GROUP: NAME :

Sources

1. Source size measurement

Show for each source an image in the 4f configuration (**3 images** similar to Fig. 20). Give the approximate dimension in pixel on the detector and in mm in the object space (image space/magnification=1). Make an error estimation. Find the datasheet value and comment.

Picture 1 – Halogen	Picture 2 - LED	Picture 3 - Laser
		

Source	Measured size (4f) pixel	Measured size (4f) mm	Error	Datasheet value
Halogen				
LASER				
LED				

Comments:

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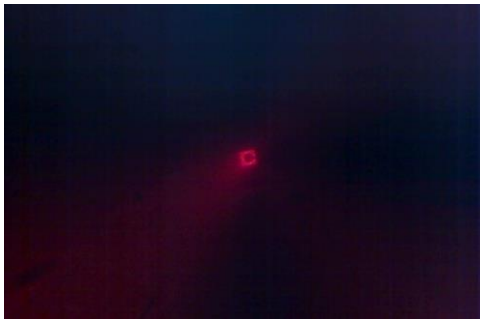
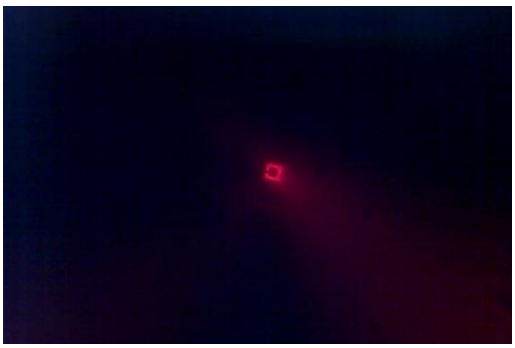
2. Light distribution for different image sizes with LED

Show an image for each of the two different measurement conditions: with double lens and single lens under identical exposure and gain (avoid saturation) **(two images).** Evaluate the integral intensity in the image for both cases and give the ratio. Calculate the theoretical difference between the optical signals and compare with your measurement.

Picture 1 – double lens - infinity configuration	Picture 2 – single lens – 4 f configuration
	

Double lens configuration

Distance camera first lens (red)	25 mm
Distance lens - lens	…..
Distance second lens (blue) source	…..
Distance source camera	….

4 f configuration (single lens)

Distance camera first lens (red)	…..
Distance lens - source	…..

	Single lens	Double lens
Integral intensity		

Intensity ratio measured:

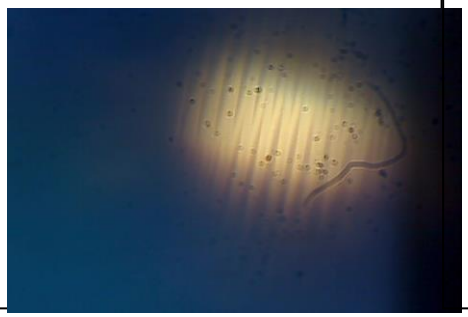
The theoretical intensity ratio is based on the brightness theorem. If the image area is identical (what we assume) only the different solid angles contribute. The theoretical difference is therefore the ratio of solid angles for the infinity (double lens) and 4f (single lens) configuration.

Theoretical value:

Comments:

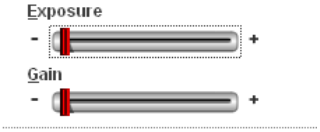
3. Spectral matching

Present an image for each of the two different measurement conditions of the halogen lamp (without and with IR filter) **(two images).** Show the exposure data! Discuss the influence of polarizer, IR filter and source spectra on the result by making **ONE GRAPH** (can be hand drawn) that shows transmission of all components against wavelength!

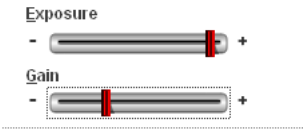
Picture 1 – without IR filter	Picture 2 – with IR filter
	

Exposure data (prints screen or value)

Without IR filter



With IR filter



Graph of spectral behavior of different components

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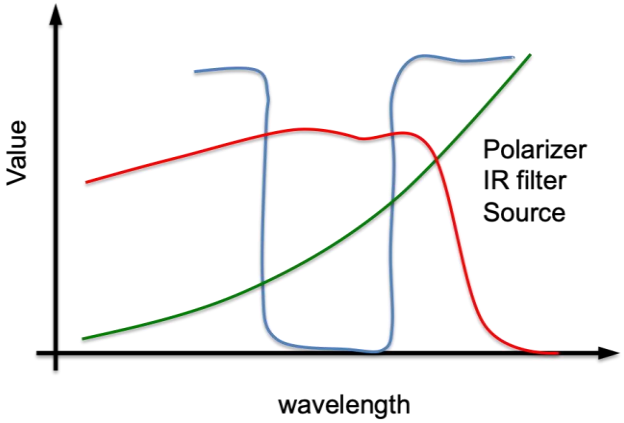

Comments:

4. Web examples

Find an example of a source with particular optical properties and its datasheet. Find in the datasheet its main parameters (working principle, spectral bandwidth, emission area, temporal behavior and, if possible, solid angle of emission and brightness). Make sure to correctly cite your reference. What is special about your source? Add a photo of the source!

EXAMPLE: Osram
Spectroscopic lamps
Spectra: white light with peaks
1A PICO VS1
Hg 100 - 22.0W
Filament size 8 mm – 3 mm
Solid angel 4 π

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(Optional) Personal feedback:

Was the amount of work adequate?

What is difficult to understand?

What did you like about it?

How can we do better?