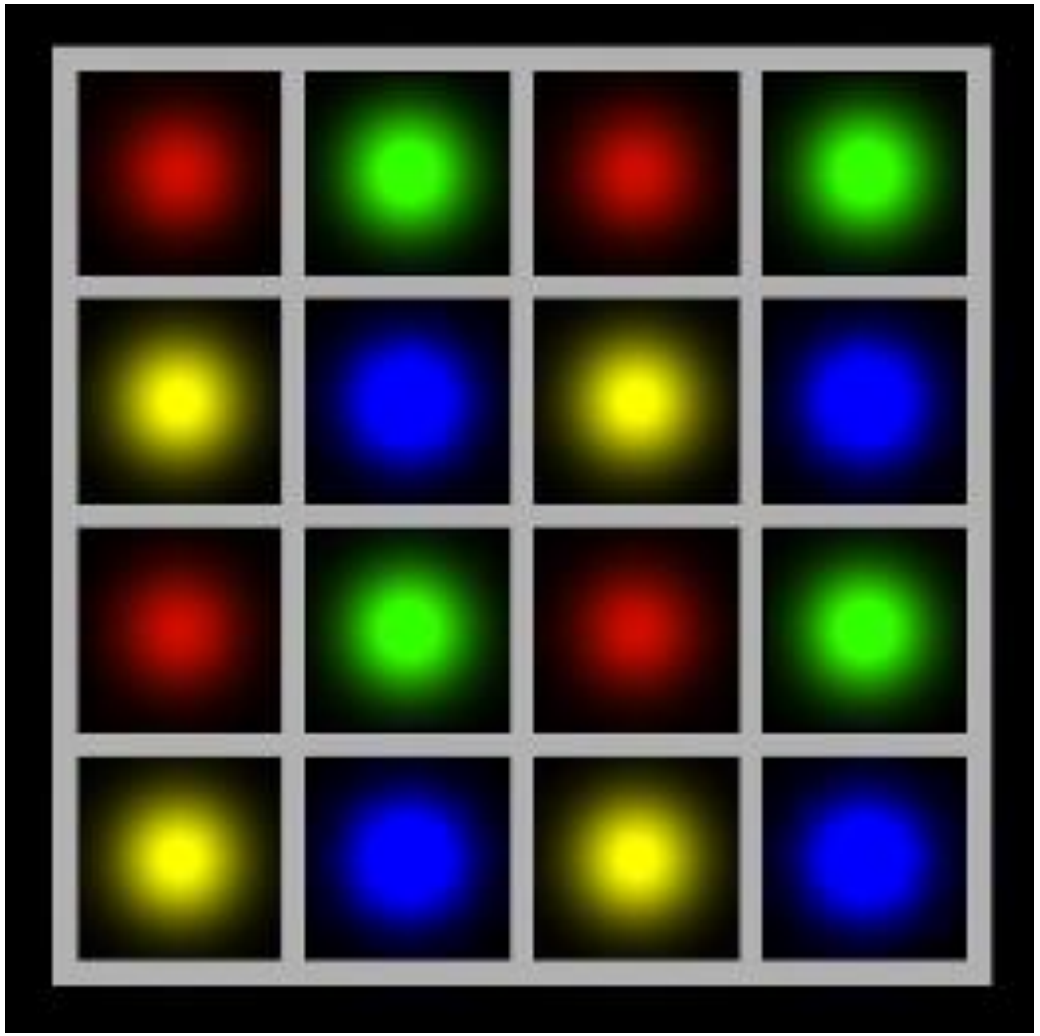
# Simulation of Multiple Light Sources with VirtualLab Fusion

# Abstract

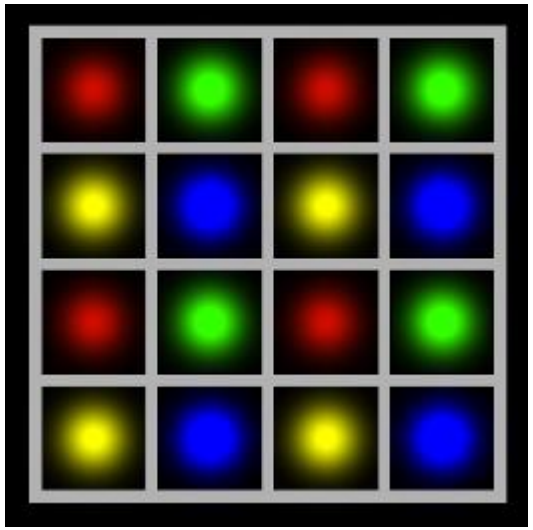


Being able to include multiple light sources in a system is fundamental for many applications, like imaging or illumination. VirtualLab Fusion provides advanced options to tackle this kind of challenges. In this document, we provide a brief overview of how to set up multiple light sources and give several simulation examples.

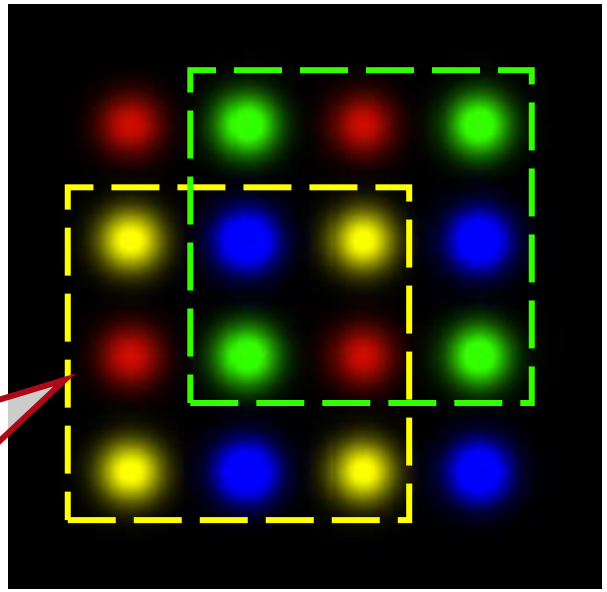
# Overview

The **Multiple Light Source**

- can contain an arbitrary number of primary light sources.
- supports all Partially Coherent Light Sources (except Panel Type and Scanning Source).
- supports coherent combination for polychromatic primary light sources.



4*4 multicolor light matrix

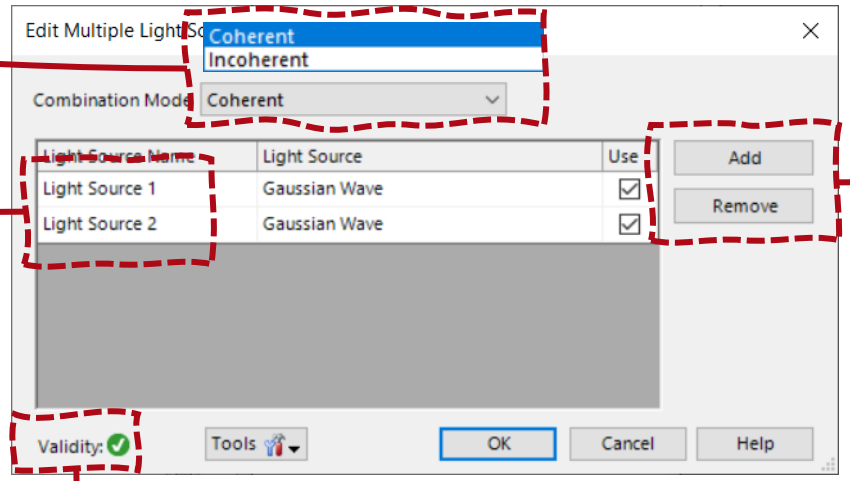


Combination of the Grid Gaussian Planar Source with different wavelengths

# Configuration of the Multiple Light Source

Click here to edit the coherence between the modes

Click here to add or remove light sources



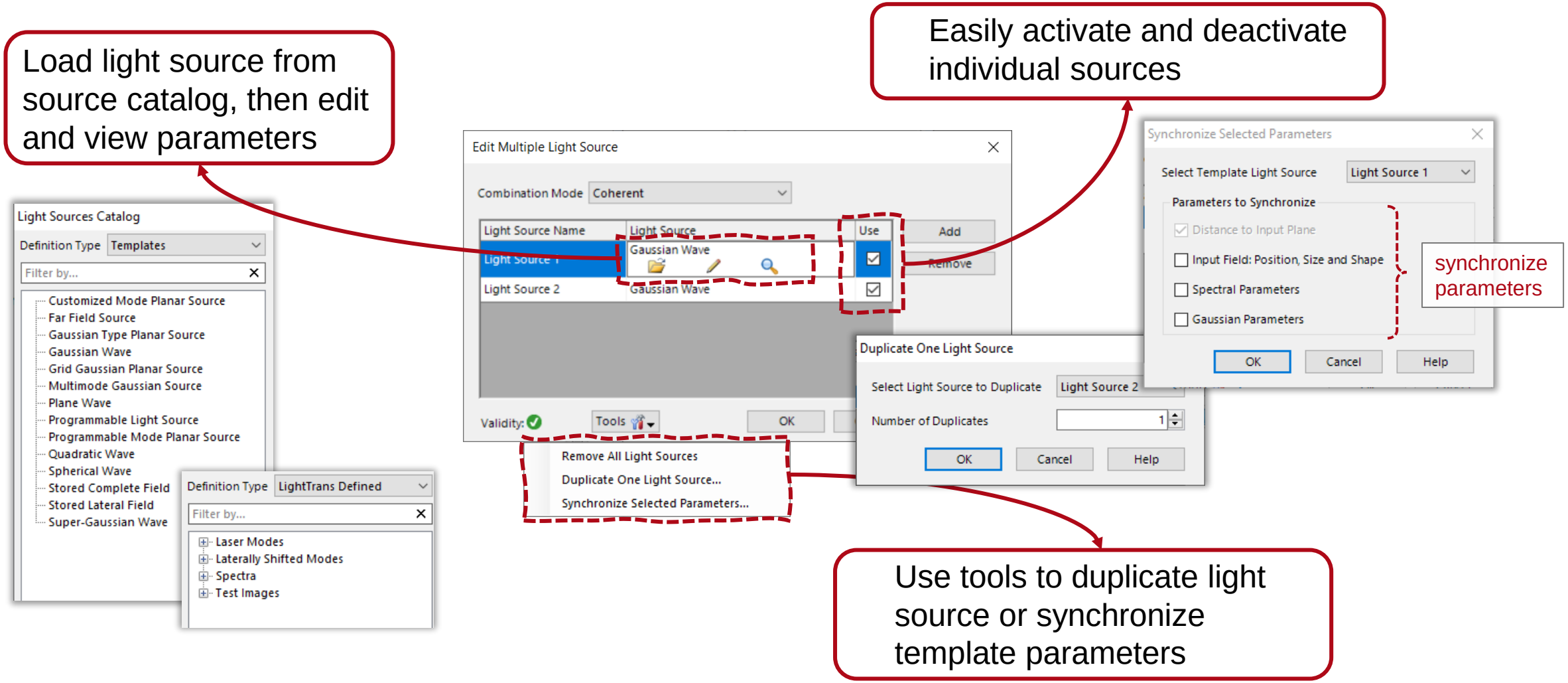

Light sources are identified by custom names

Get validity information to check whether there are issues with the current configuration

# Configuration of the Multiple Light Source

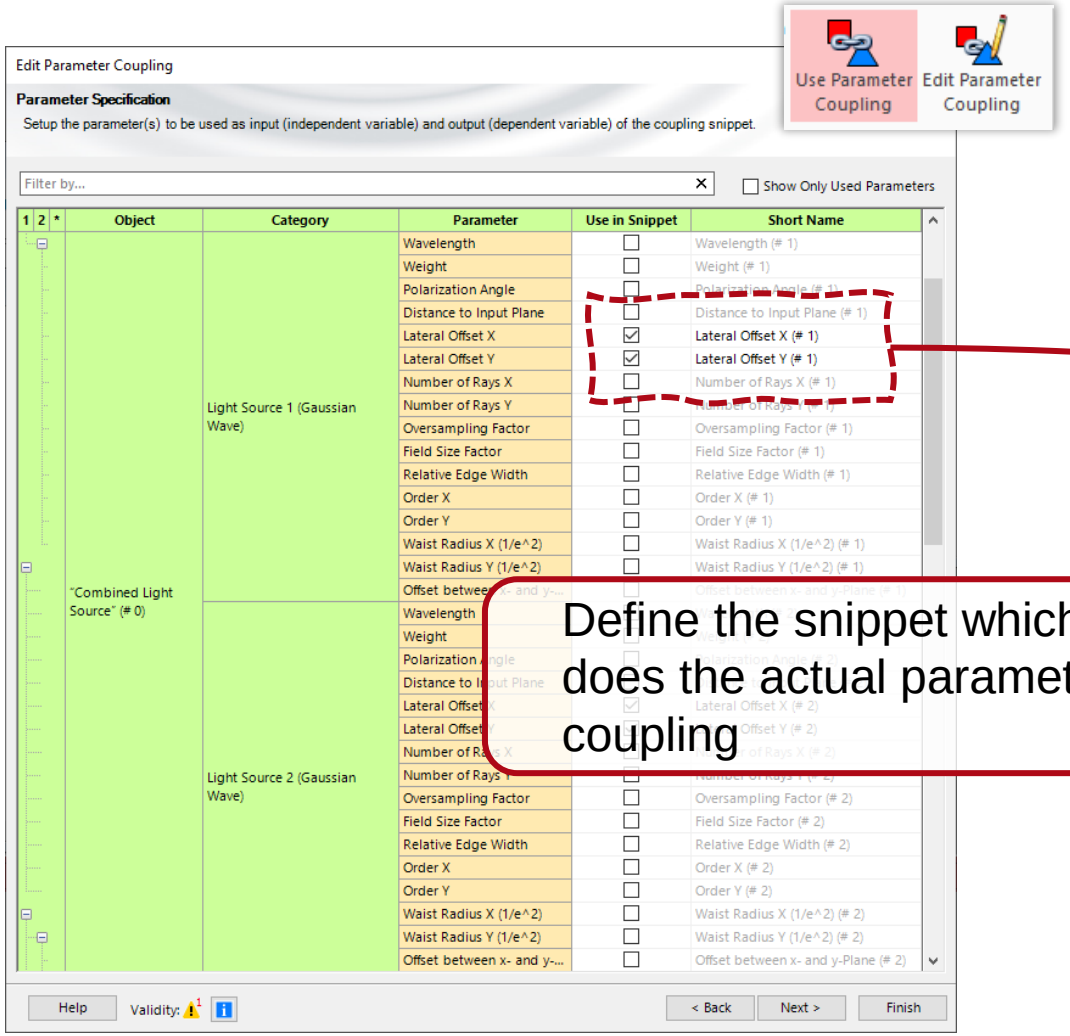
Load light source from source catalog, then edit and view parameters

Easily activate and deactivate individual sources




Use tools to duplicate light source or synchronize template parameters

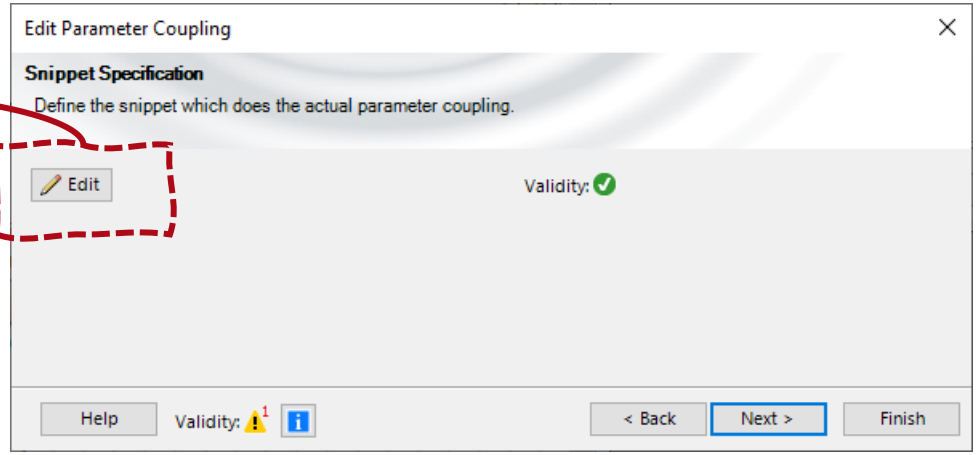
# Use Parameter Coupling to Link Parameters



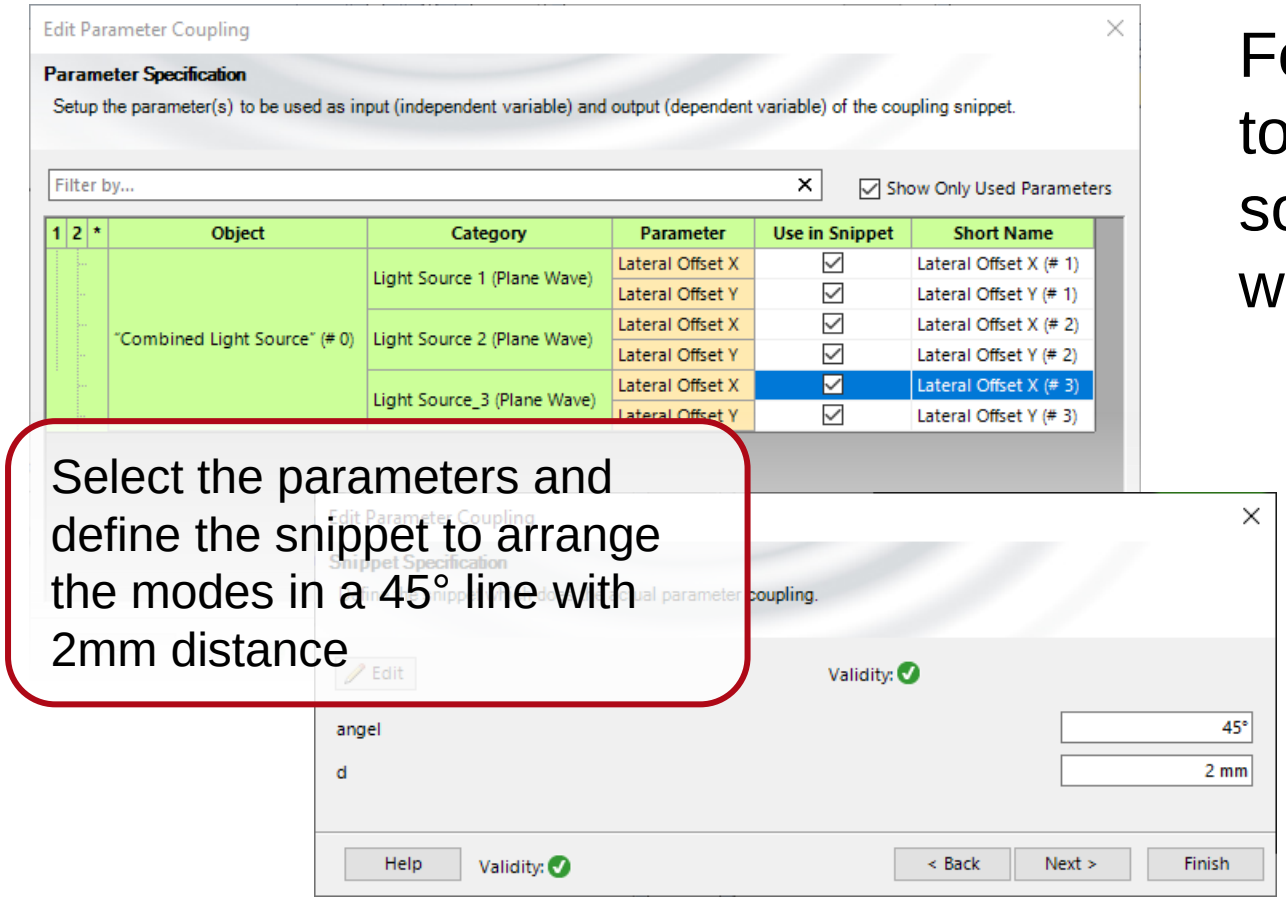

The Parameter Coupling can link the relative parameters of all the sources together, so that there is no need to define those parameters repeatedly.

Select coupled parameters

Define the snippet which does the actual parameter coupling

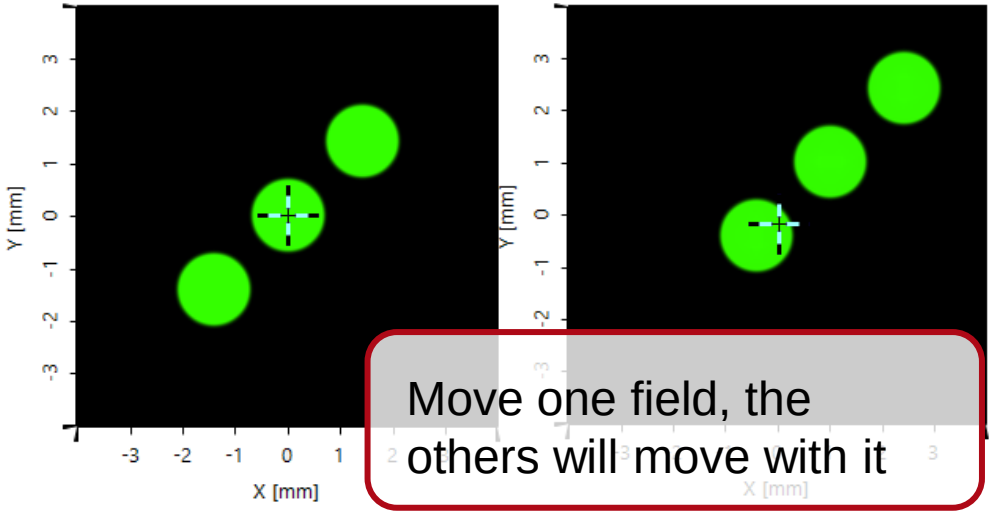


# Use Parameter Coupling to Link Parameters – Positioning




Select the parameters and define the snippet to arrange the modes in a 45° line with 2mm distance

For example, use Parameter Coupling to fix the relative position of the fields, so that all fields will shift automatically with one movement.



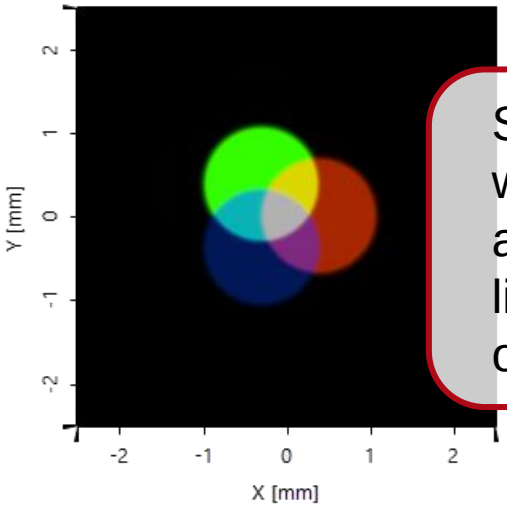

Move one field, the others will move with it

# Multiple Light Source Simulation Examples

# Simulation of the Additive (Light) Color Primaries

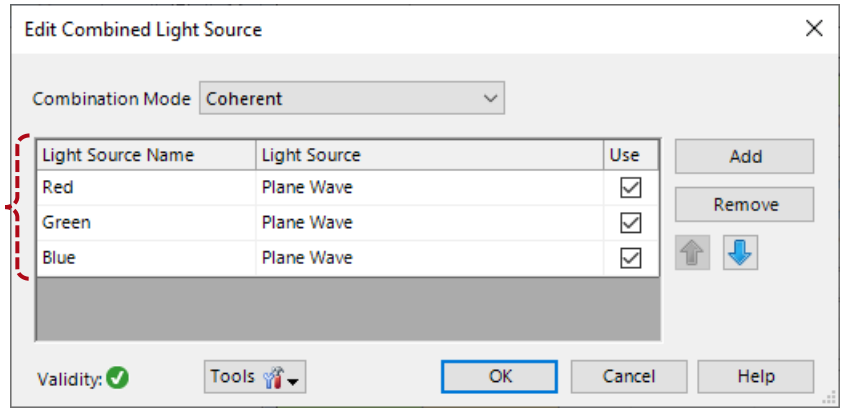
The visible light spectrum encompasses those wavelengths between 380nm and 750nm, which produce colors ranging from purple to red. However, red, green and blue are considered primary colors, since their combination can generate almost all other colors.

In this example, the three primary colors are simulated using the multiple light source, and their mixing behavior is investigated.

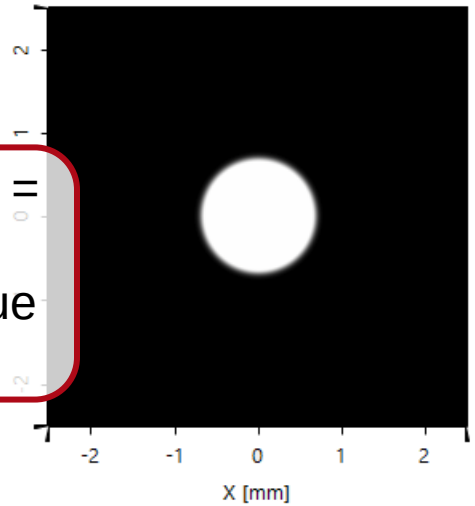



Set up multiple light sources with different wavelengths, and the additive mixing of light can be observed in the overlapping area.

plane waves with different wavelength

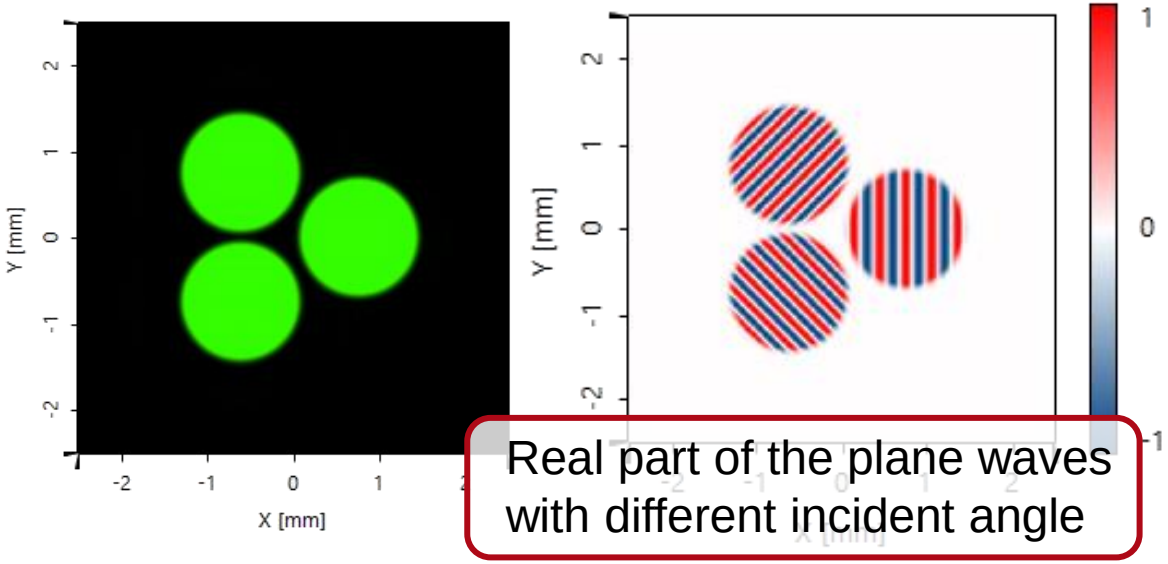



All colors added together = white.
The absence of light = true black.

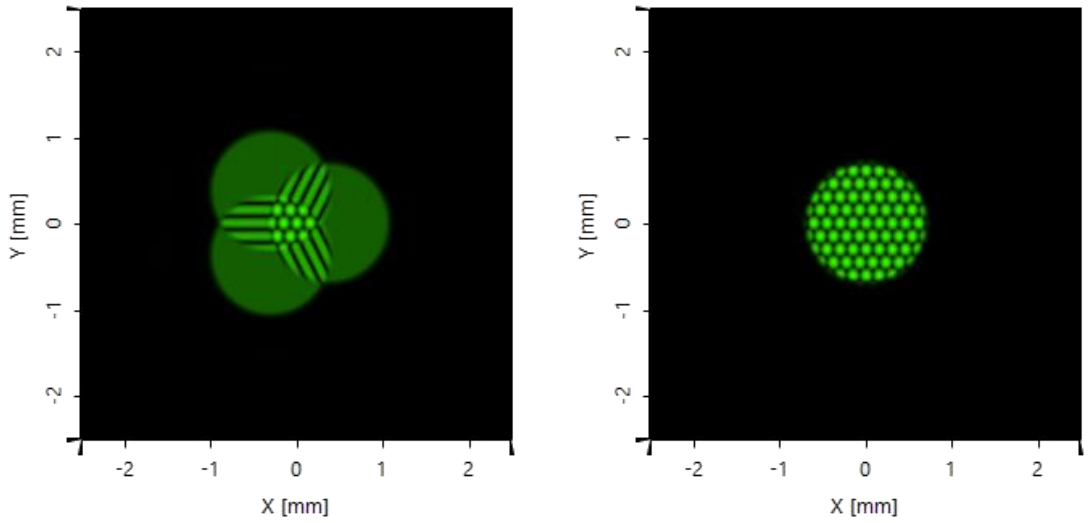


# Simulation of Coherence Effects

Set up plane waves with different incident angles that therefore carry different linear phases.




Real part of the plane waves with different incident angle




By shifting the position of the plane waves, the interference pattern at the overlapping area can be observed.

# Document Information

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|---|---|
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