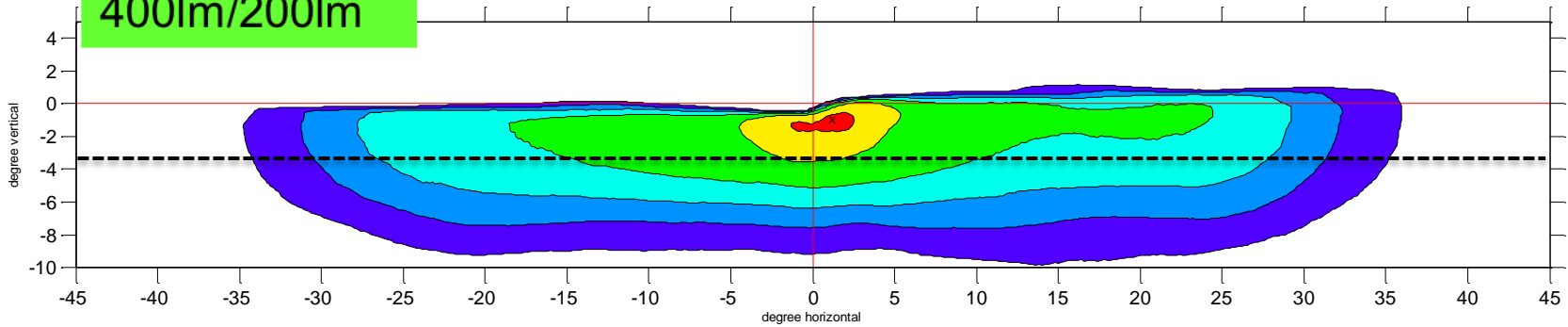


Typical H4  
nearfield focused  
430lm/200lm

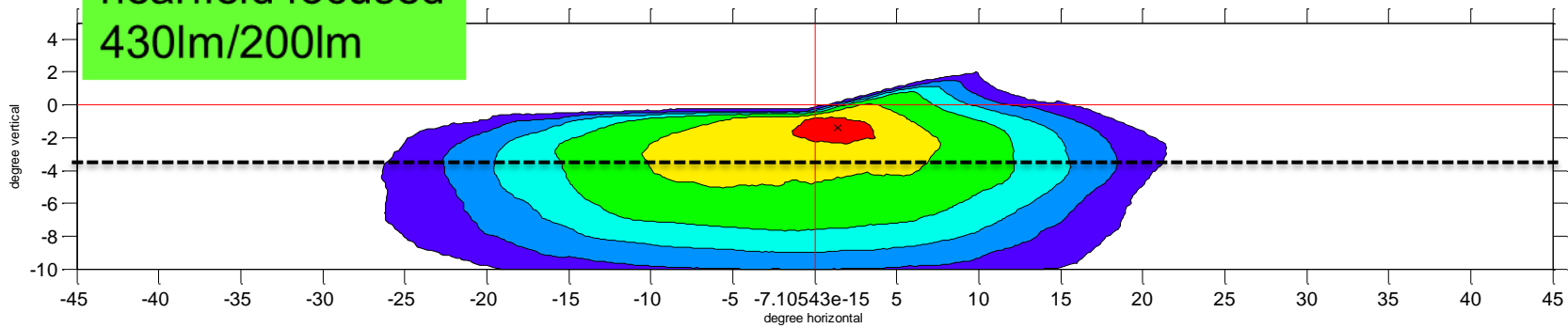


# Comparison: different 400lm light distributions

Well balanced  
400lm/200lm

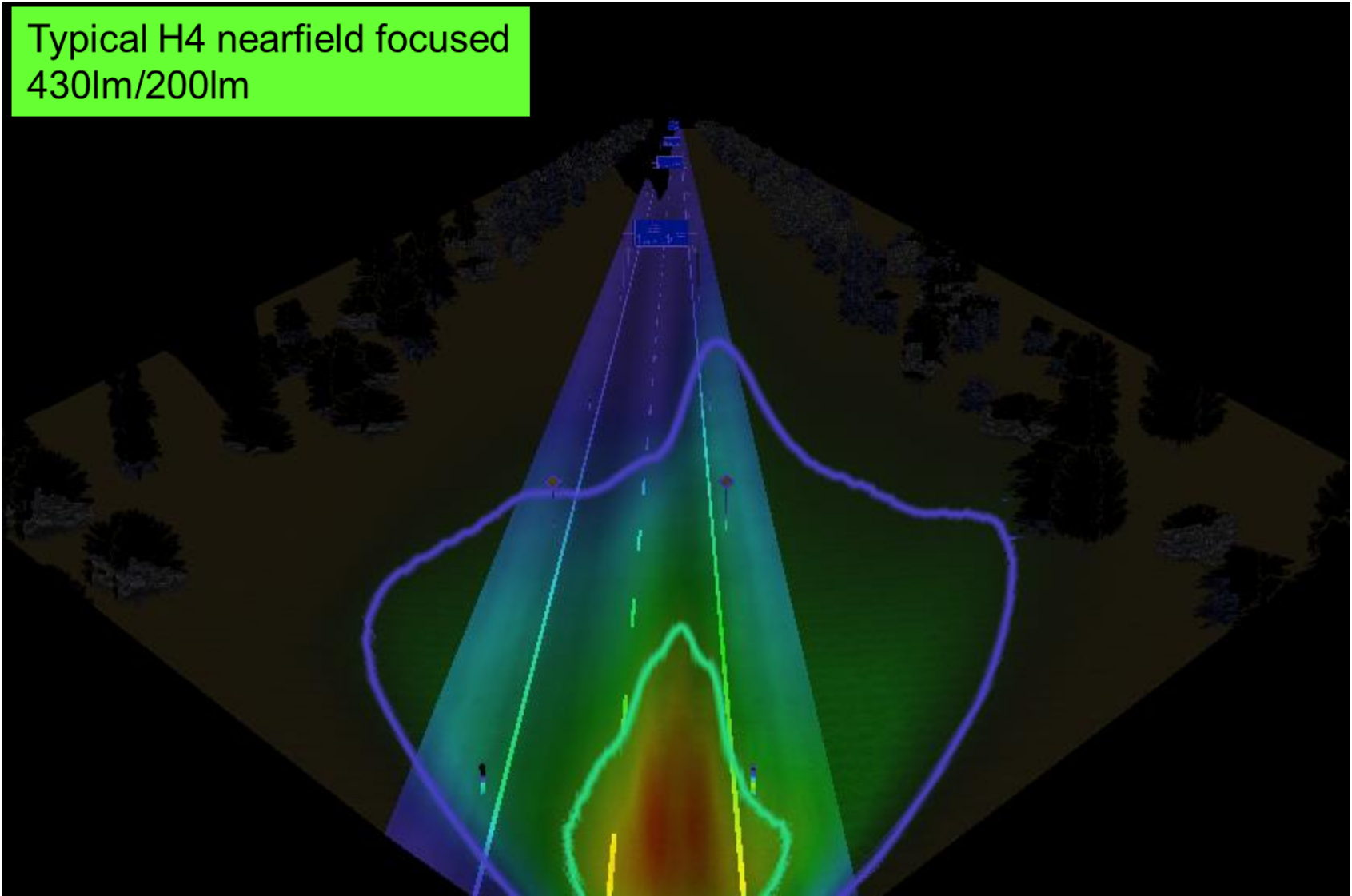


Typical H4  
nearfield focused  
430lm/200lm



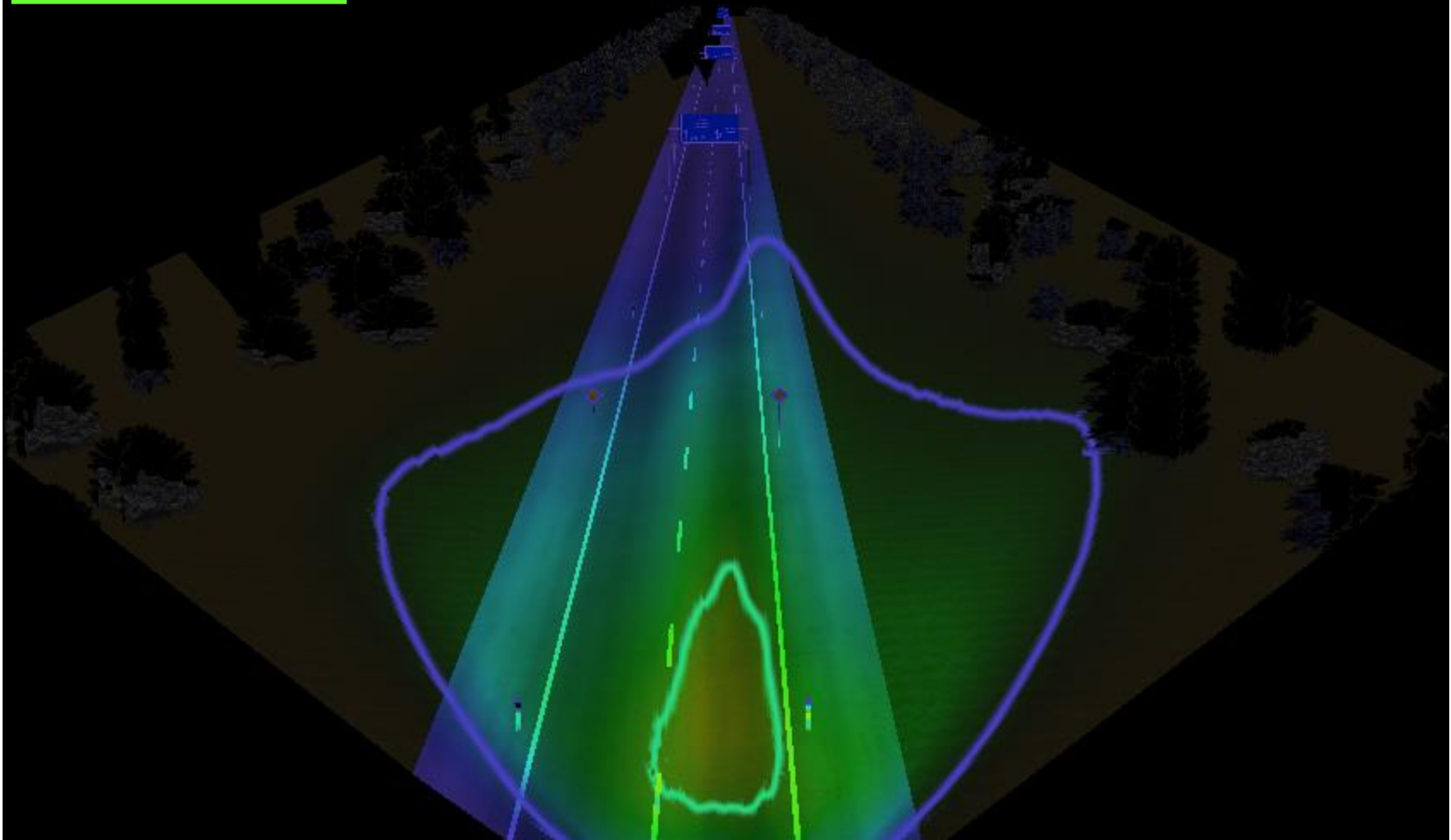
# Comparison: H4 light distributions

Typical H4 nearfield focused  
430lm/200lm



# Comparison: balanced LED light distribution

Well performing  
400lm/200lm



# Comparison: H4 light distributions

Typical H4 nearfield focused  
430lm/200lm





# Comparison: balanced LED light distribution

Well performing  
400lm/200lm



**GTB**

*The International Automotive Lighting  
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*Groupe de Travail "Bruxelles 1952"*

GTB Document No.CE-5360