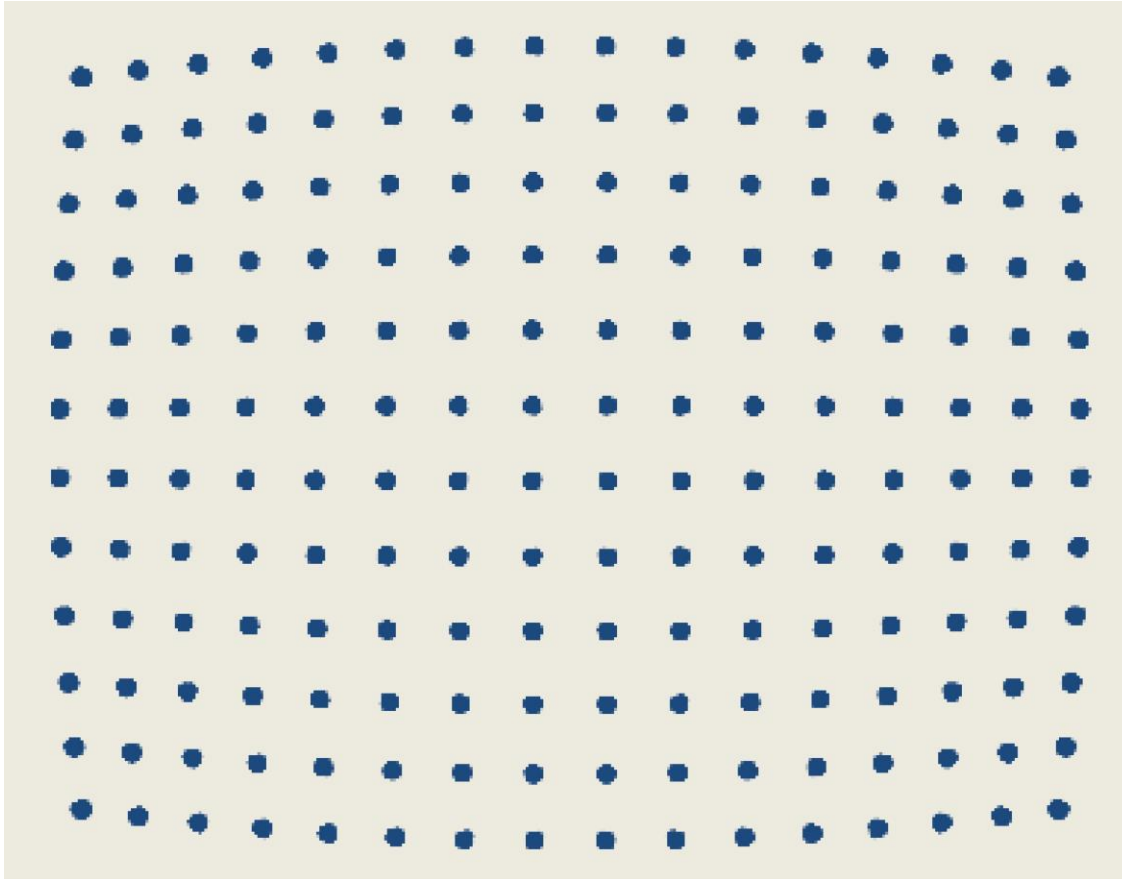


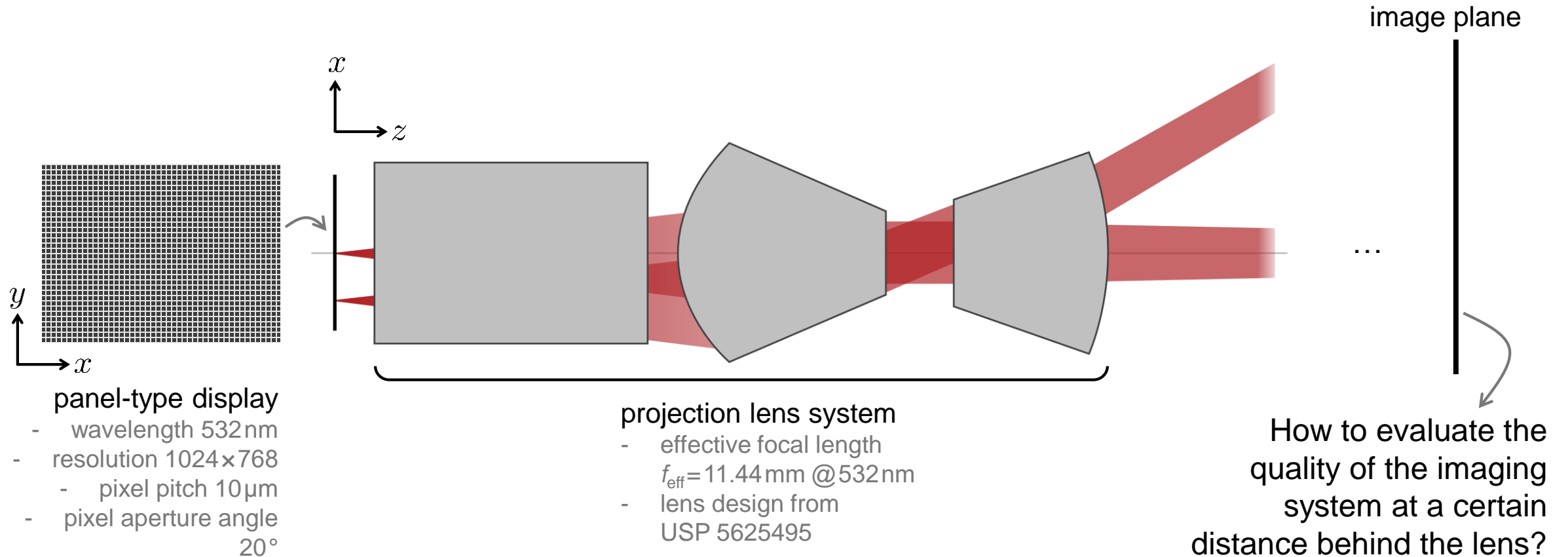
Modeling of An Image Projection System Based on Panel-Type Display

Abstract

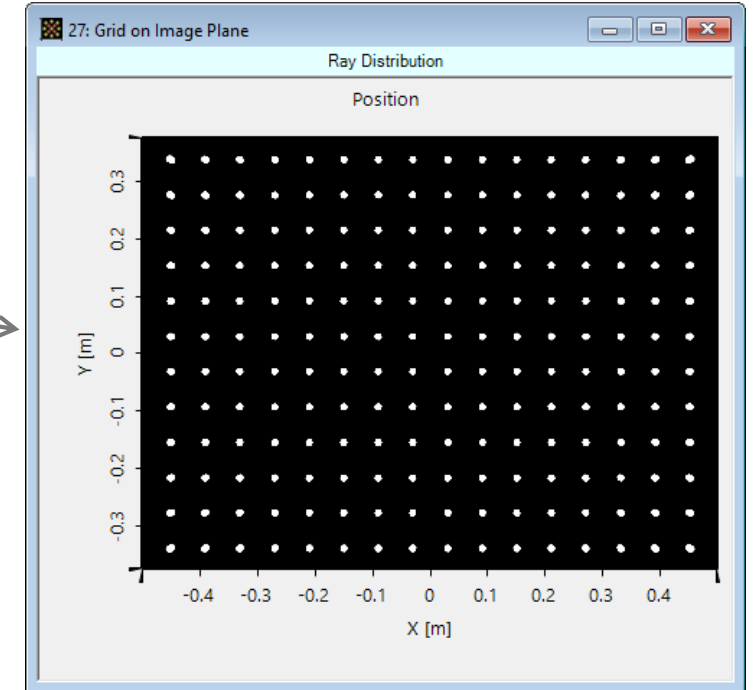
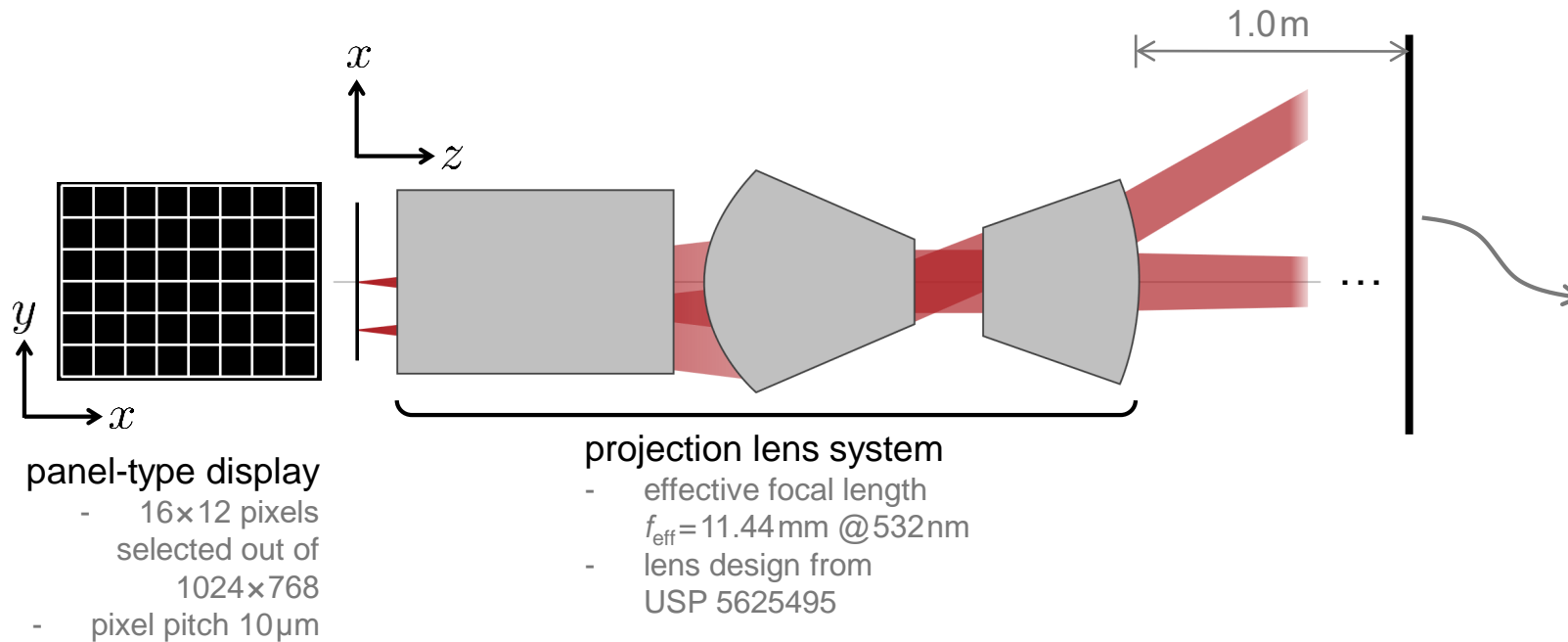


The modern display devices, e.g., liquid crystal display (LCD), are often used as the source for an imaging or projection system. Such display devices can be modeled conveniently by using the panel-type source in VirtualLab. As an example, an image projection lens is selected and analyzed with a panel-type source. The performance of the system is evaluated by both observing the spot grid in the image plane, and evaluating the angular/direction behavior.

Modeling Task

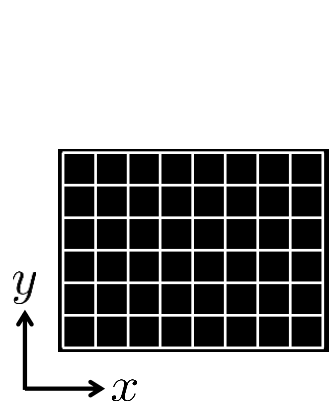


Spot Grid on Image Plane

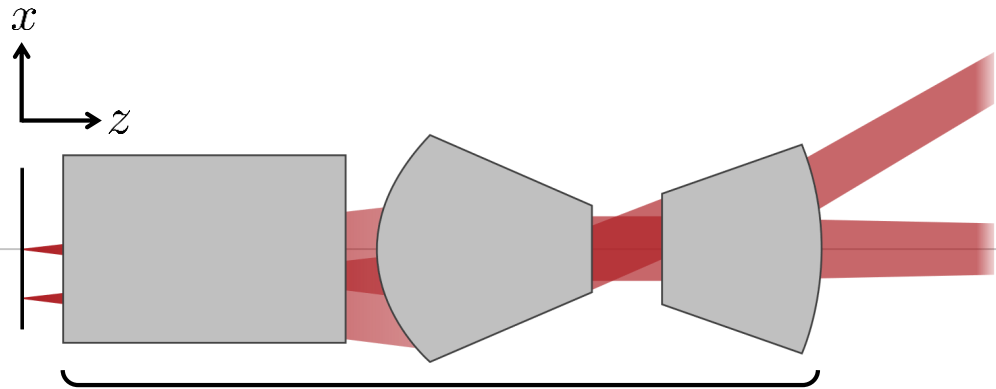


A well-designed projection lens system delivers an almost equidistant grid on image plane, with distortion under control.

Analysis in Angular Domain

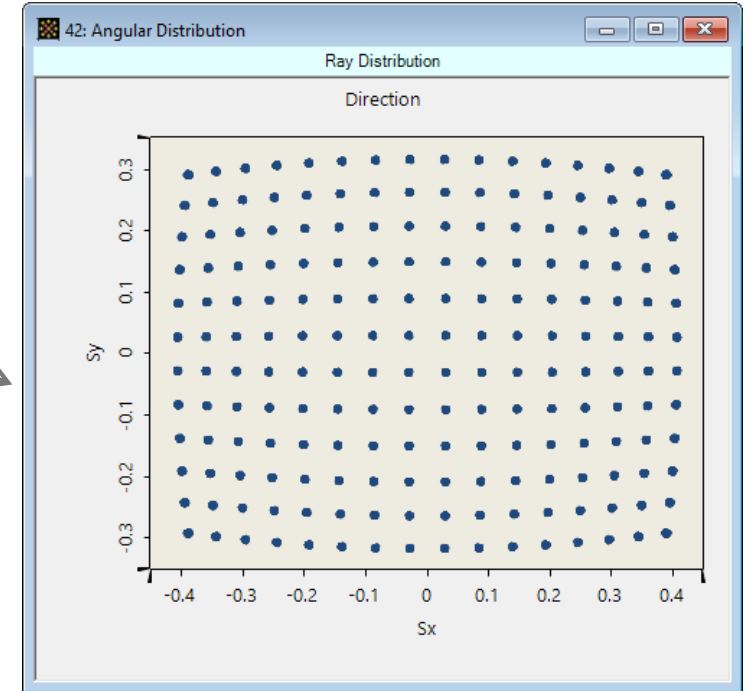


- panel-type display
- 16x12 pixels selected out of 1024x768
 - pixel pitch 10 μ m



projection lens system

- effective focal length $f_{\text{eff}} = 11.44 \text{ mm @ } 532 \text{ nm}$
- lens design from USP 5625495



analysis in angular/direction domain

Peek in VirtualLab

panel source configuration

Edit Panel Type Source

Basic Parameters Specific Parameters **Ray Selection** Polarization Mode Selection

Intensity Distribution

From Chromatic Fields Set

Constant 1

Number of Pixels ×

Wavelength

Pixel Pitch ×

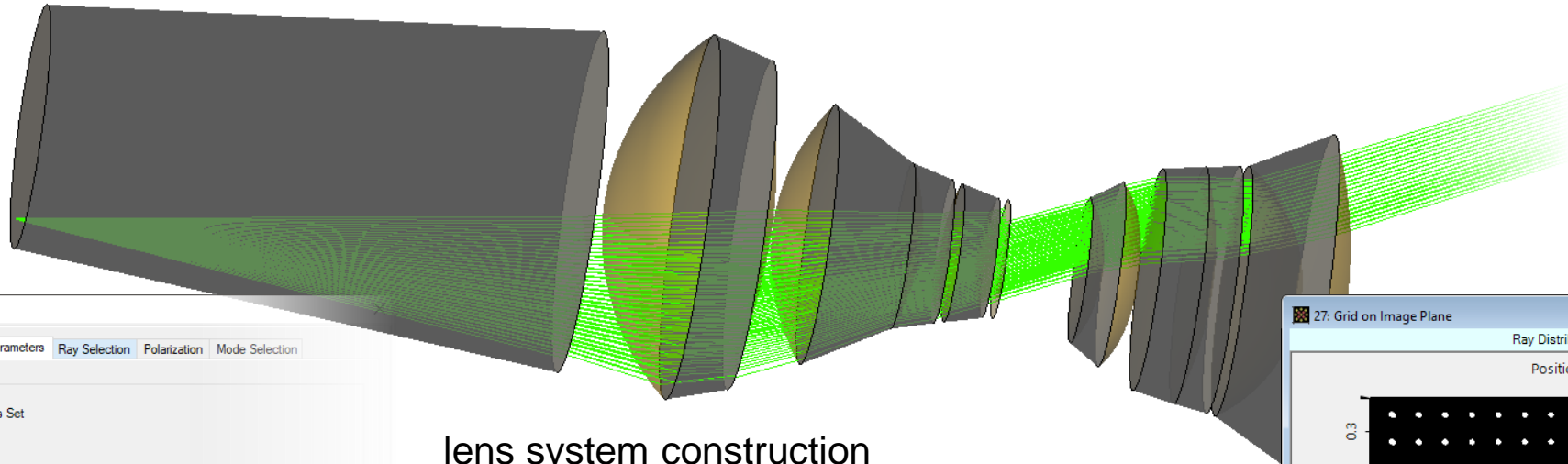
Aperture Angle

Distance to Source Plane

Geometry / Channels

Position / Orientation

Source Parameters



lens system construction

Edit Optical Interface Sequence

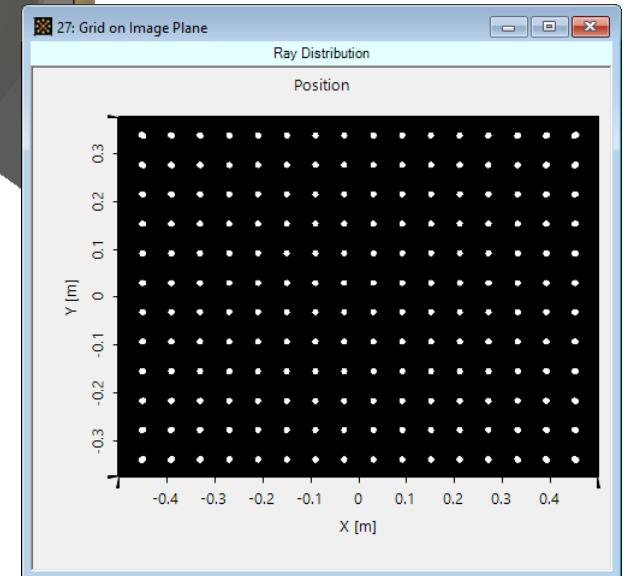
Geometry / Channels

Position / Orientation

Structure / Function

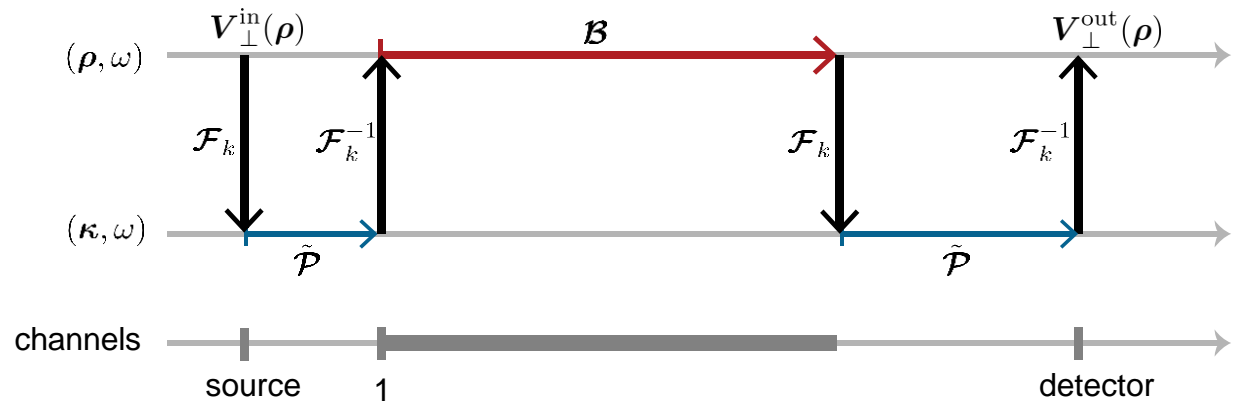
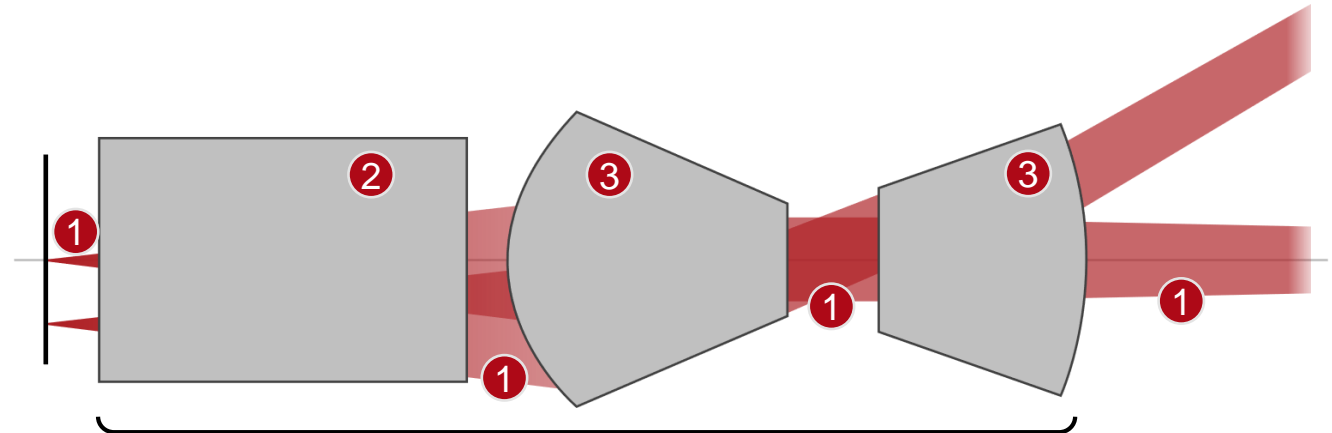
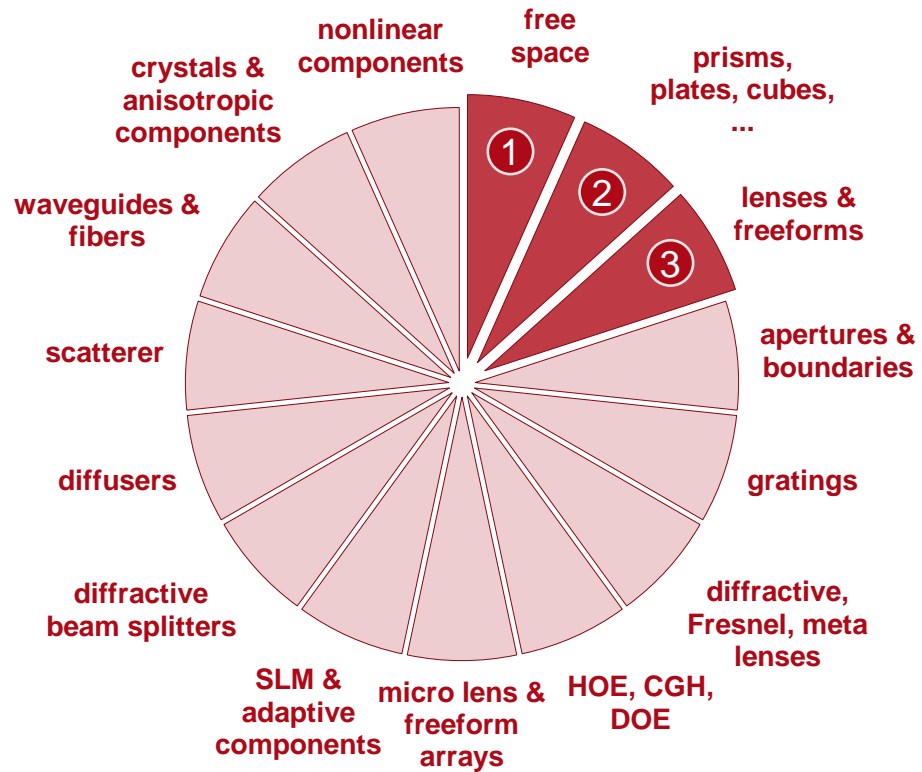
Propagation Channels

Index	Distance	Position	Type	Homogeneous Medium	Comment
1	0 mm	0 mm	Plane Interface	SK5_schott in Homogen	Zemax Interf
2	31.2 mm	31.2 mm	Plane Interface	Air (Zemax) in Homogen	Zemax Interf
3	1.4 mm	32.6 mm	Aspherical Interface	ACRYLIC_MISC in Hom	Zemax Interf
4	9.37 mm	41.97 mm	Aspherical Interface	Air (Zemax) in Homogen	Zemax Interf
5	200 μm	42.17 mm	Conical Interface	BK7_schott in Homogen	Zemax Interf
6	8.33 mm	50.5 mm	Conical Interface	SF6_schott in Homogen	Zemax Interf
7	1 mm	51.5 mm	Conical Interface	Air (Zemax) in Homogen	Zemax Interf
8	200 μm	51.7 mm	Aspherical Interface	ACRYLIC_MISC in Hom	Zemax Interf
9	2 mm	53.7 mm	Aspherical Interface	Air (Zemax) in Homogen	Zemax Interf
10	1.3575 mm	55.057 mm	Plane Interface	Air (Zemax) in Homogen	Zemax Interf
11	5.76 mm	60.817 mm	Aspherical Interface	ACRYLIC_MISC in Hom	Zemax Interf



spot distribution visualization

VirtualLab Technologies



Document Information

title	Modeling of An Image Projection System Based on Panel-Type Display
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VL version used for simulations	7.4.0.49
category	Application Use Case
