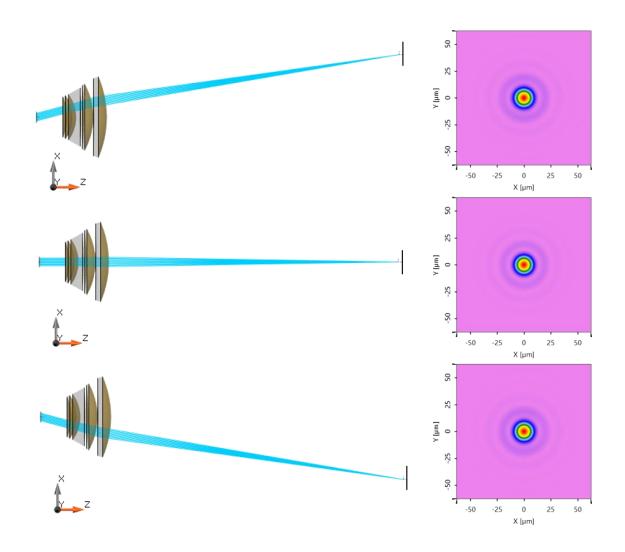


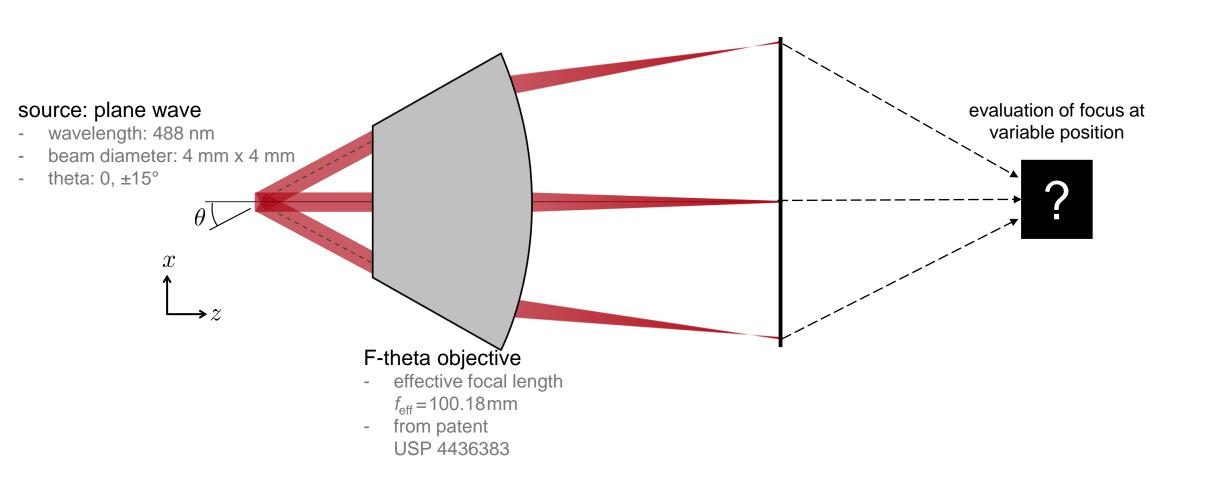
# Automatized Detector Positioning by using Parameter Coupling

#### Abstract



In this example, the focus (PSF) of an Ftheta objective is investigated for certain angles of incidence. In order to avoid the superfluous computational effort introduced by the shift of the resulting foci with off-axis illumination, the detector position is shifted according to the main propagation direction of the light. VirtualLab's Parameter Coupling tool is applied to automatically handle this adjustment of the detector position.

## Modeling Task



## **Automatic Detector Positioning via Parameter Coupling**

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12	• Obj	ect	Catego	ory	Parameter	Use in Snippet	Short Name		
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Parameter Coupling allows the user to define the variation of the desired system parameters through a small script "snippet".

As a result, any change of the value of the independent input parameter will simultaneously result in a change of the dependent (coupled) parameter.

In this example, we couple the lateral position of the desired detector to coincide with the position of chief ray.

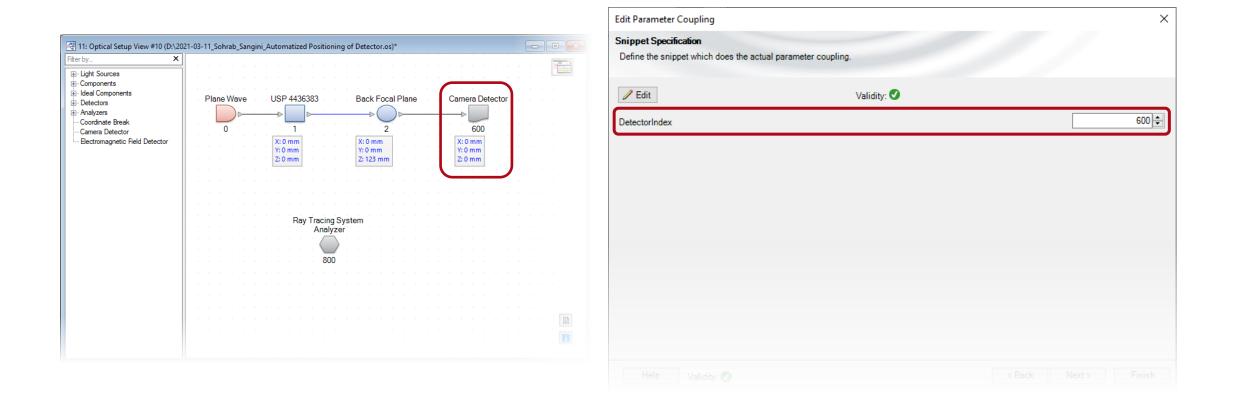
## **Parameter Coupling Procedure**

In order to find the appropriate lateral position of the detector, an additional ray tracing step is performed by the applied Parameter Coupling snippet. This particular snippet can be imported:

Source Code Editor – – X	Open				×
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27 ♀ #region Additional using directives	Name	Date modified	Type Size	e	
28 29 #endregion	Quick access 2021-01-27 Detector Position 2021-01-27 Detector Position	on via PC.snp 11/03/2021 11:39	SNP File	5 KB	
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38 🗊 /***********************************					
39 ********** INSERT YOUR CODE HERE *********************************					
41					
42 /* begin of sample code (can be removed) 43					
44 // Access the current value of any parameter in					
<pre>45 double inputValue = Parameters["Variable1"]; 46</pre>	File name: 2021-01-27 Detector Positio	n via DC ann		Snippet Files (*.snp)	
47 // Add a coupled parameter to the return value.	The numer 2021-01-27 Detector Position	in via retsip	ĭ		Cancel
48 returnValue.Add("Variable2", 2 * inputValue);	Select Snippet Parts to Import	– 🗆 X	L	Open C	.ancei
Check Consistency Validity: 🚹 🚺 OK Cancel Help					
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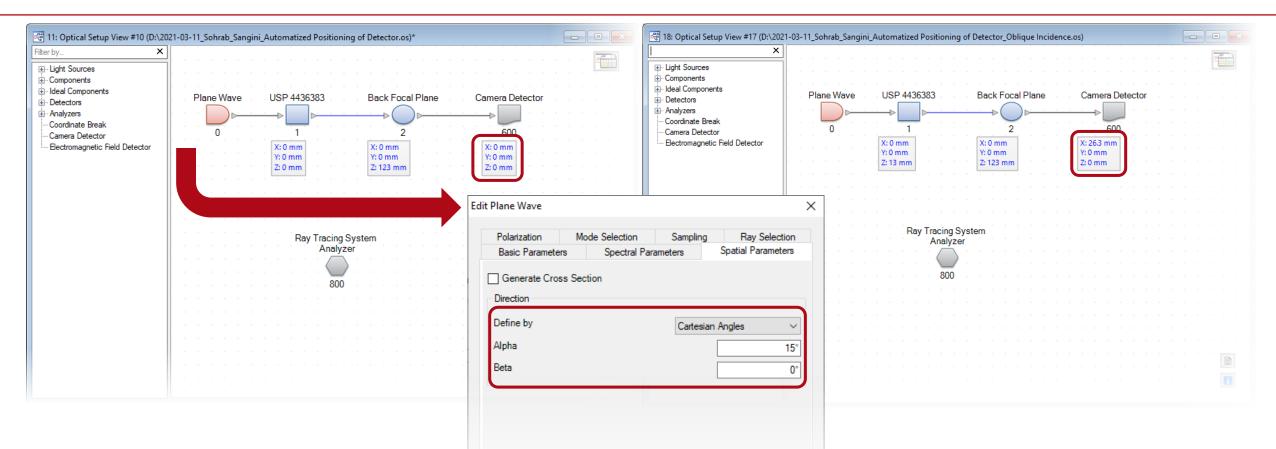
import snippet

## **Detector Index Selection**



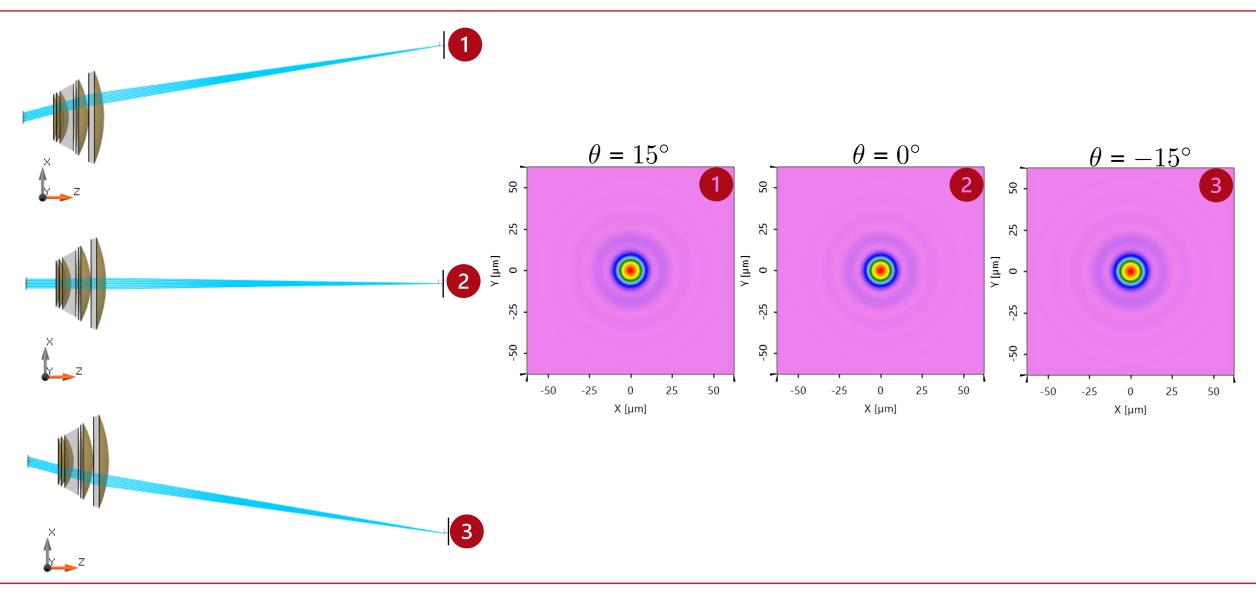
The unique index of the detector has to be specified in the specification tab of the snippet.

## **Oblique Incidence**



Now, if the direction of propagation of the plane-wave source is modified, the position of the detector is automatically adapted. In this example, an angle of 15° will lead to a shift of 26.3 mm in x direction.

#### **Performance Evaluation – Oblique Incidence**

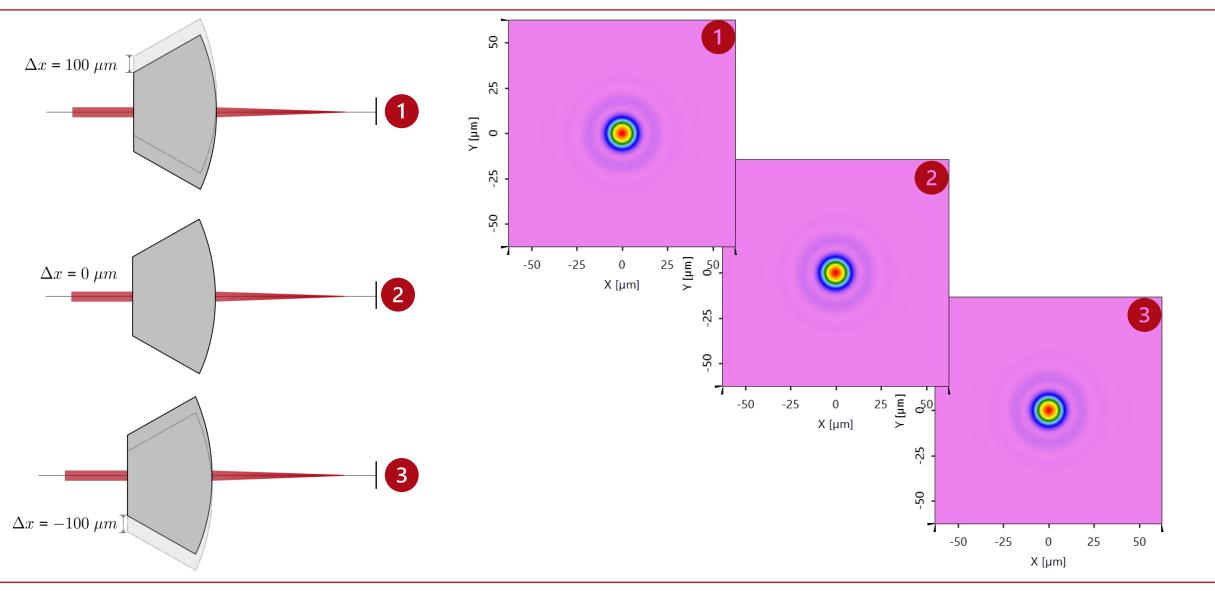


## **On- & Off-Axis Illumination**

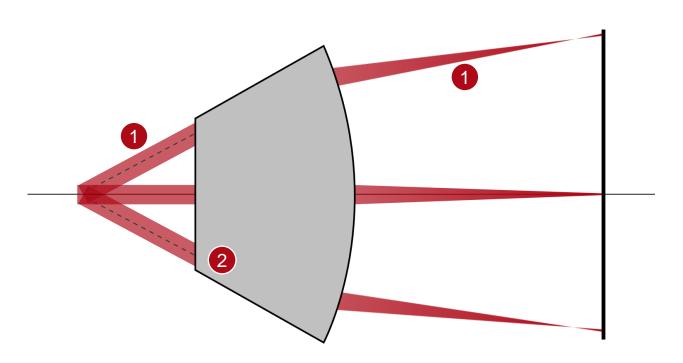
11: Optical Setup View #10 (D:\20) Filter byX      Uight Sources     Components     Detectors     Analyzers     Coordinate Break     Camera Detector     Detector	Plane Wave USP 4436383 Back Focal Plane 0 1 2 X: 0 mm Z: 0 mm Z: 0 mm	Camera Det		S: Optical Setup View #4 (D:\2021         Filter byX         Image: Set of the set of	-03-11_Sohrab_Sangin	LUSP 4436383 1 2 X:100 µm Y:0 mm Z:13 mm Z:123 mm	Camera Detector	
	Ray Tracing System Analyzer 800	Edit Lens System Con Coordinate Systems Position / Orientation	Basal Positioning Isolated Positioning F Position and Orientation Use Isolated Translation	Jse Isolated Orientation	× Axes	Ray Tracing System Analyzer 600		

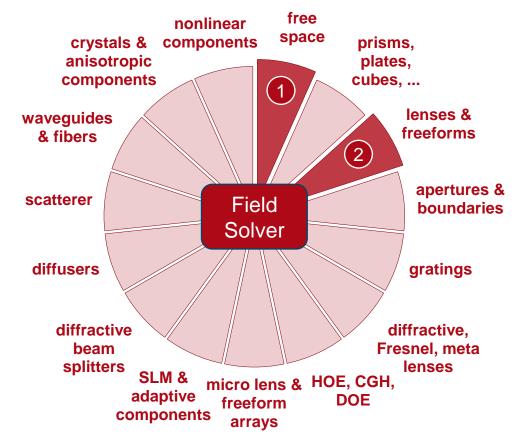
In the case of off-axis illumination, the position of the detector is also automatically adapted. In this example, a shift of  $100 \,\mu$ m is automatically considered by the Parameter Coupling.

## **Performance Evaluation – Off-Axis Illumination**



### **VirtualLab Fusion Technologies**





title	Automatized Detector Positioning by using Parameter Coupling					
document code	SWF.0039					
document version	1.1					
software version	2023.1 (Build 1.556)					
software edition	edition VirtualLab Fusion Basic					
category	Feature Use Case					
further reading	<ul> <li><u>Performance Analysis of Laser Scanning System</u></li> <li><u>Coupling of Parameters in VirtualLab Fusion</u></li> </ul>					