Fachhochschule Graubünden
University of Applied Sciences

Eye Safety

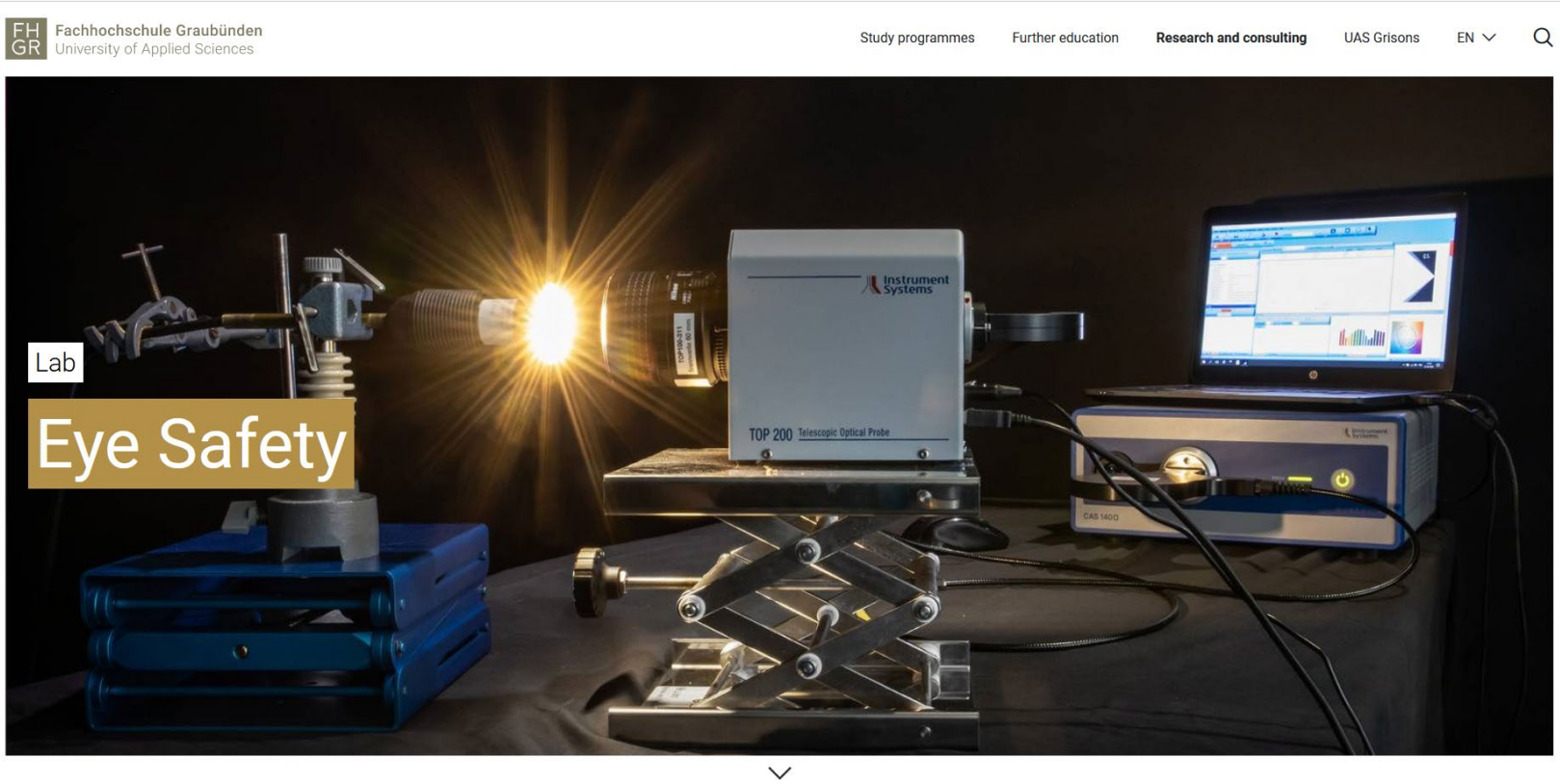
Swissphotonics

8. Oktober 2021 – Ursin Solèr

Bilden und forschen. graubünden

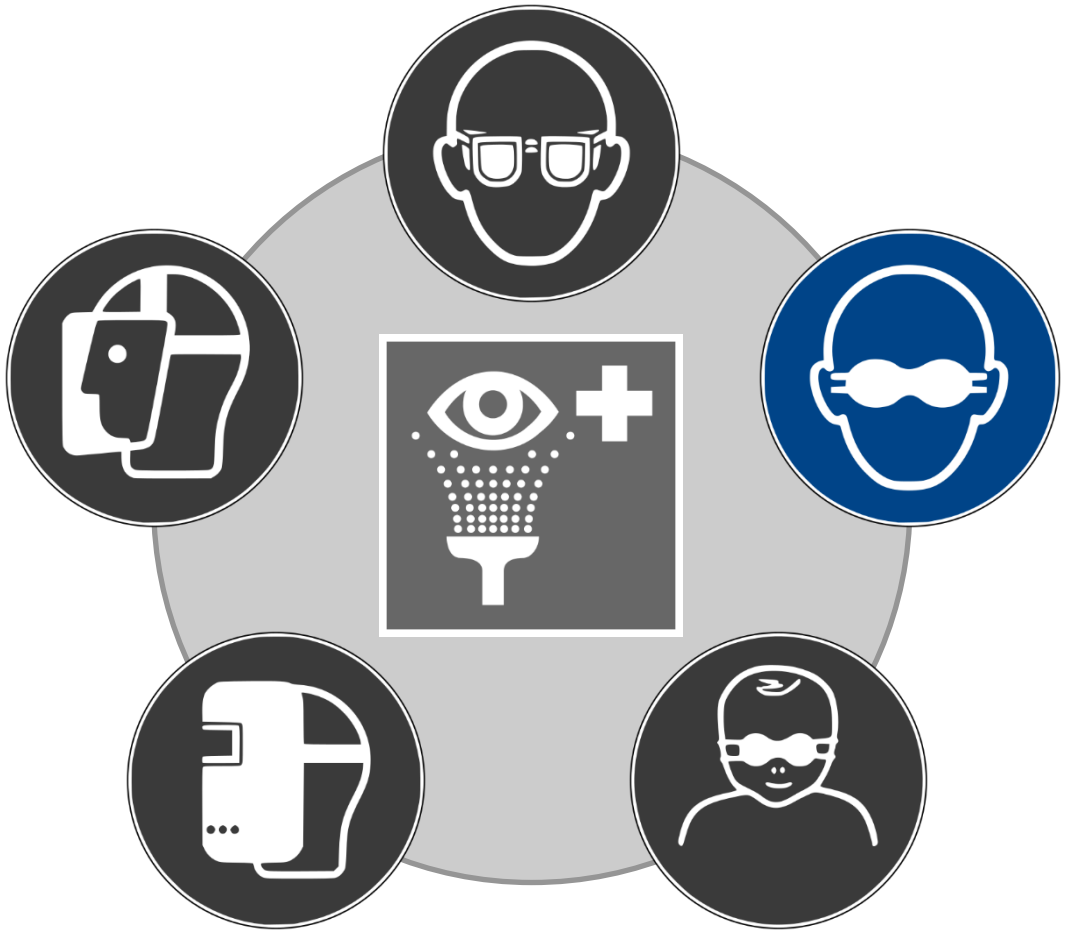
Center of Competence for Opto-Electronics

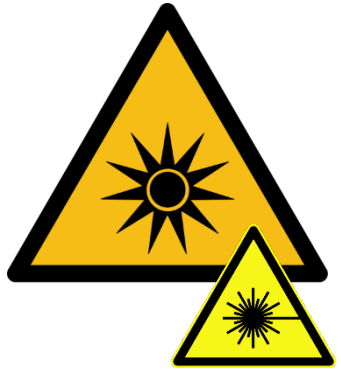
fhgr.ch/eye-safety



Quelle: FHGR webpage & booklet

Center of Competence for Opto-Electronics





optical radiation in the visible and near-infrared range

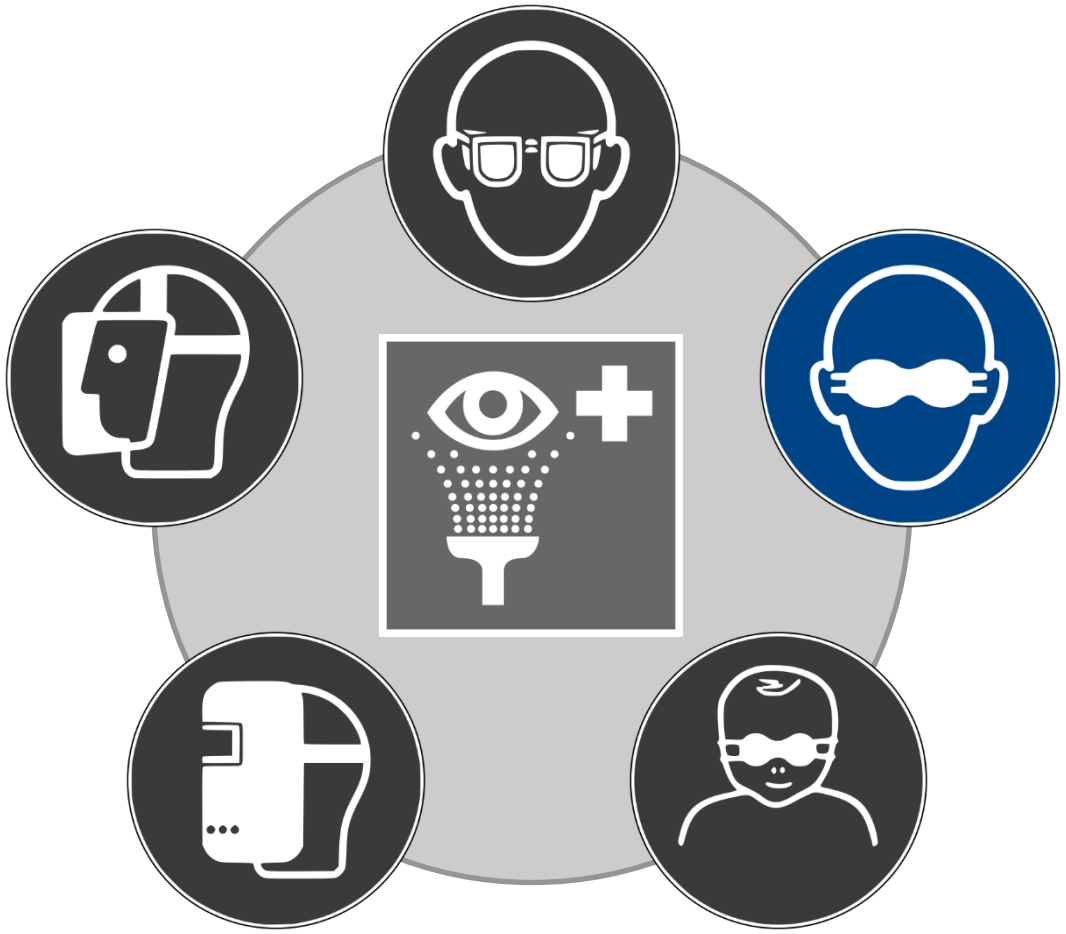
Center of Competence for Opto-Electronics:

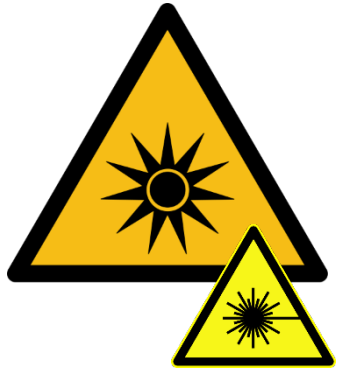
1. Robustness against extraneous light
2. Characterization of optical devices regarding specifications
3. Light sources and eye safety

FH GR

Quelle: DIN EN ISO 7010 / DIN 4844-2 (wikimedia)

Center of Competence for Opto-Electronics





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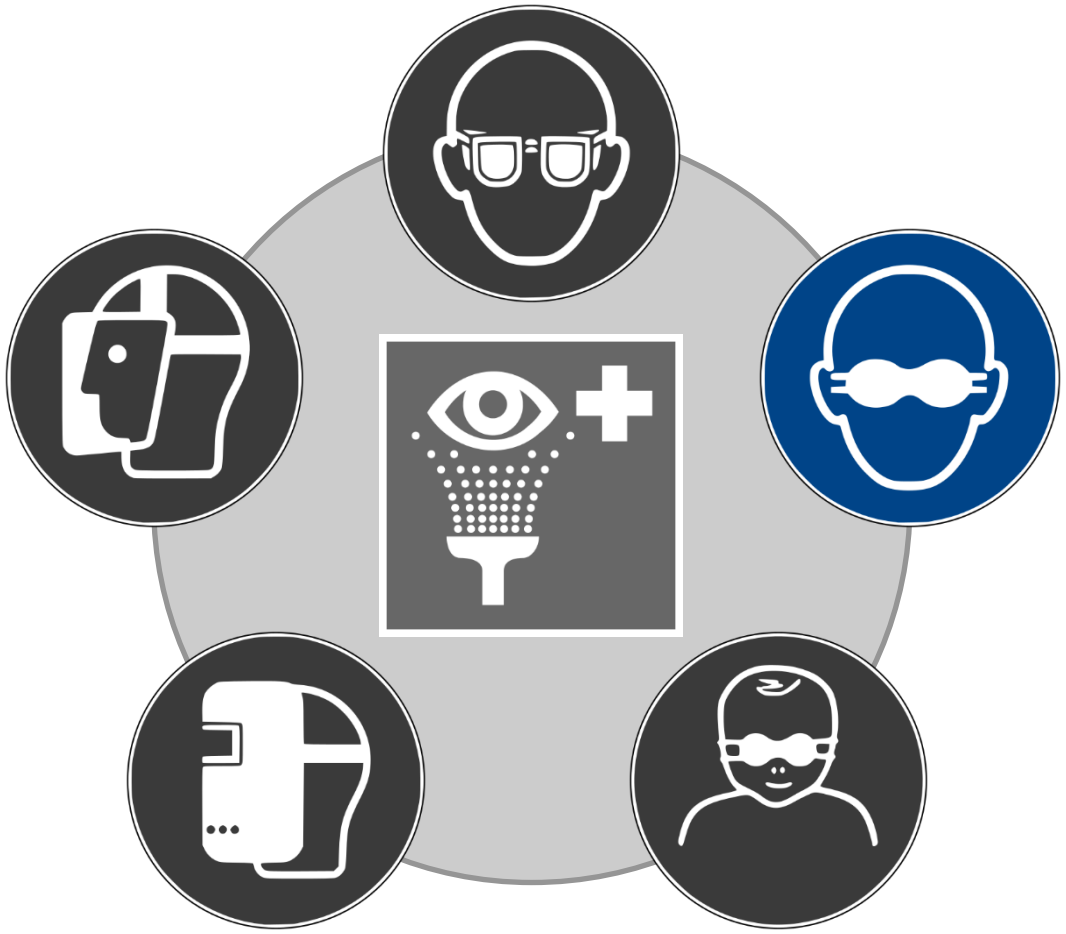

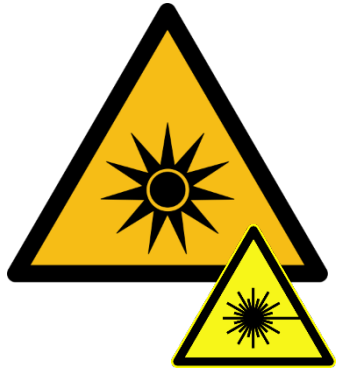

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Problem? – Please ask us any question!

Need to start working with lasers or high intensity sources?

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Need to start working with lasers or high intensity sources?

Need to get CE, TÜV, … certification?

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more to come…

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Need to measure an «exotic» quantity?

FH GR

Problem: start working with lasers or high intensity sources

Need to start working with lasers or high intensity sources?

We can support and advise you regarding laser safety, setting up your lab, product development, measurements, etc.

Problem: start working with lasers or high intensity sources

Need to start working with lasers or high intensity sources?

setup your lab

- know-how
- safety, protection
- equipment
- experiments

product development

- standards
- simulation, modelling (Zemax, python)
- design, construction
- classification (according standards)

measurements

- according standards
- temporal
- spatial / geometry
- spectral

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Problem: compliance with standards

We can help you figure out what standards apply and what the implications to your product are

Need to verify compliance with standards?

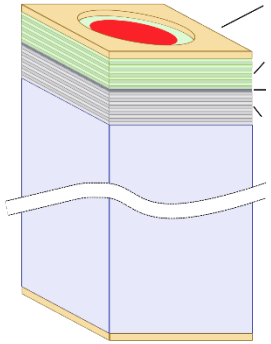
Problem: compliance with standards

ToF camera

LED

DIN Norm EN 62471
«Photobiological safety of lamps and lamp systems»

eye-safe = group 1 / low risk



VCSEL

DIN Norm EN 60825
«Safety of laser products»

eye-safe = laser class 1

Need to verify compliance with standards?

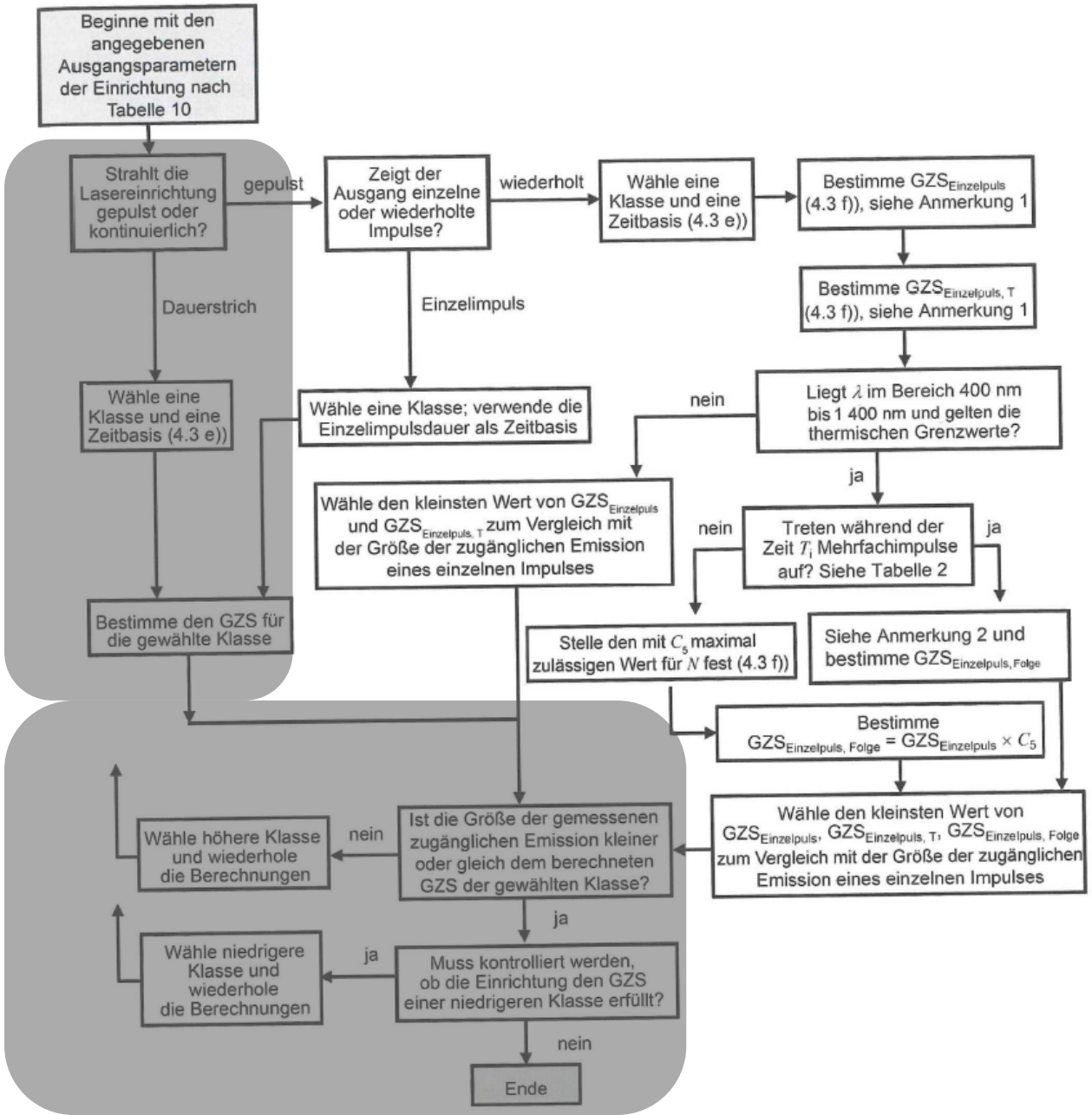
FH GR

Problem: compliance with standards – DIN Norm EN 60825

most simple but also most strict assessment

continously emitting point source

Need to verify compliance with standards?

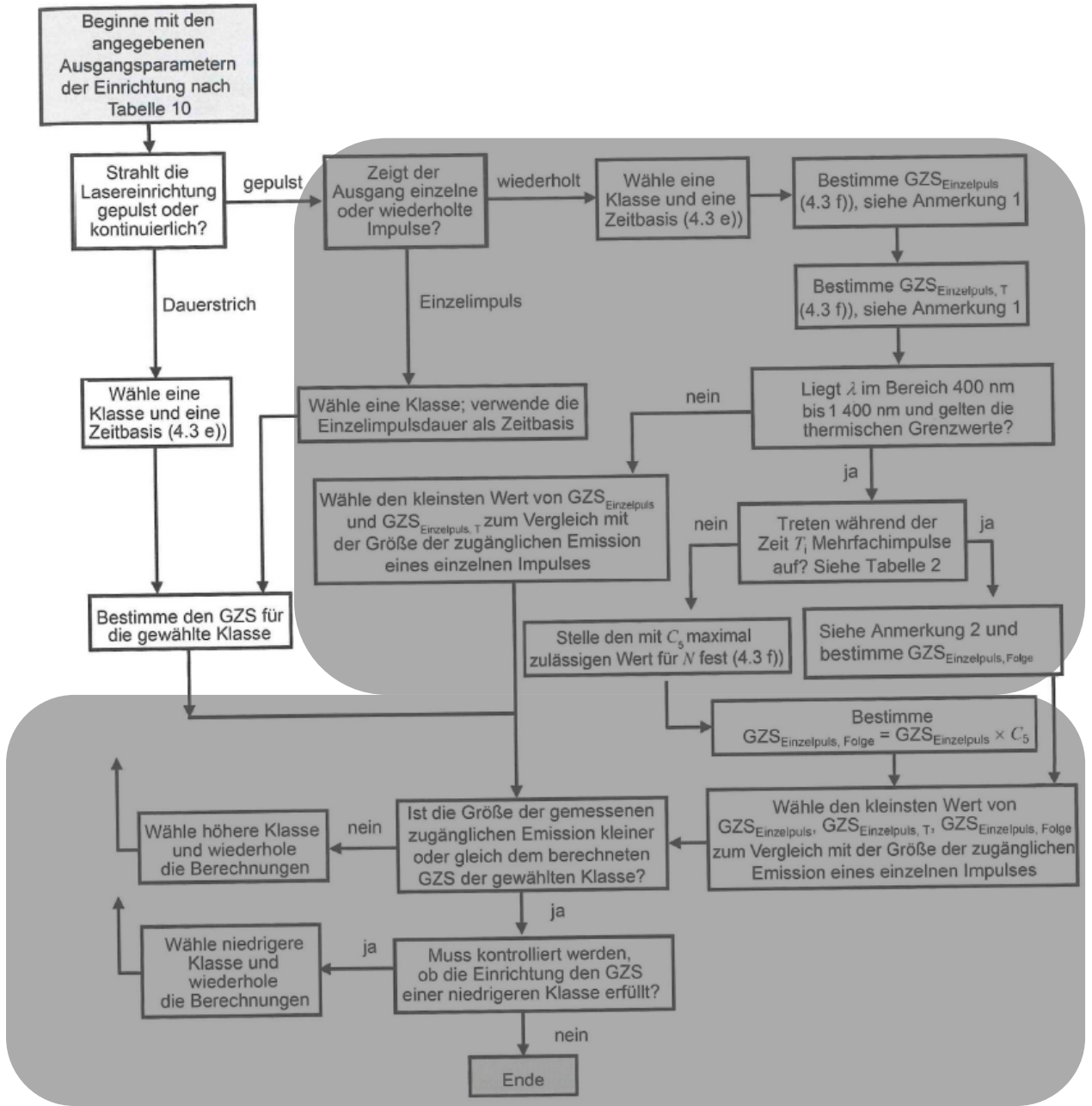


Problem: compliance with standards – DIN Norm EN 60825

complex assessment that allows to apply higher power

depending on temporal and spatial (geometry) distribution

Need to verify compliance with standards?



Problem: compliance with standards – ToF & VCSEL – DIN Norm EN 60825

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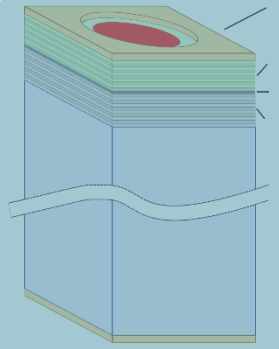

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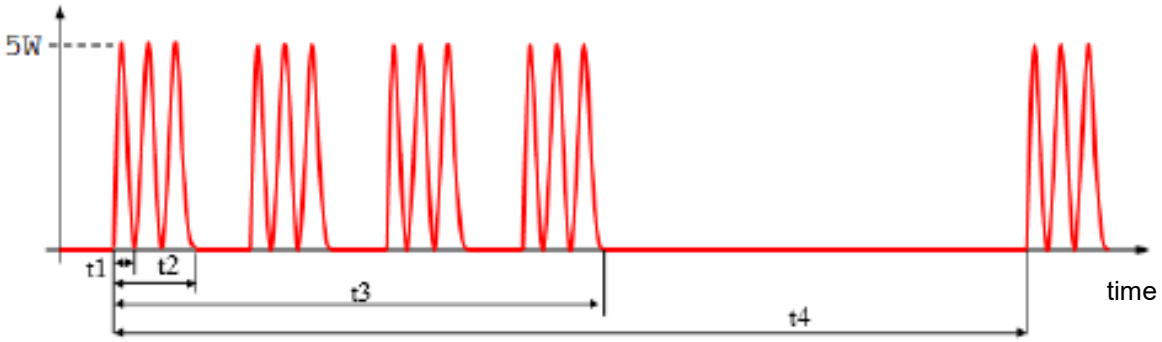
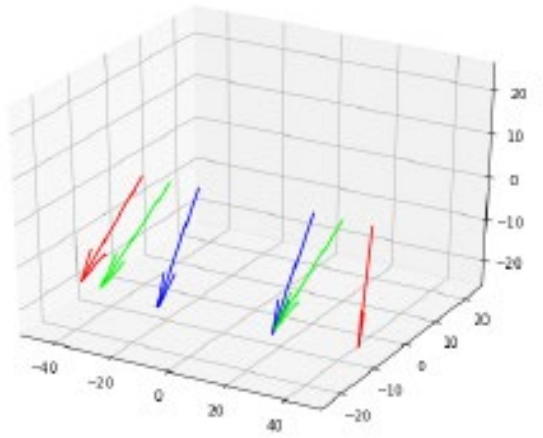
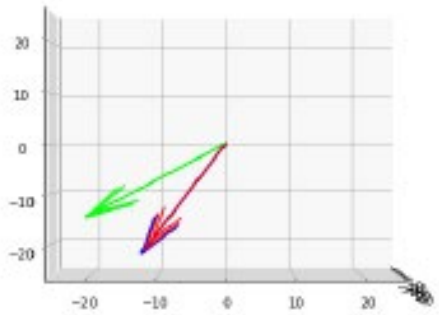
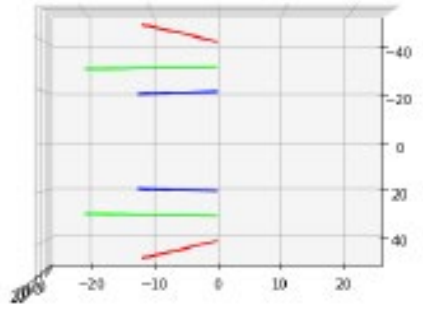
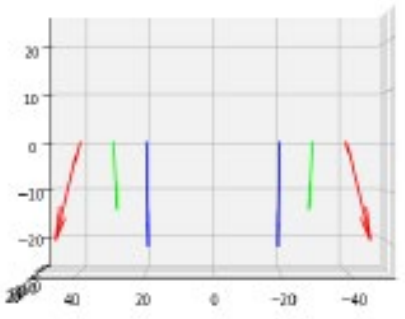






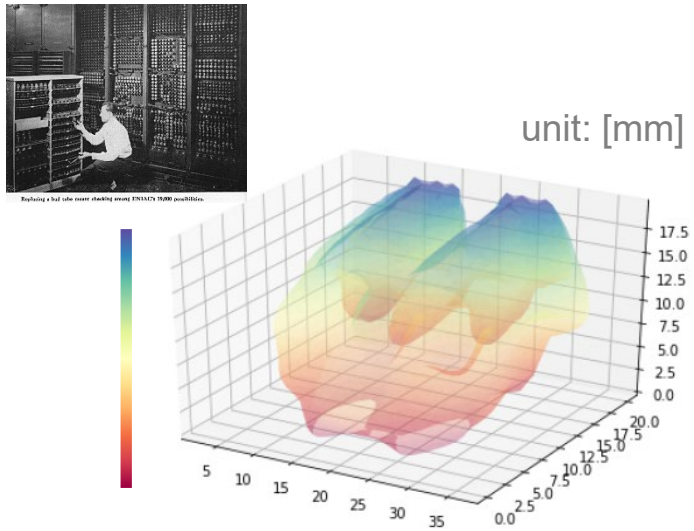




Need to verify compliance with standards?

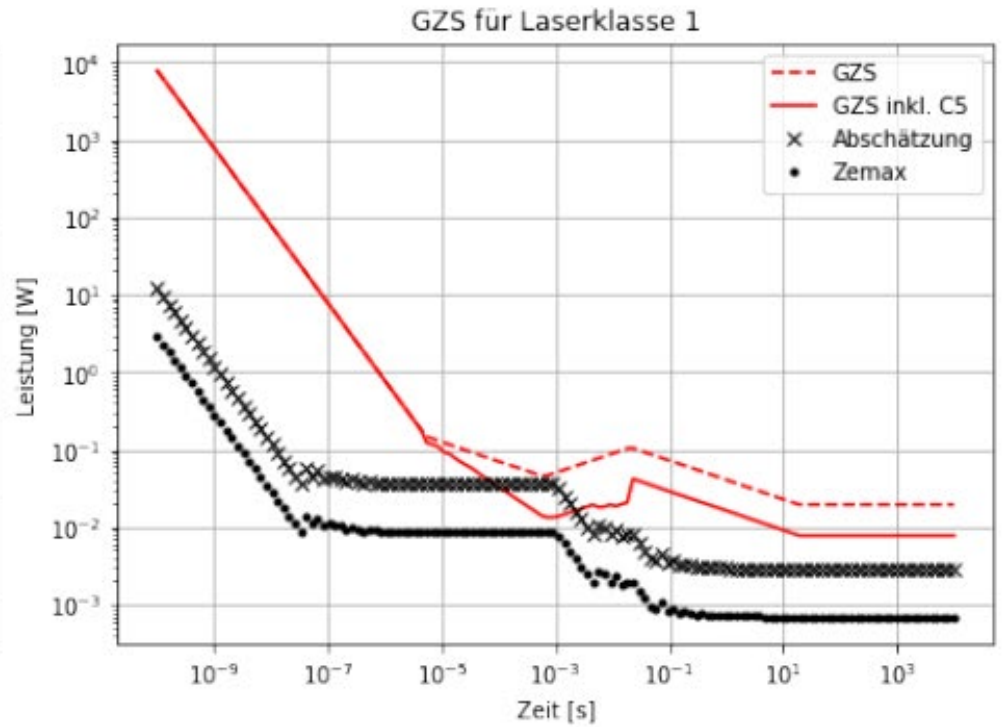
unit: [mm]

Problem: compliance with standards – ToF & VCSEL – DIN Norm EN 60825



Modell and Simulation

Power



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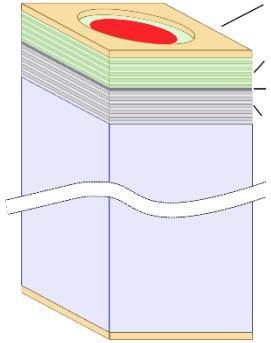

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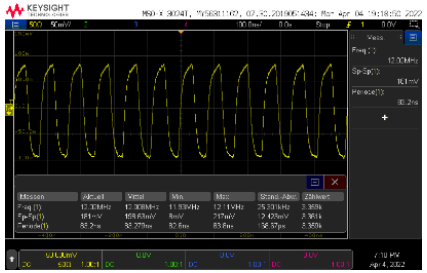
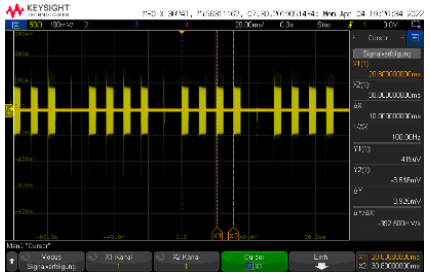
Timing

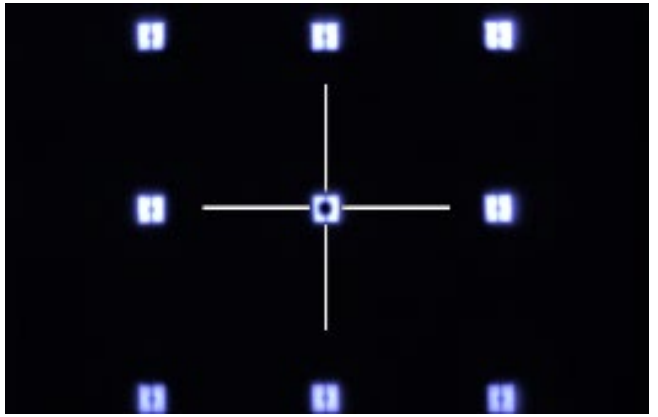




Illumination Geometry

Irrandiance (+Spectrum)

Radiance (+Spectrum)



Problem: get CE, TÜV, … certification

Need to get CE, TÜV, … certification?

We can do measurement and classification according to the standards

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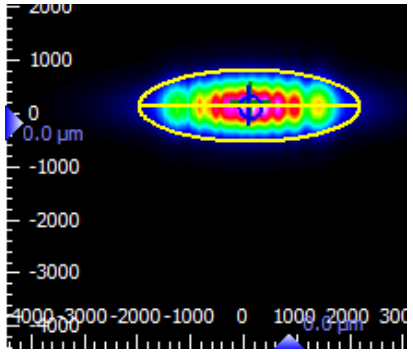
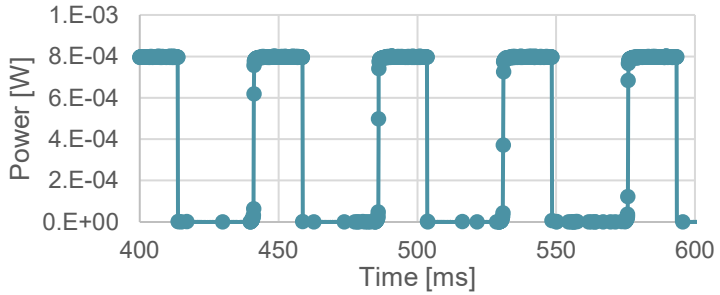
Illumination Geometry



Timing, Power and Energy



Need to get CE, TÜV, … certification?

please note:

FHGR eye safety lab is currently **not** accredited.

However we can do the same measurements beforehand.

Problem: measure an «exotic» quantity

We have various measurement devices and setups to measure and calculate important quantities

Need to measure an «exotic» quantity?

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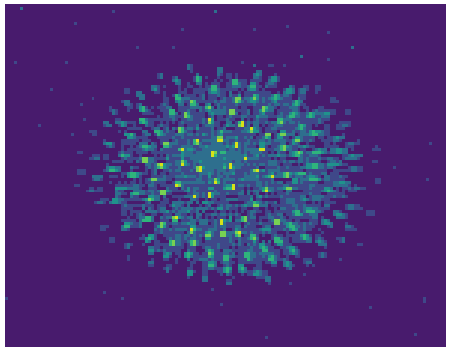
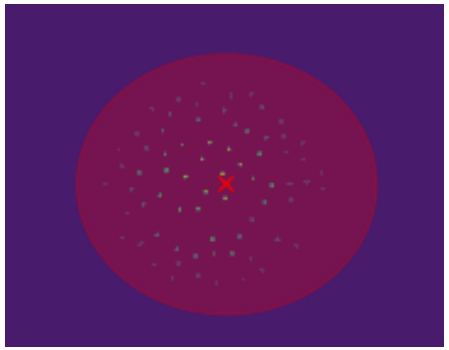
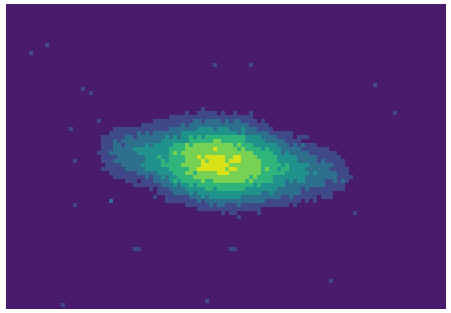
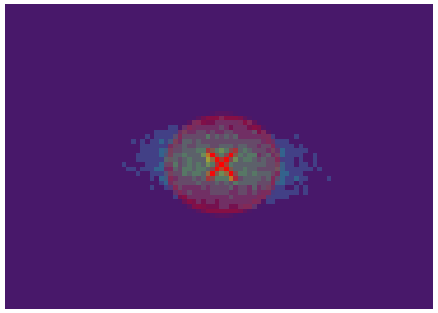
Problem: measure an «exotic» quantity

Power (spatial)









Need to measure an «exotic» quantity?

Summary

Help to get you started:
- know-how
- safety, protection
- equipment
- experiments

Measure the Emissions:
- according standards
- time dependent
- position dependent
- wavelenght dependent
- more (blue light, T/R, color, …)

more to come…

Support your development:
- model/Sim.: selction of parts
- design: optimize usage
- classification: verify results

Consultation on any question:
- don’t bother just call and ask
- we help you to solve the problem and proceed

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Questions?

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Pulvermühlestrasse 57
7000 Chur
T +41 81 286 24 24
info@fhgr.ch

Take-Home-Message:

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don’t bother just call and ask!

Vielen Dank für Ihre Aufmerksamkeit.
Grazia fitg per l'attenziun.
Grazie per l'attenzione.

Fachhochschule Graubünden
Scola auta spezialisada dal Grischun
Scuola universitaria professionale dei Grigioni
University of Applied Sciences of the Grisons

swissuniversities

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