

Scenario 278.01: Simulation of interferometer with temporal partially coherent light source

Demonstrate the modeling of a temporal partially coherent light source and the light propagation in an interferometer.

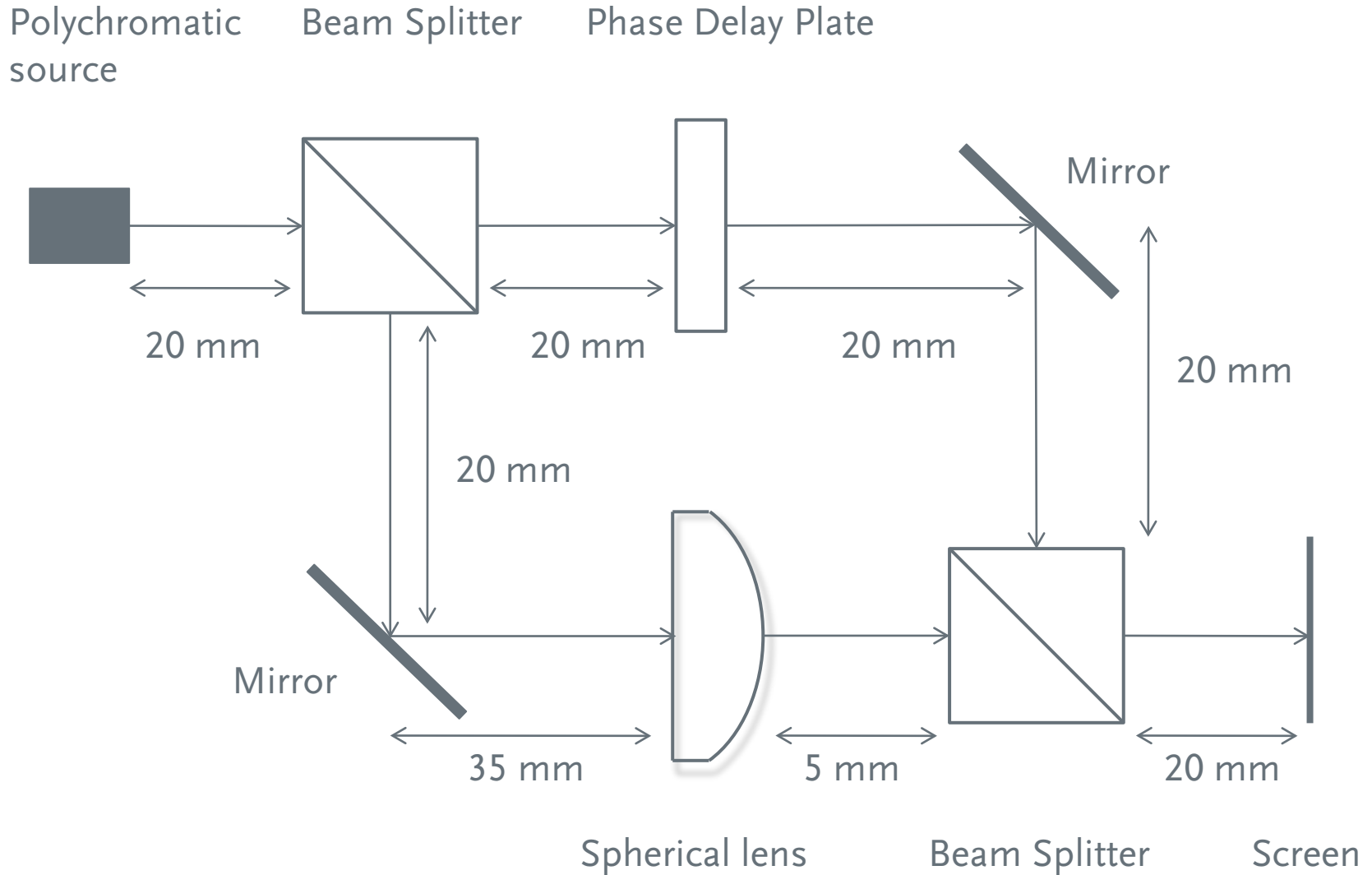
Keywords: temporal coherence, interferometer, spectral band width

Required Toolboxes: Starter Toolbox

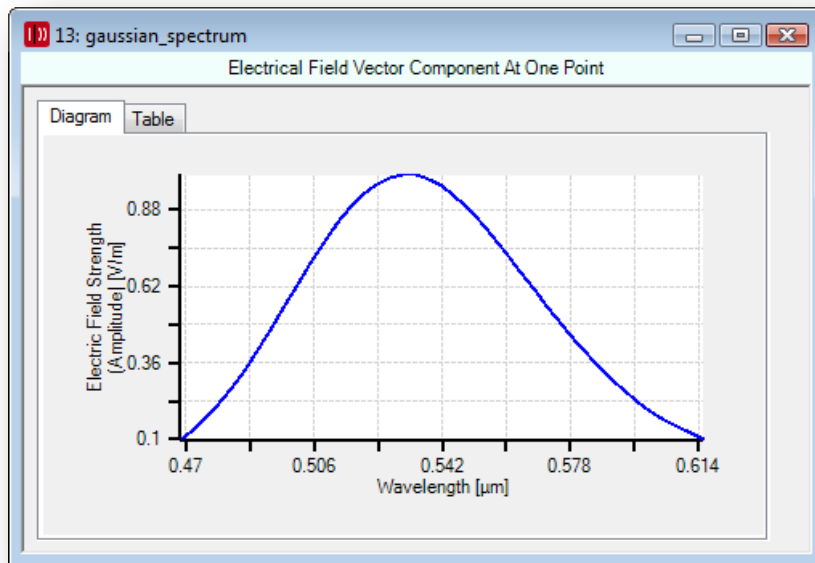
Related Tutorials:



Modeling Task

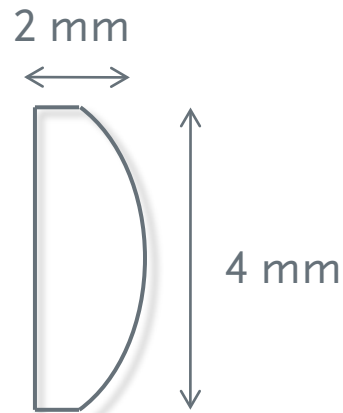
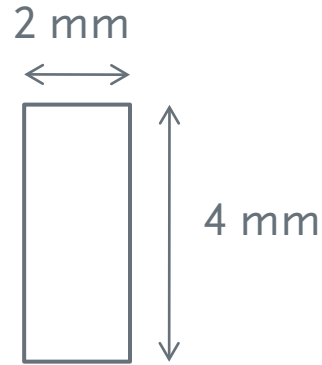


Modeling Task



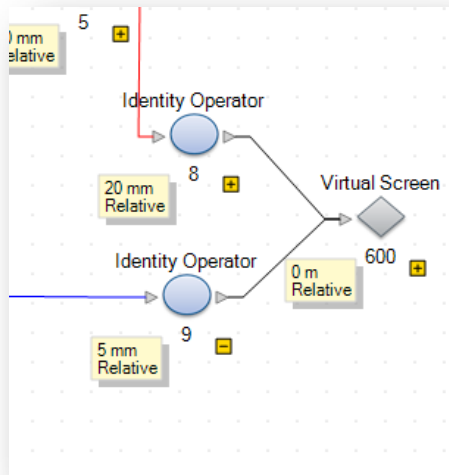
- The light source has constant intensity with 3.5 mm diameter.
- The center wavelength is 532 nm.
- Gaussian spectrum with 56 nm FWHM.
- Spectrum corresponds to a temporal coherence length of 5 μm.
- Spectral distribution can be generated with spectrum generators in light source menu.
- 41 wavelengths are used for simulation.

Modeling Task



- The interferometer measures a spherical lens with a radius of curvature of 100 mm.
- In the reference path a phase delay plate is used.
- Plate and lens are made of BK7.

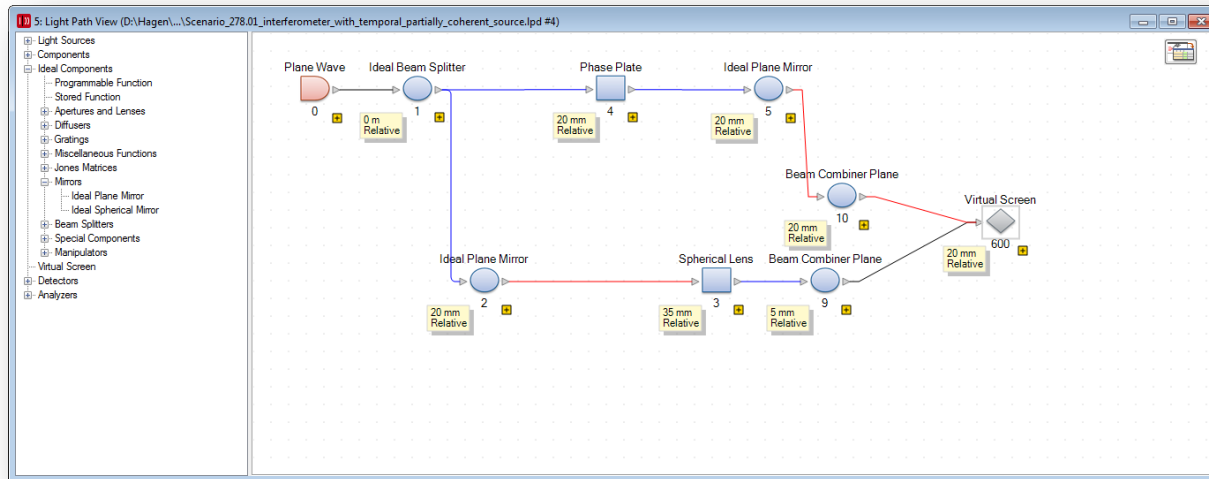
Modeling Task



Medium	Sum	Propagation Method
Standard Air in	Yes	Combined SPW/Fresnel Operato
Standard Air in	Yes	Combined SPW/Fresnel Operato

- Splitting of light beam by ideal beam splitter.
- Combining of laser beam by virtual screen. The screen must be switched in sum-mode to interfere the light distributions.

Light Path Diagram



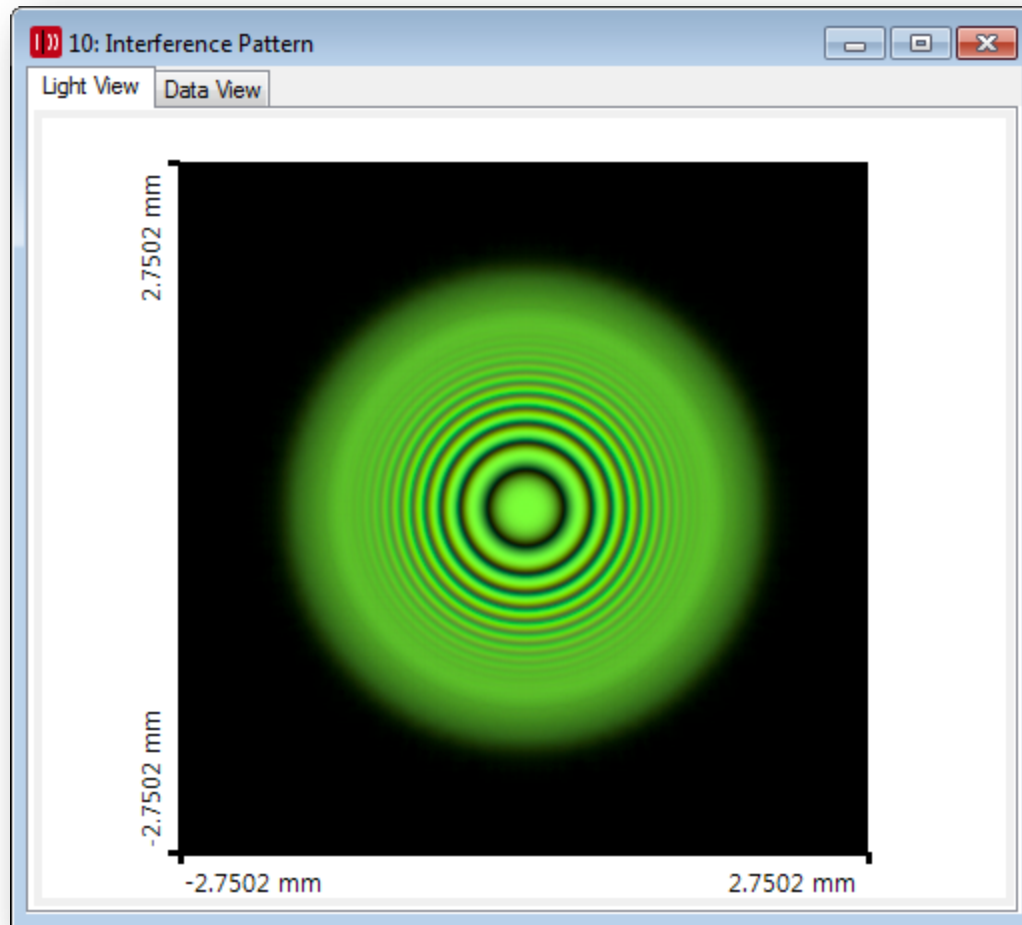
4: Light Path Editor (D:\Hagen\...\Scenario_278.01_interferometer_with_temporal_partially_coherent_source.lpd #4)

Path Detectors Analyzers

Start Element				Target Element		Linkage		
Index	Type	Channel	Medium	Index	Type	Propagation Method	On/Off	Color
✓ 0	Plane Wave	-	Standard Air in Homogen...	1	Ideal Beam Splitter	Combined SPW/Fresnel Operator	On	
✓ 1	Ideal Beam Splitter	0	Standard Air in Homogen...	4	Phase Plate	Combined SPW/Fresnel Operator	On	
✓ 4	Phase Plate	T	Standard Air in Homogen...	5	Ideal Plane Mirror	Combined SPW/Fresnel Operator	On	
✓ 5	Ideal Plane Mirror	R	Standard Air in Homogen...	10	Beam Combiner Plane	Combined SPW/Fresnel Operator	On	
✓ 1	Ideal Beam Splitter	1	Standard Air in Homogeneous Medium	2	Ideal Plane Mirror	Combined SPW/Fresnel Operator	On	
✓ 2	Ideal Plane Mirror	R	Standard Air in Homogen...	3	Spherical Lens	Combined SPW/Fresnel Operator	On	
✓ 3	Spherical Lens	T	Standard Air in Homogen...	9	Beam Combiner Plane	Combined SPW/Fresnel Operator	On	
9	Beam Combiner Plane	0	Standard Air in Homogen...					

Tools Re-Use Automatic Settings Simulation Type: Field Tracing Go!

Simulation Results



Summary

- VirtualLab™ can model temporal partially coherent sources.
- Modeling of interferometers possible.
- Interferences of partially coherent waves can be calculated.