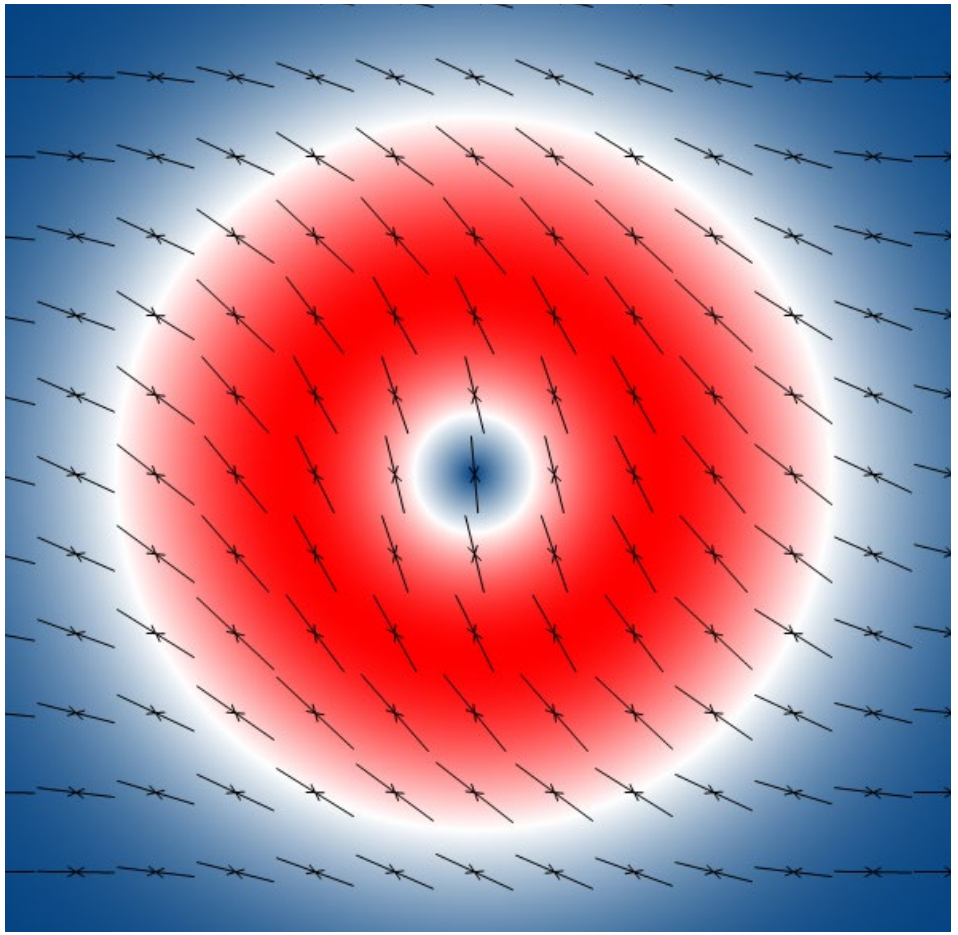
Laterally-Varying Retarder

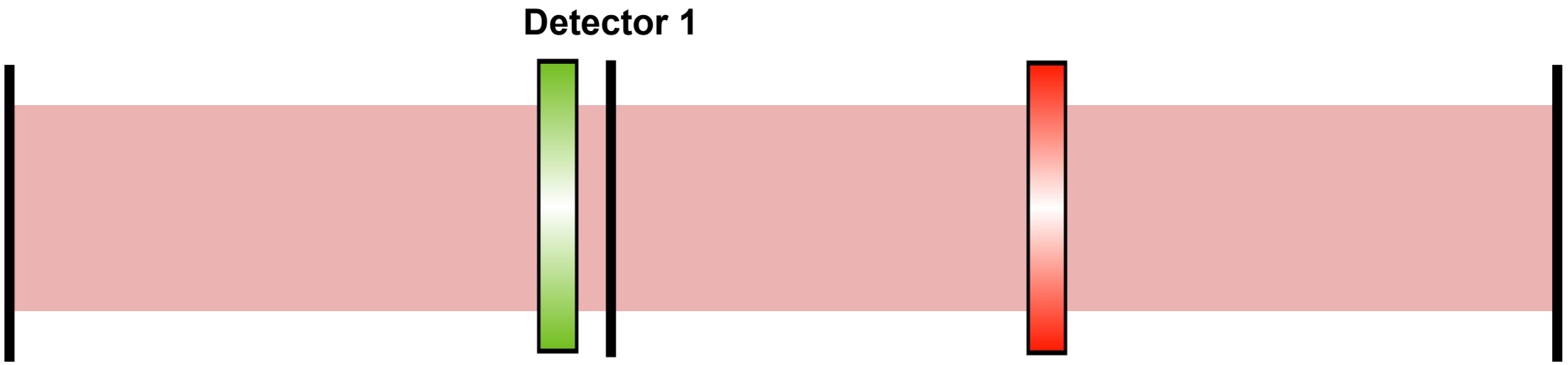
Abstract



In this use case, a function-based laterally varying retarder (LVR) is introduced into the optical path, producing a field with polarization that changes across the beam profile. Placing a polarizer behind the LVR and rotating it reveals these local polarization variations as corresponding intensity patterns.

Application Scenario

Application Scenario: System



Source: Gaussian Wave

- wavelength: 532nm
- beam diameter: 2mm x 2mm
- Polarization: Linear X-polarized

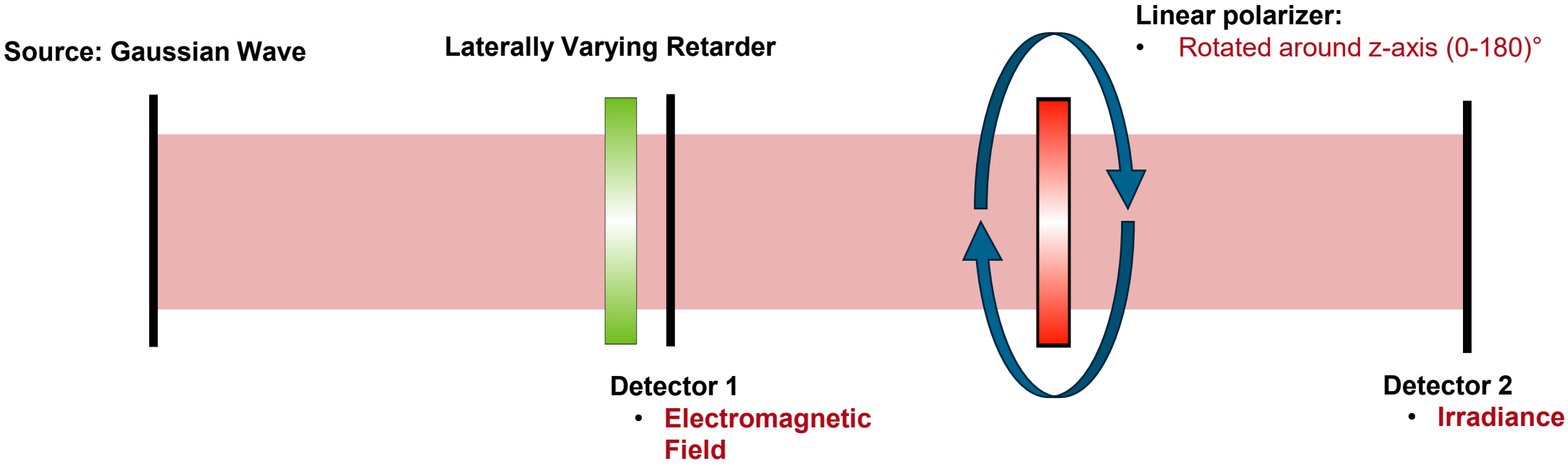
Laterally Varying Retarder:

- Retardance: λ/2
- Diameter: 2mm × 2mm
- Polarization: Modulated linearly across the radius

Linear polarizer

Detector 2

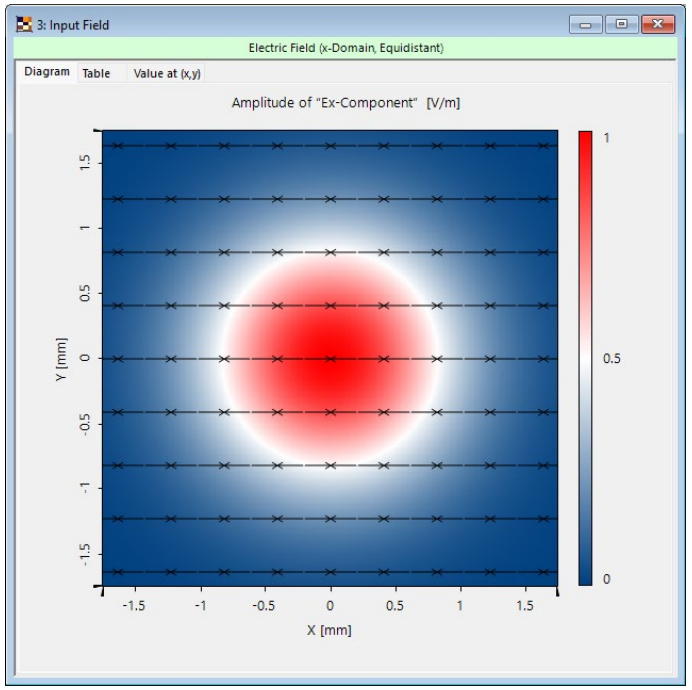
Application Scenario: Task



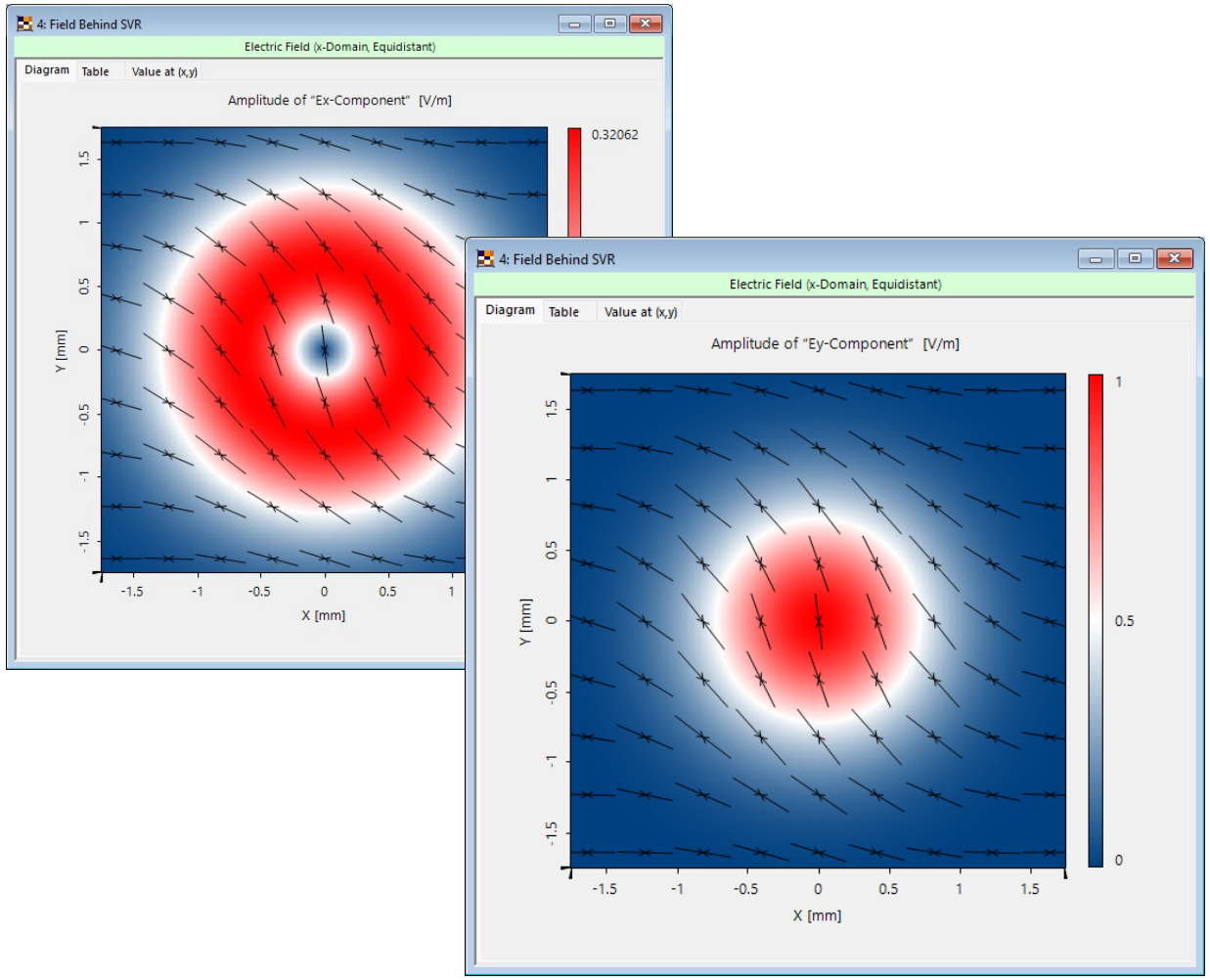
Task 1: Visualize the field behind the LVR (detector 1).
Task 2: Rotating the polarization of a linear polarizer behind the functional LVR and observe the irradiance at detector 2.

Results

Task 1: Field Behind the LVR

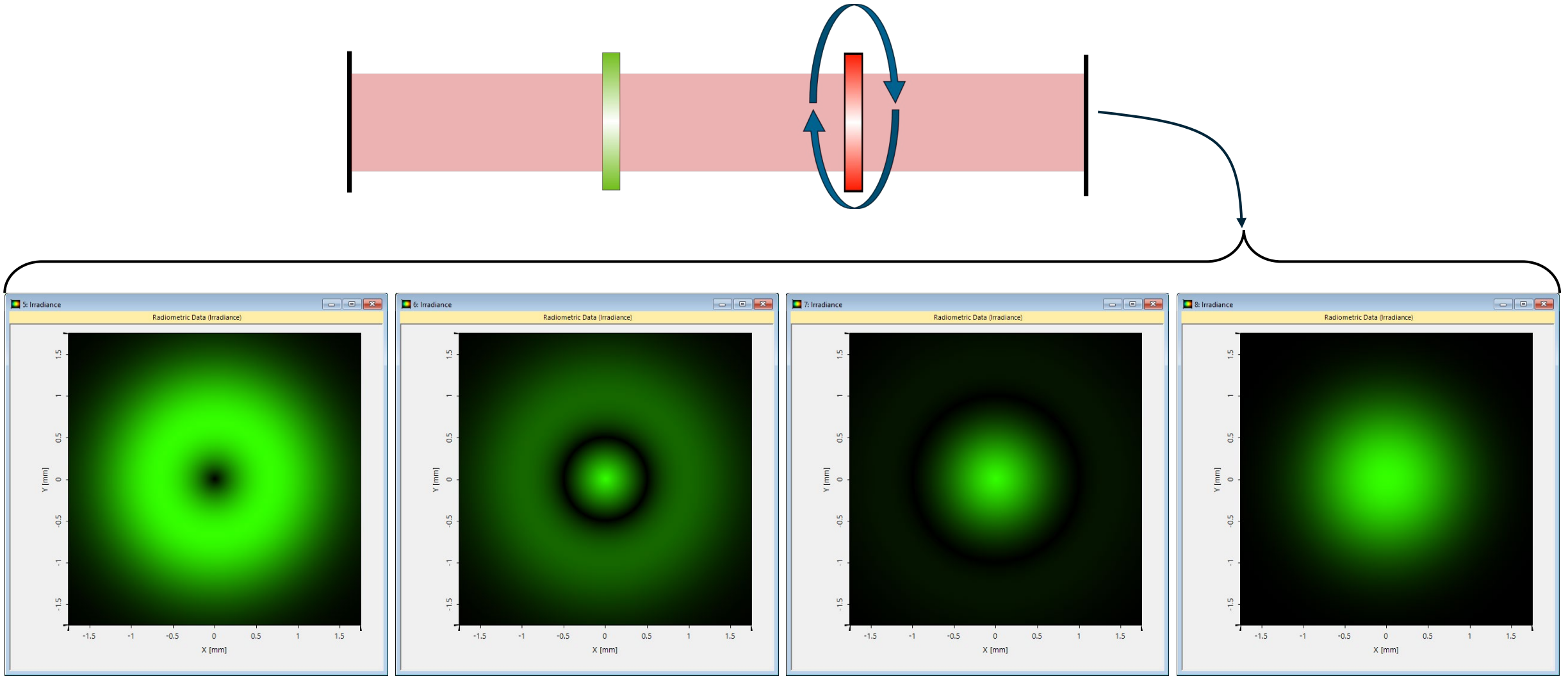


Input Field



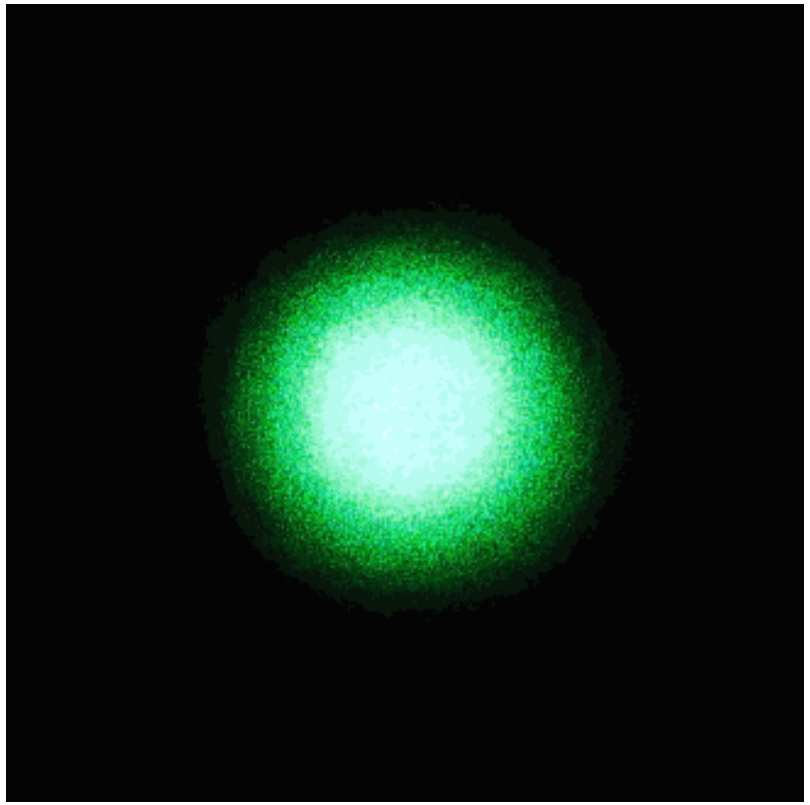
Field behind the SVR

Task 2: Irradiance Behind Rotated Linear Polarizer

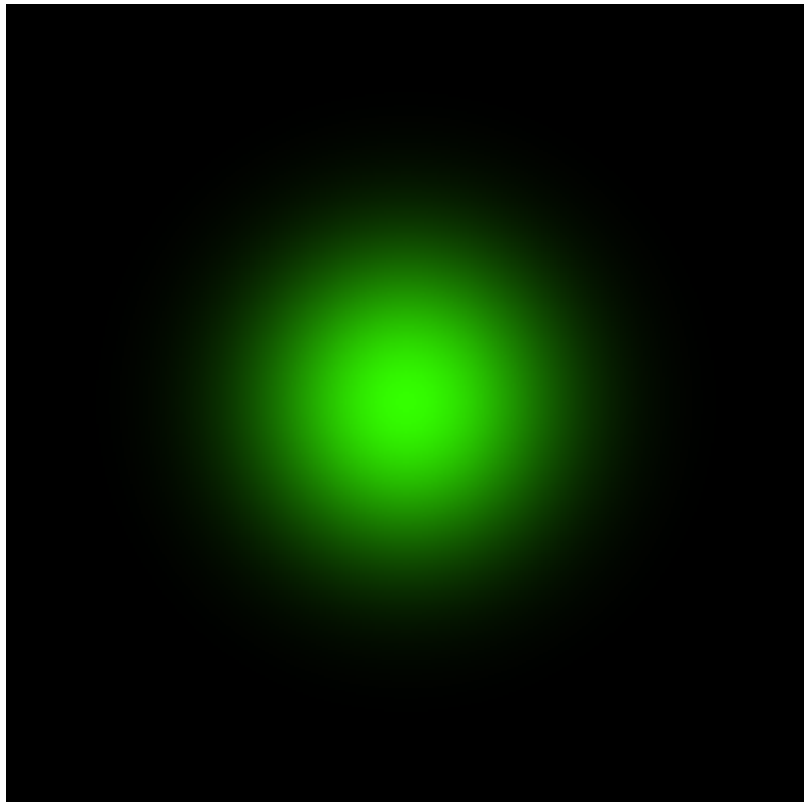


0° 22.5° 45° 90°

Comparison with Real-World Experiment



Measured in real-world experiment



Simulated in VirtualLab Fusion

Workflows

Gaussian Wave Source

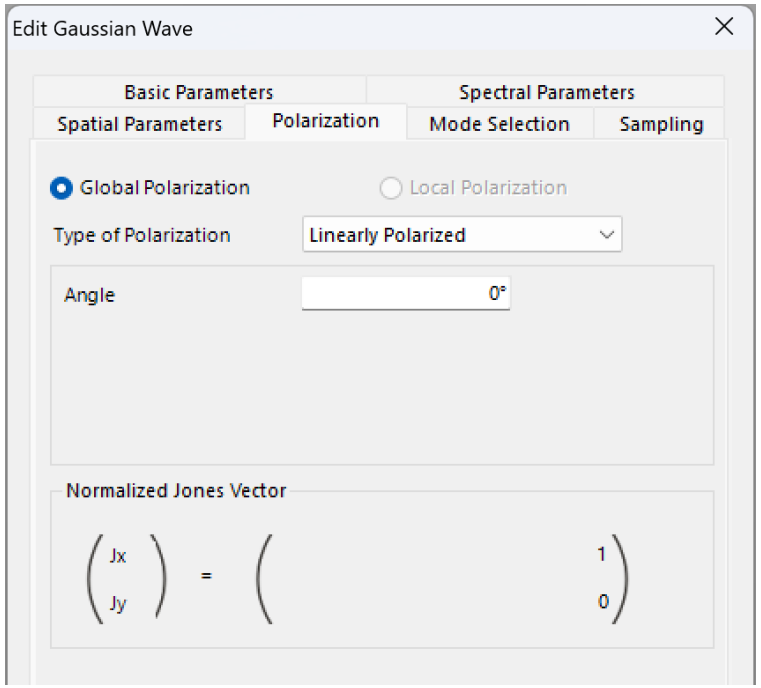
Source selection

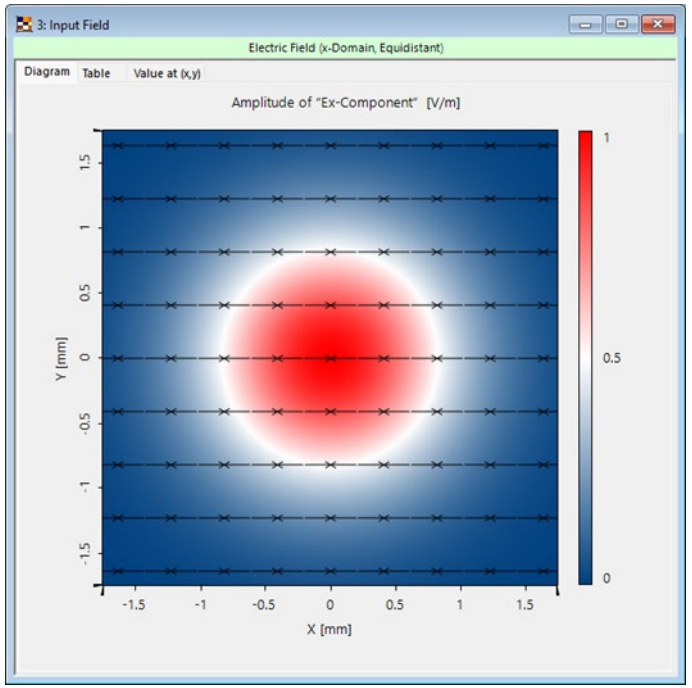
System setup

Detector selection

Getting it done in VirtualLab Fusion:

- Gaussian Wave





System Setup

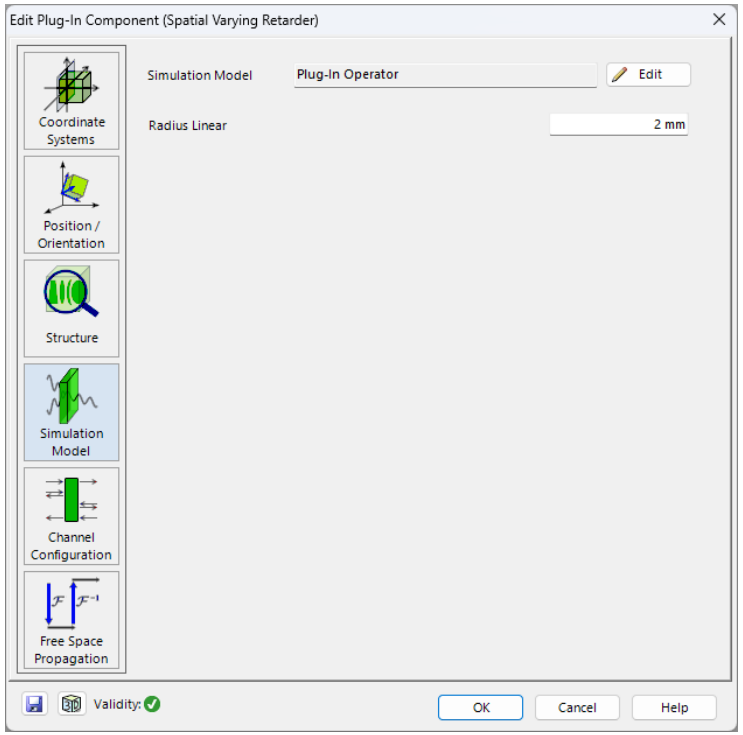
Source selection

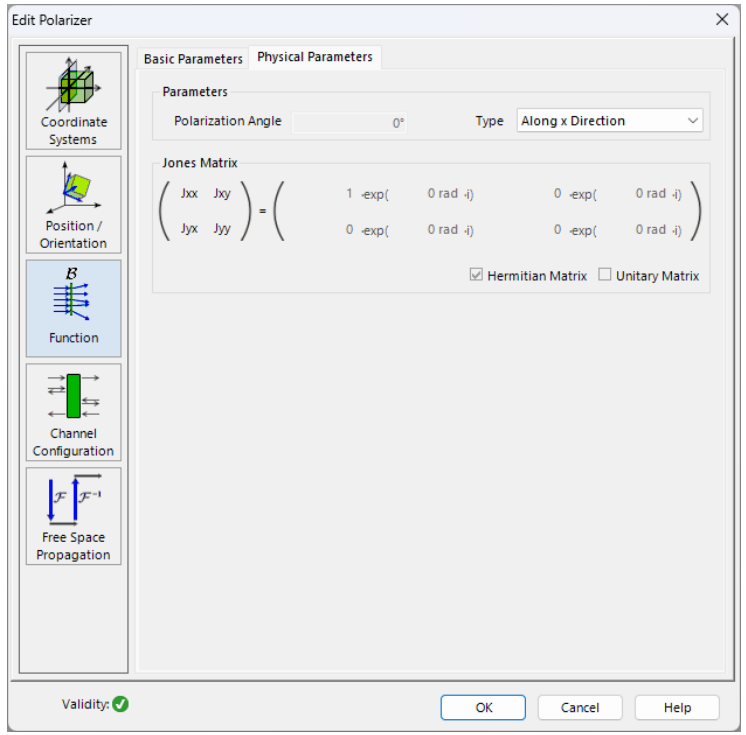
System setup

Detector selection

Getting it done in VirtualLab Fusion:

- Model LVR by Plug-In Component
- Use polarizer component for linear polarizer





Detector Selection

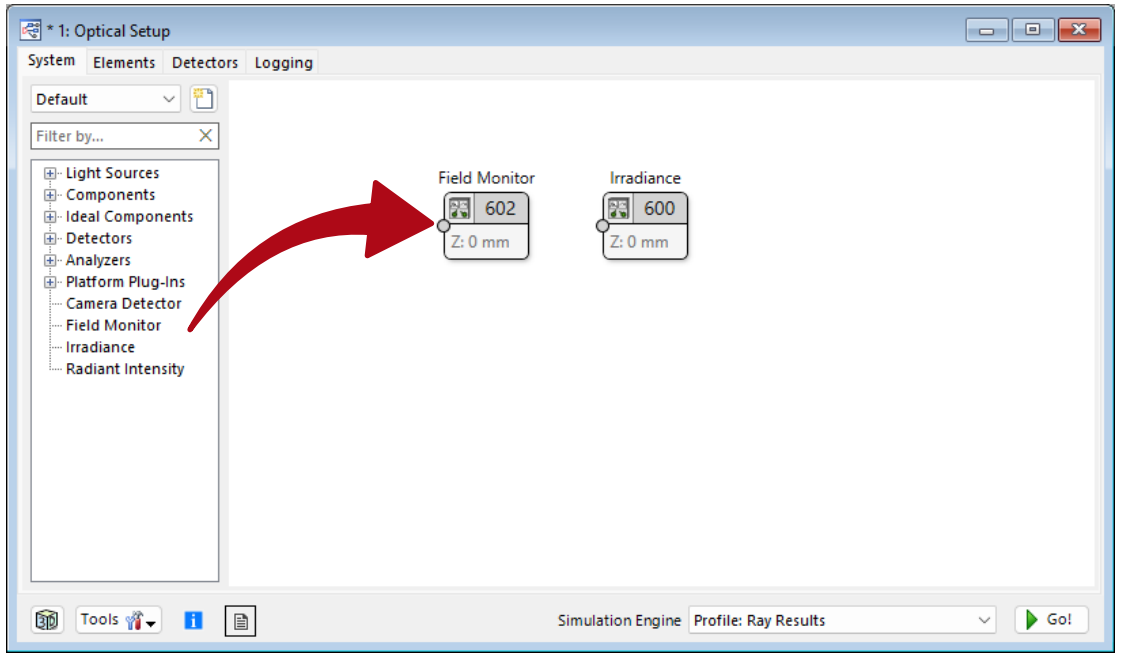
Source selection

System setup

Detector selection

Getting it done in VirtualLab Fusion:

- Add Field Monitor to your system.
- Add Irradiance detector to your system.



Document Information

Title	Laterally Varying Retarder
Document code	USC.0465
Publication date	22.09.2025
Required packages	-
Software version	2025.2 (Build 1.118)*
Category	Use Case
Further reading	- Catadioptric Imaging System Based on Pancake Lenses - Birefringence Effect of Anisotropic Calcite Crystal

* *The files attached to this document require the specific version or later.*