WinLens¹ short user guide for Lab 5



Lab5.SPD



Lab5_1.SPD



¹ Free software, can be downloaded from the Qioptiq homepage ("Free software Winlens Basic")

1. Basic functions

1.1. System data Editor



- 1. Lens
- 2. Aperture
- 3. Distance between the lens and the aperture (5mm)
- 4. Click to flip a lens
- 5. Drag-and-drop optical components

1.2. System Parameter Editor

<u>1.2.1. "Main"</u>

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- 1. Distance from the object to the first surface (lens or aperture). See 1.2.2 Conjugates on p. 4
- 2. Radius of the aperture (half of the diameter)
- 3. Distance from the optical axis to the object (object height)



1.2.2. "Conjugates"

🚺 System Parameter Editor								
Main Conjugates Aperture Field Waveband Obj/Img								
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OBS! Positions marked with * have to be always checked

OBS! Values in the red box are calculated AUTOMATICALLY (can be used)

- 1. Distance from the object to the 1st surface of the optical system (lens or aperture);
- 2. Distance from the last surface of the optical system to the image (lens or aperture).

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2. Graphs

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2.1. "Lens drawing"

Shows how the optical system looks like



2.2. Seidel Barchart

Shows separate aberrations, for example **<u>Coma</u>**:

- A. Only Coma should be shown;
- B. "Component" shows aberrations for the system [lens + aperture];
- C. TOTal amount of Seidel Coma.

2.3. Spot Diagram

Shows how the image of a point source (punktkälla) will look like.



- A. Make sure to <u>Un</u>check "Symb";
- B. Changes the size of the figures;
- C. On-axis object;
- D. Off-axis object.

2.4. Geometric MTF

Shows Modulation Transfer Function (MTF):



- A. Maximum spatial frequency (Cycles/mm = lines/mm).
- B. On-axis object point.
- C. Off-axis object point.

2.5. Chromatic aberration [longitudinal]



- 1. Maximal wavelength in nanometers
- 2. Equivalent Focal Length (EFL) should be chosen
- 3. Wavelengths in nanometers and their colors on the figure
- 4. Equivalent Focal Length for each wavelength

3. Additional Functions

3.1. "Defocus" slider



Clicking on the arrows will move the image plane from the paraxial focus (Defocus the image):





OBS! The defocus step is usually too small (or too big), so it needs to be adjusted. This is done by clicking on the I----I button of the Defocus slider:

	Slider definition Type of parameter to be adjusted: Y tit Y tit X decenter Y decenter I decenter I decenter I mage space is automatically chosen.	ু বিজ
1	Increment: ±Rang Defocus 0.05 2x ½x Defocus -4,11 nominat: -4,06 Defocus + incr[s]: > -4,01 -1,56	
Defocus Culudefined Sider	QK Reset Cancel	

- A. Change "Increment" to bigger/smaller value.
- B. Press "Enter". The "Range" will change automatically.
- C. Press "OK".

3.2. Change number of object points

A. In the top menu press "Options"-> "Number of Object Points":

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Old System Parameter Editor	Aperture Control	
Main Conjugates Aperture Field Waveband Obj/Img	Number of Object Points	Shift+F4
Object Distance -71,0443	Number of Wavelengths	Shift+F5
Stop Rad 10,0 Show	Number of Rays in Fans Number of Ray Rings	Shift+F6
Object Size Radius 10,0 <u>Z</u> oom	Glass Maker Preferences	
Title	Defocus	Shift+F7
	Colour Scheme	Shift+F8
	Update Now	F9
🚺 System Data Editor		

🚺 WinLens3D Basic: C:\Users\Dmitry\Desktop\Lab5.SPD

B. In the dialog box choose number of object points and press "OK":

🚺 Lens Drawing					
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3.3. Adding more wavelengths (colors)

A. In the top menu press "Options"-> "Number of Wavelengths"

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B. In the dialog box choose number of wavelength and press "OK"

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