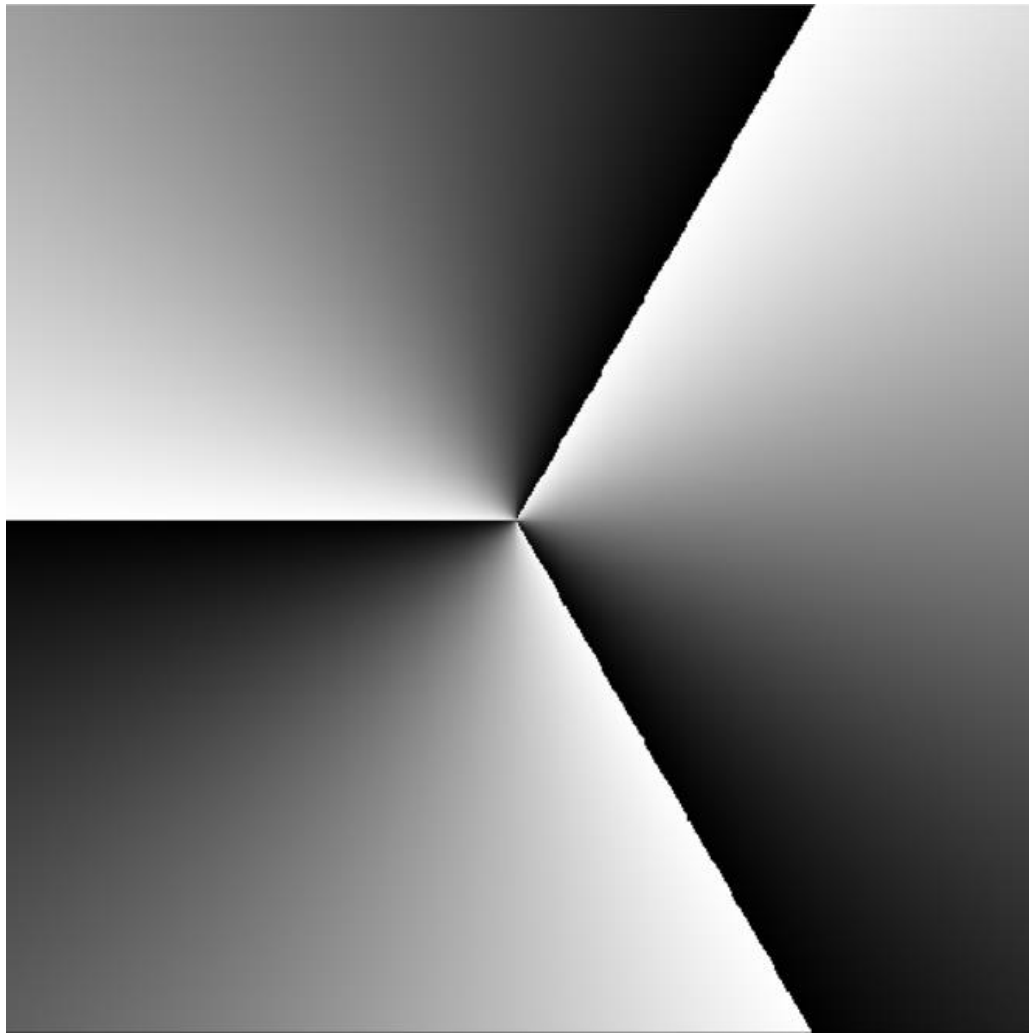
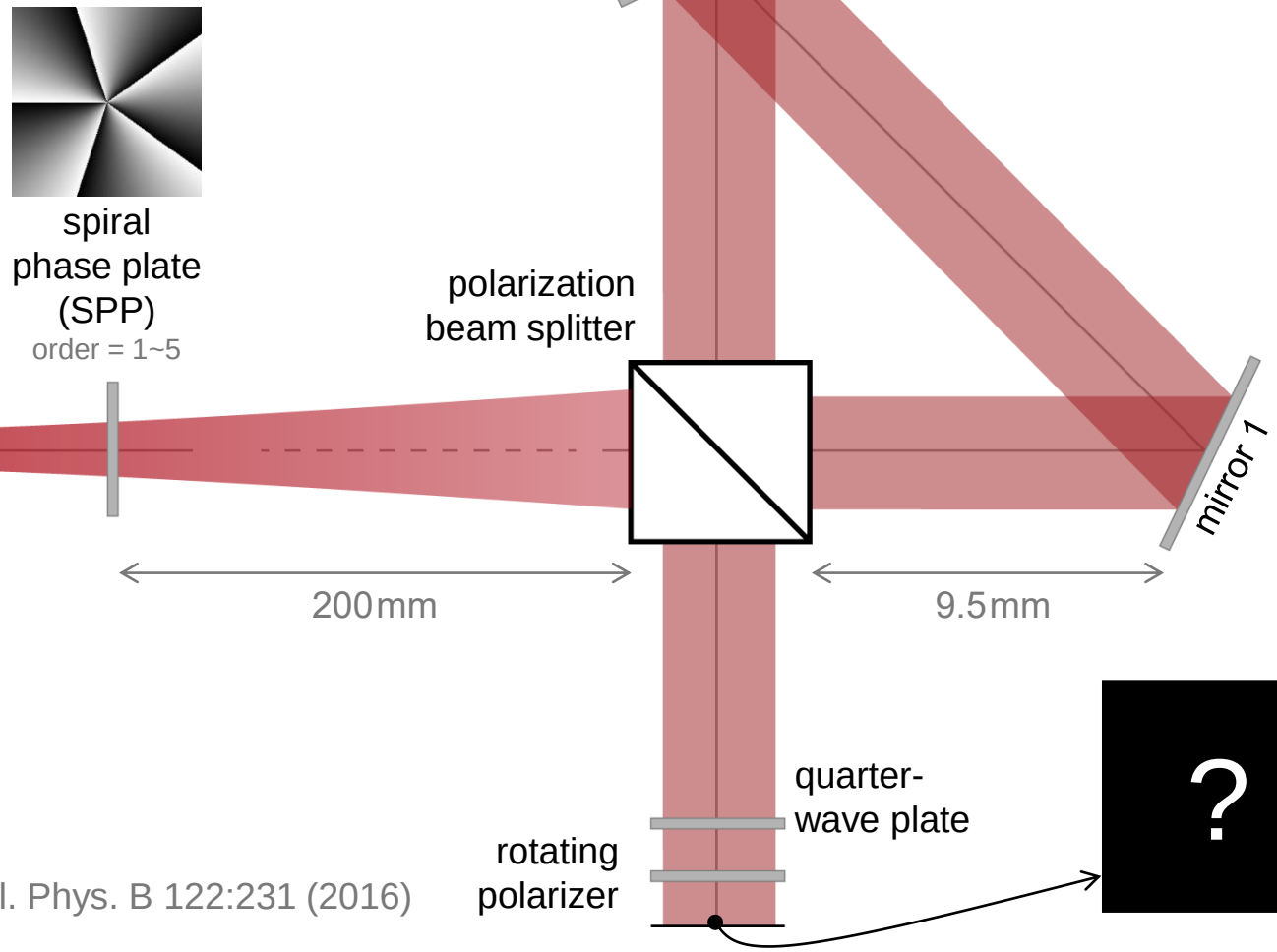
Generation of Vector Beam by a Sagnac-Like Interferometer

Abstract



Vector beam is a fully polarized beam, but has spatially different polarization distribution. It can be used in many applications, e.g., microscopy illumination. Following the idea of T. Wang et al., Appl. Phys. B 122:231 (2016), this use case demonstrates a Sagnac-interferometer scheme to generate a vector beam. This setup contains an SLM of spiral phase, a polarization beam splitter, and a quarter-wave plate.

Modeling Task

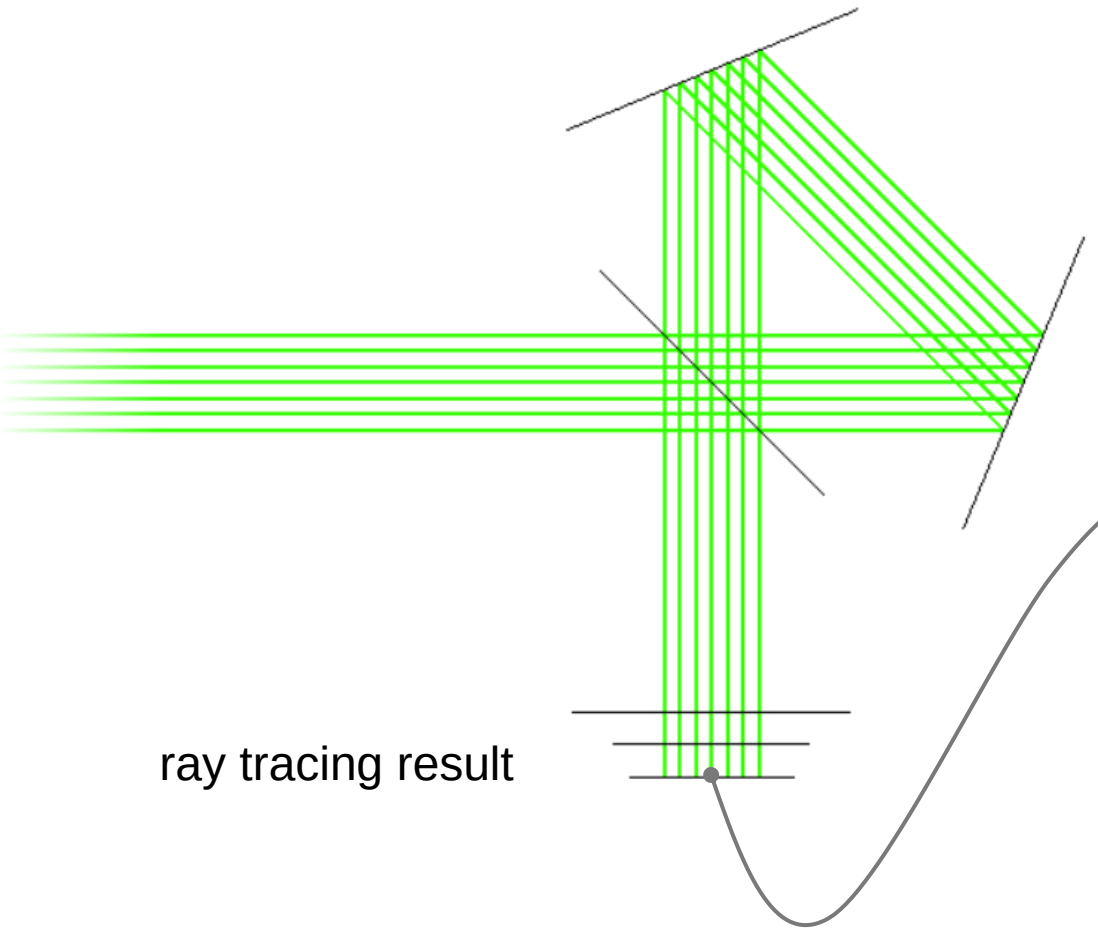


T. Wang et al, Appl. Phys. B 122:231 (2016)

the energy density of

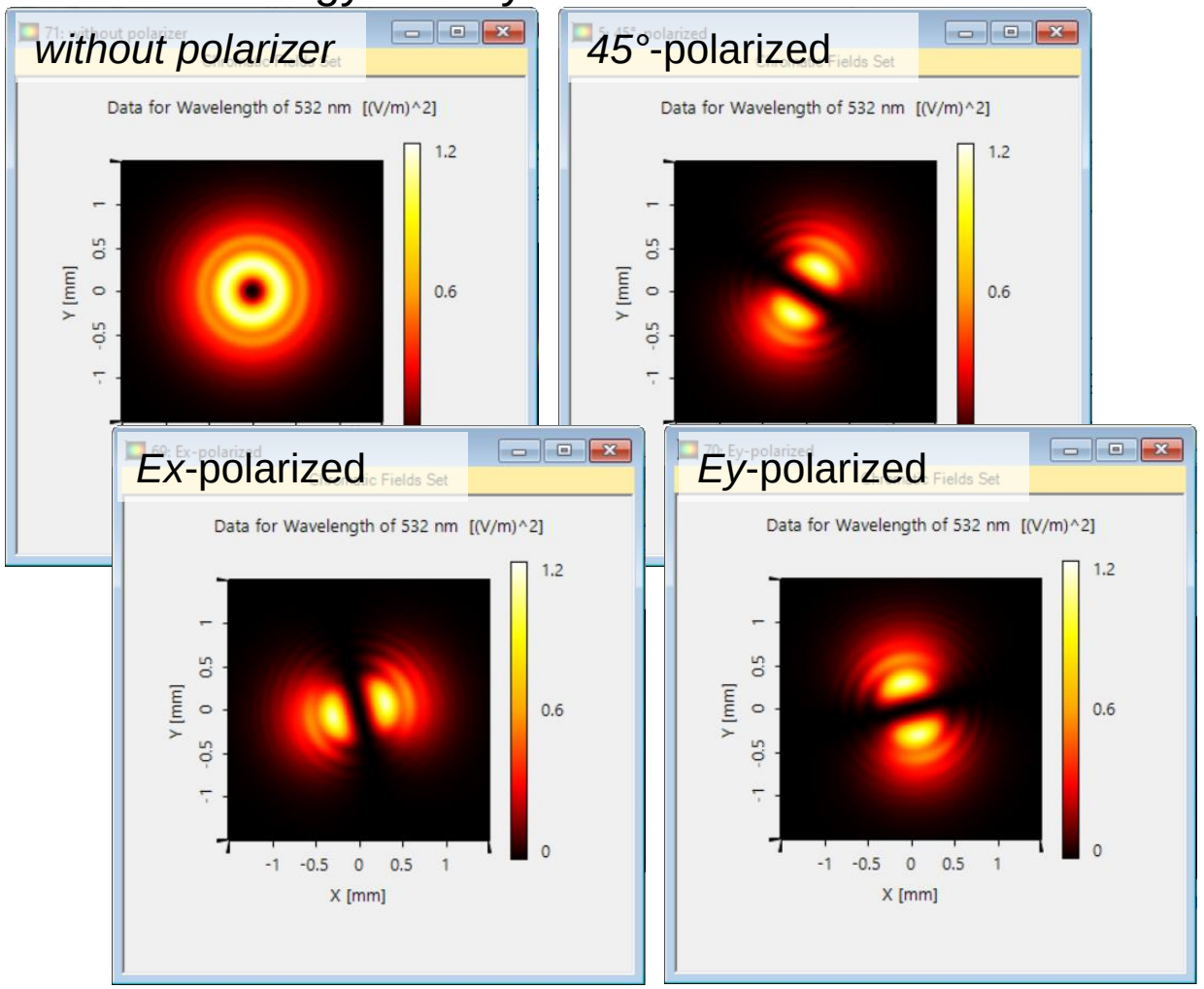
- *Ex-*, *Ey-* and 45°-polarized field
- total field

Ray Tracing and Field Tracing Results

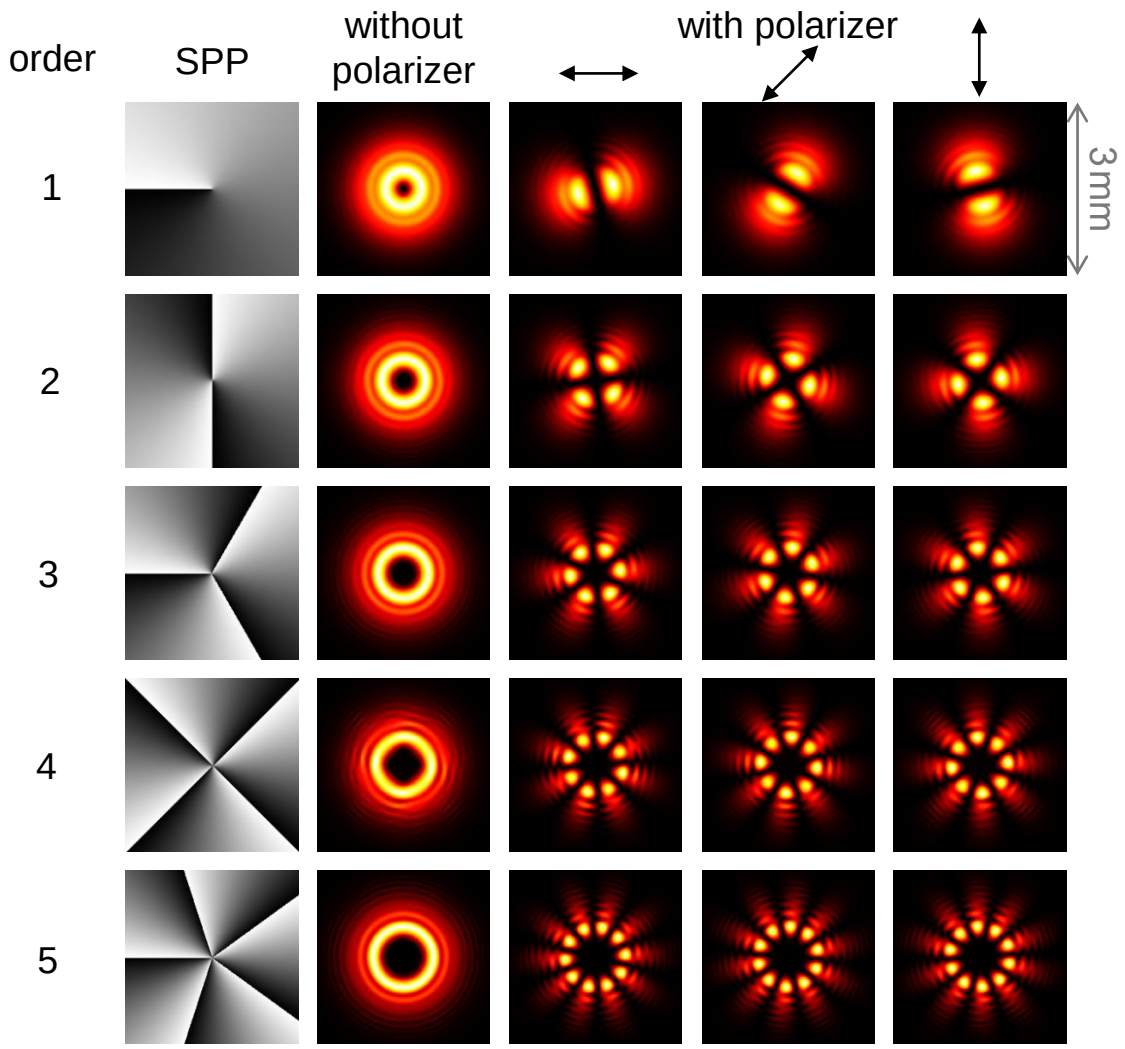


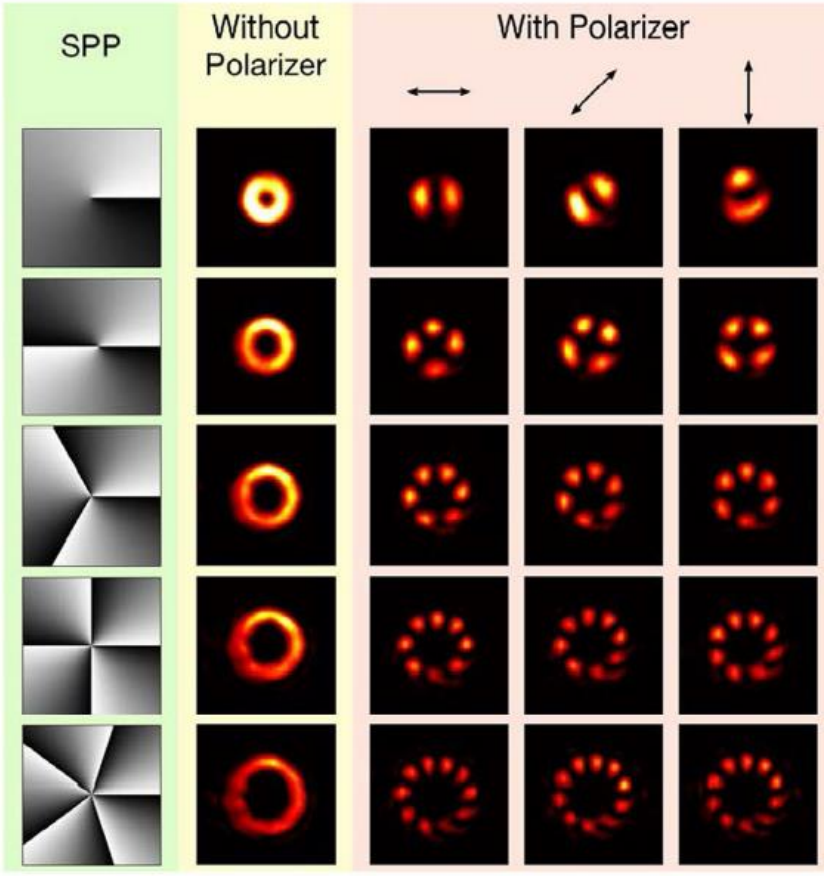
ray tracing result

energy density when order = 1



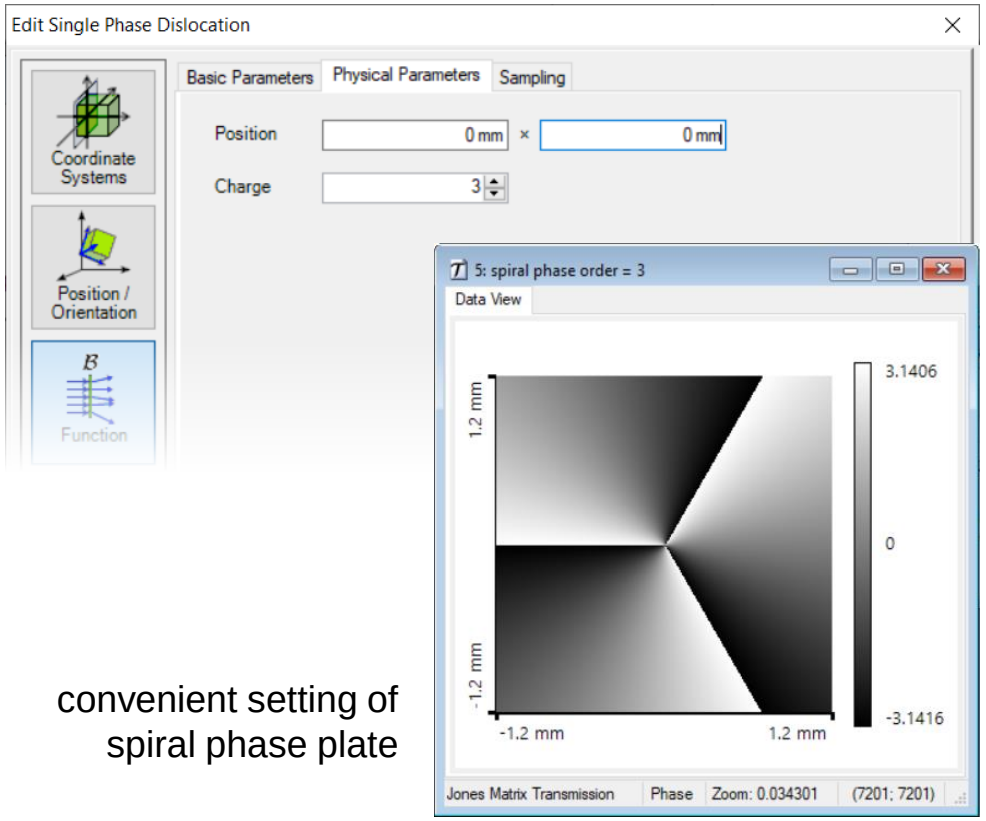
Results of Energy Density





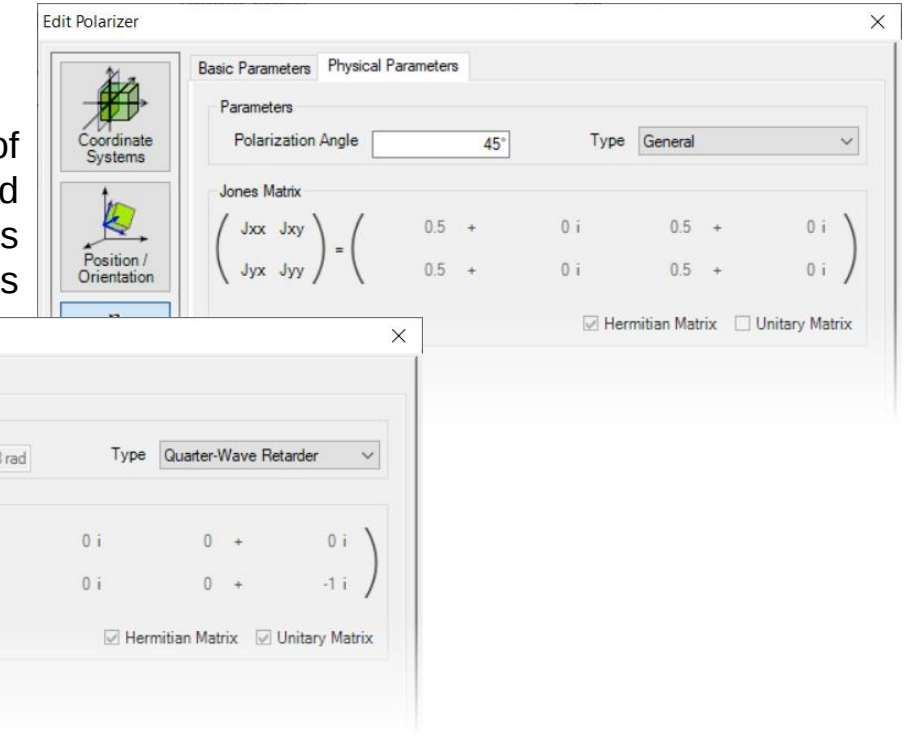
T. Wang et al, Appl. Phys. B 122:231 (2016)

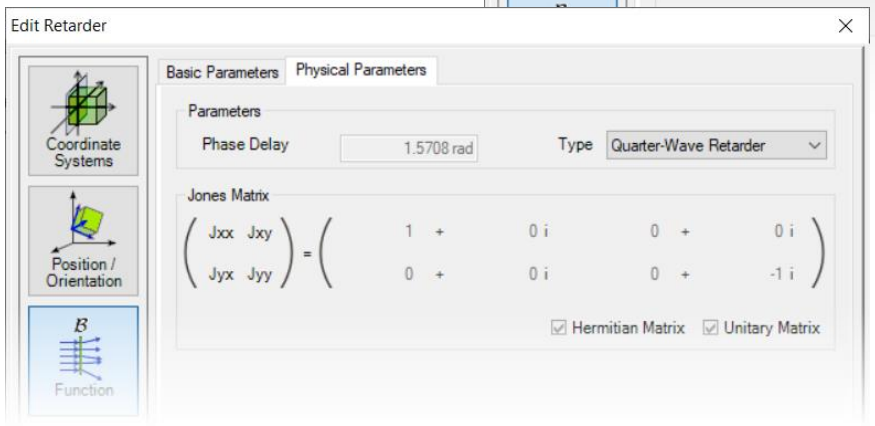
Peek into VirtualLab Fusion



convenient setting of spiral phase plate

realize the function of quarter-wave plate and polarizer by Jones matrices

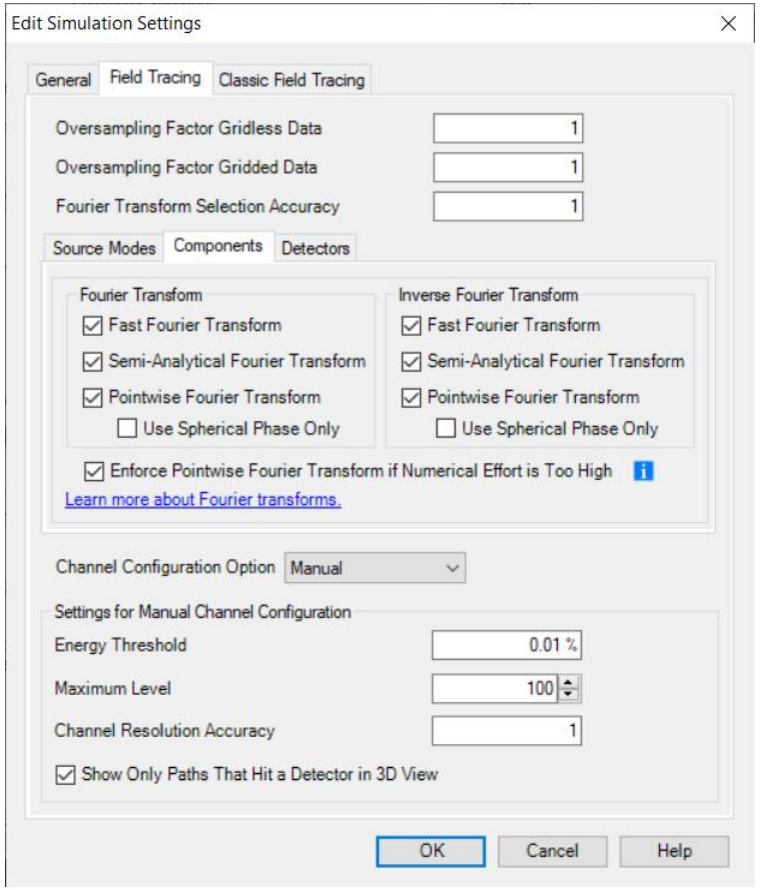




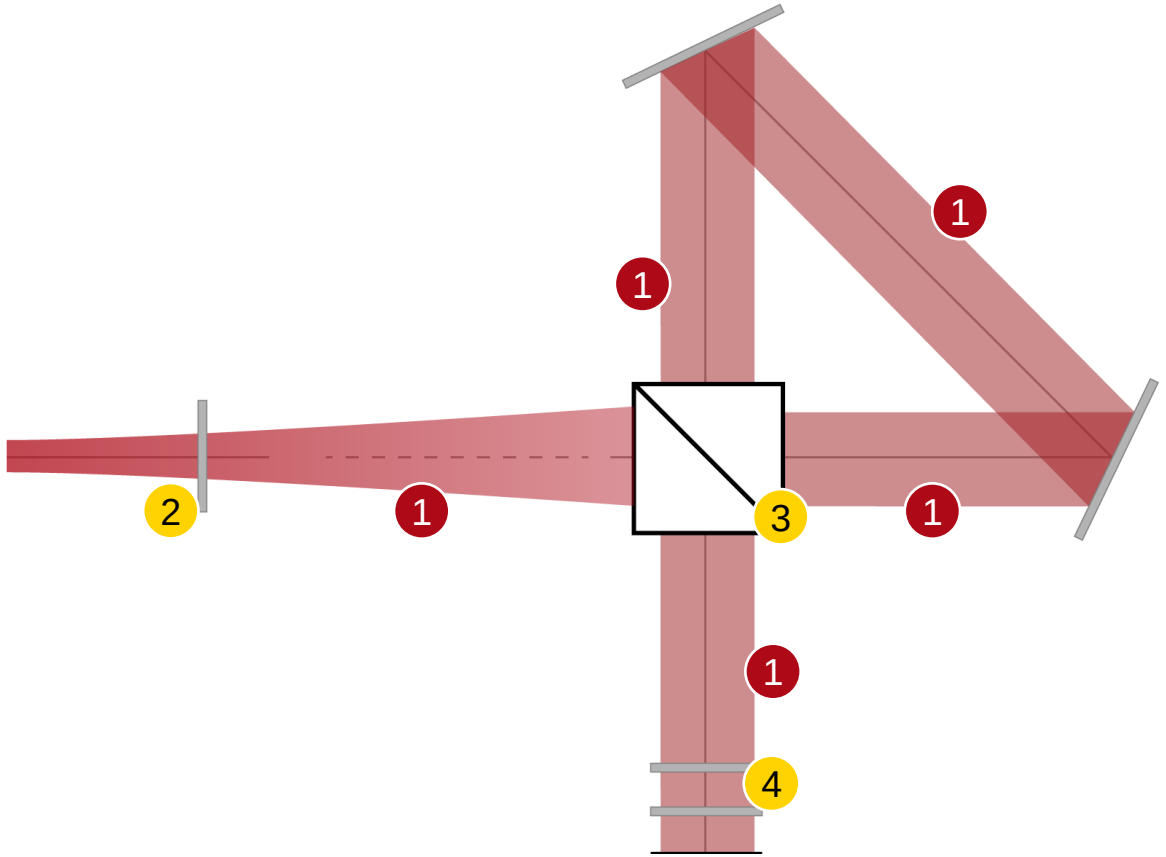
Workflow in VirtualLab Fusion

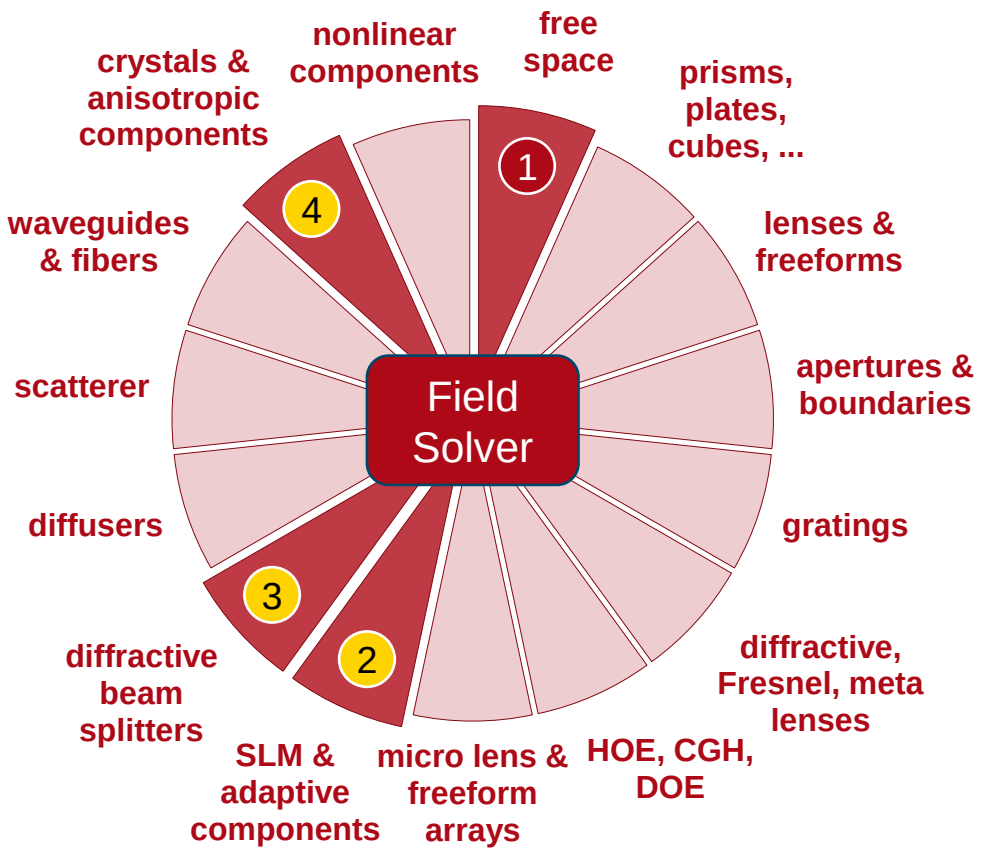
- Setup the Sagnac-Interferometer by manual channel configuration
  - Laser-Based Michelson Interferometer and Interference Fringe Exploration [Use Case]
  - Channel Setting for Non-Sequential Tracing [Use Case]

- Set the Fourier transforms properly
  - Fourier Transform Settings – Discussion at Examples [Use Case]



VirtualLab Fusion Technologies





idealized component

Document Information

title	Generation of Vector Beam by a Sagnac-Like Interferometer
document code	IFO.0018
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software version	2020.2 (Build 2.22)
category	Application Use Case
further reading	- Generation of Spatially Varying Polarization by Interference with Polarized Light - Vector Beam Generation with a SLM and a Common-Path Interferometer