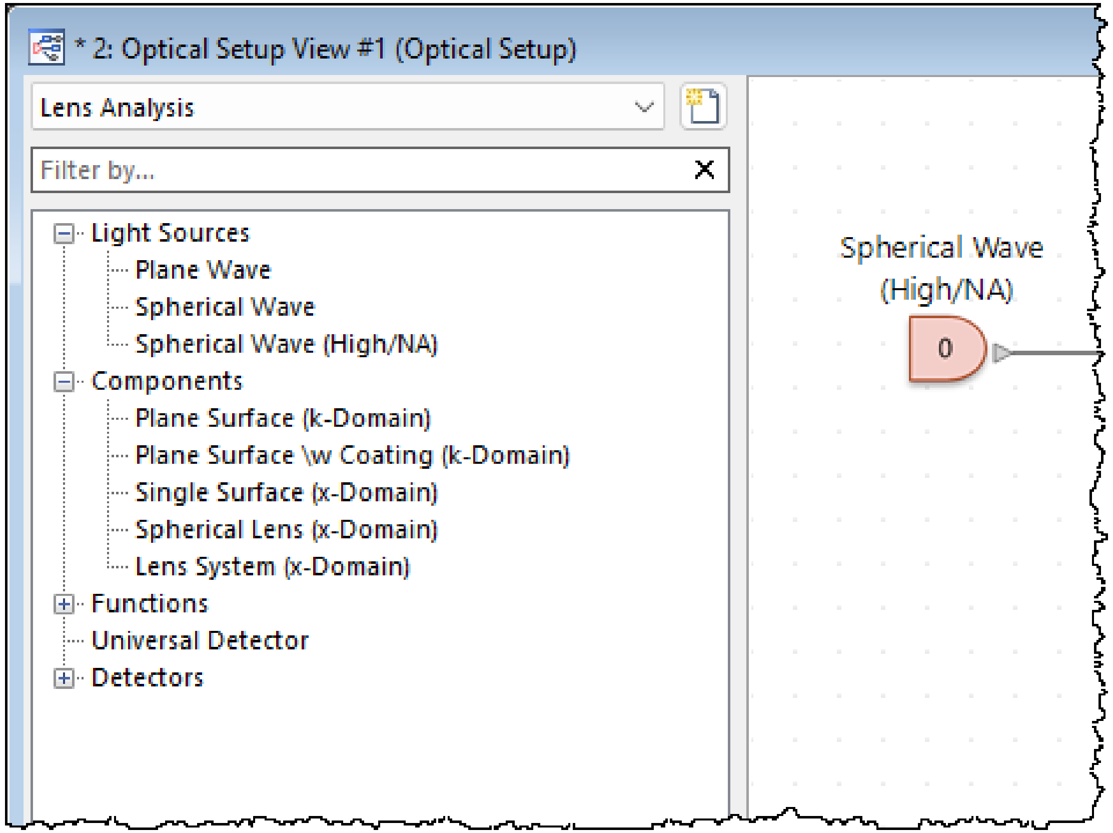
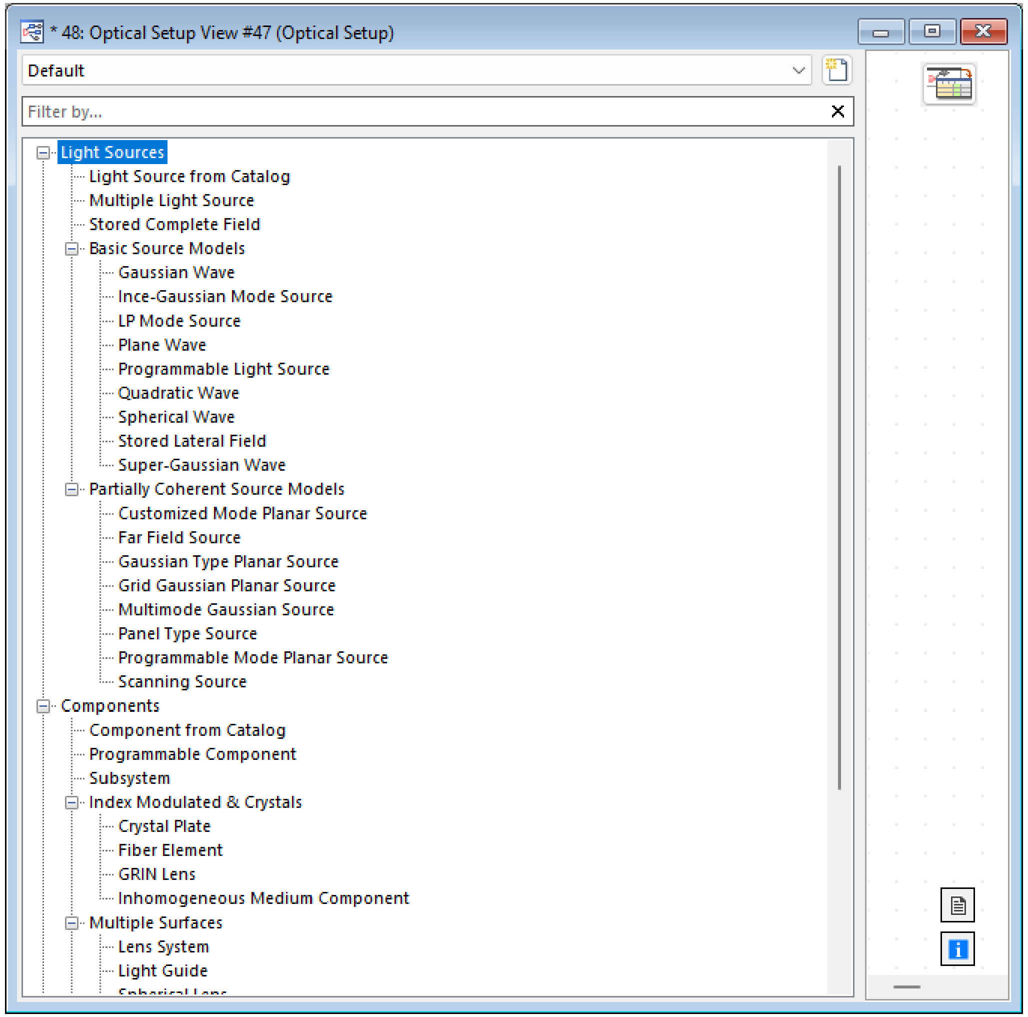
Customize Optical Trees Suitable to your Workflows

Abstract



VirtualLab Fusion provides a wide array of solutions for diverse applications, offering numerous sources, components, and detectors in the Optical Setup. To streamline personal workflows, users can restrict the available components to suit their specific needs.

This Use Case Shows ….

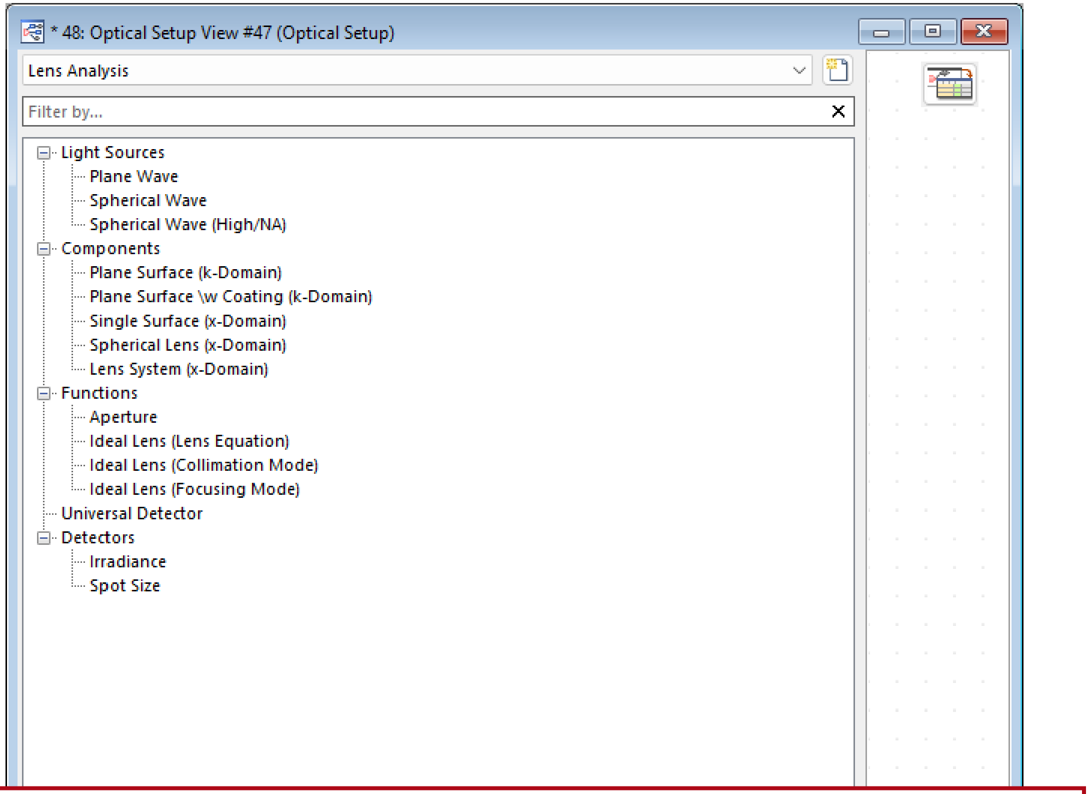


* 48: Optical Setup View #47 (Optical Setup)

Default

Filter by...

- Light Sources
  - Light Source from Catalog
  - Multiple Light Source
  - Stored Complete Field
  - Basic Source Models
    - Gaussian Wave
    - Ince-Gaussian Mode Source
    - LP Mode Source
    - Plane Wave
    - Programmable Light Source
    - Quadratic Wave
    - Spherical Wave
    - Stored Lateral Field
    - Super-Gaussian Wave
  - Partially Coherent Source Models
    - Customized Mode Planar Source
    - Far Field Source
    - Gaussian Type Planar Source
    - Grid Gaussian Planar Source
    - Multimode Gaussian Source
    - Panel Type Source
    - Programmable Mode Planar Source
    - Scanning Source
- Components
  - Component from Catalog
  - Programmable Component
  - Subsystem
  - Index Modulated & Crystals
    - Crystal Plate
    - Fiber Element
    - GRIN Lens
    - Inhomogeneous Medium Component
  - Multiple Surfaces
    - Lens System
    - Light Guide
    - Spherical Lens



* 48: Optical Setup View #47 (Optical Setup)

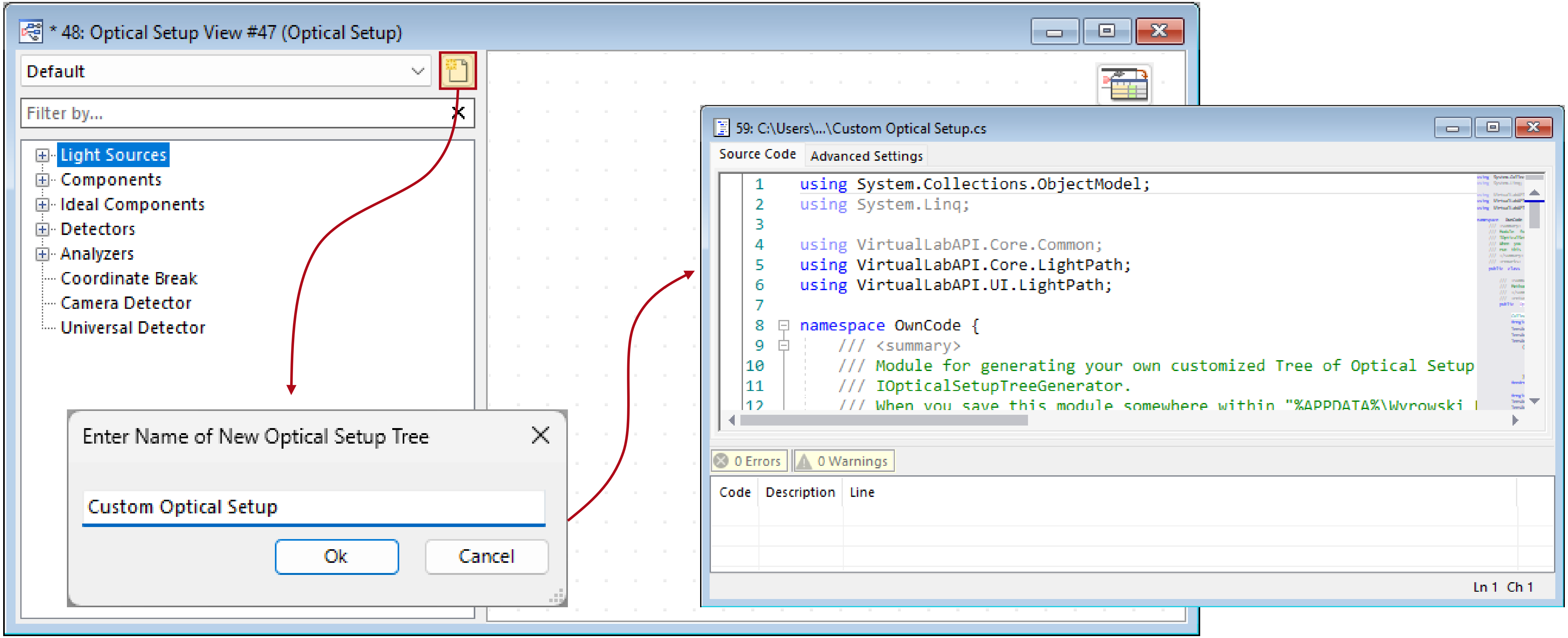
Lens Analysis

Filter by...

- Light Sources
  - Plane Wave
  - Spherical Wave
  - Spherical Wave (High/NA)
- Components
  - Plane Surface (k-Domain)
  - Plane Surface \w Coating (k-Domain)
  - Single Surface (x-Domain)
  - Spherical Lens (x-Domain)
  - Lens System (x-Domain)
- Functions
  - Aperture
  - Ideal Lens (Lens Equation)
  - Ideal Lens (Collimation Mode)
  - Ideal Lens (Focusing Mode)
- Universal Detector
- Detectors
  - Irradiance
  - Spot Size

… how to create custom Optical Setup trees that include only the elements necessary for your workflow.

Create Custom Optical Setup Trees



* 48: Optical Setup View #47 (Optical Setup)

Enter Name of New Optical Setup Tree

Custom Optical Setup

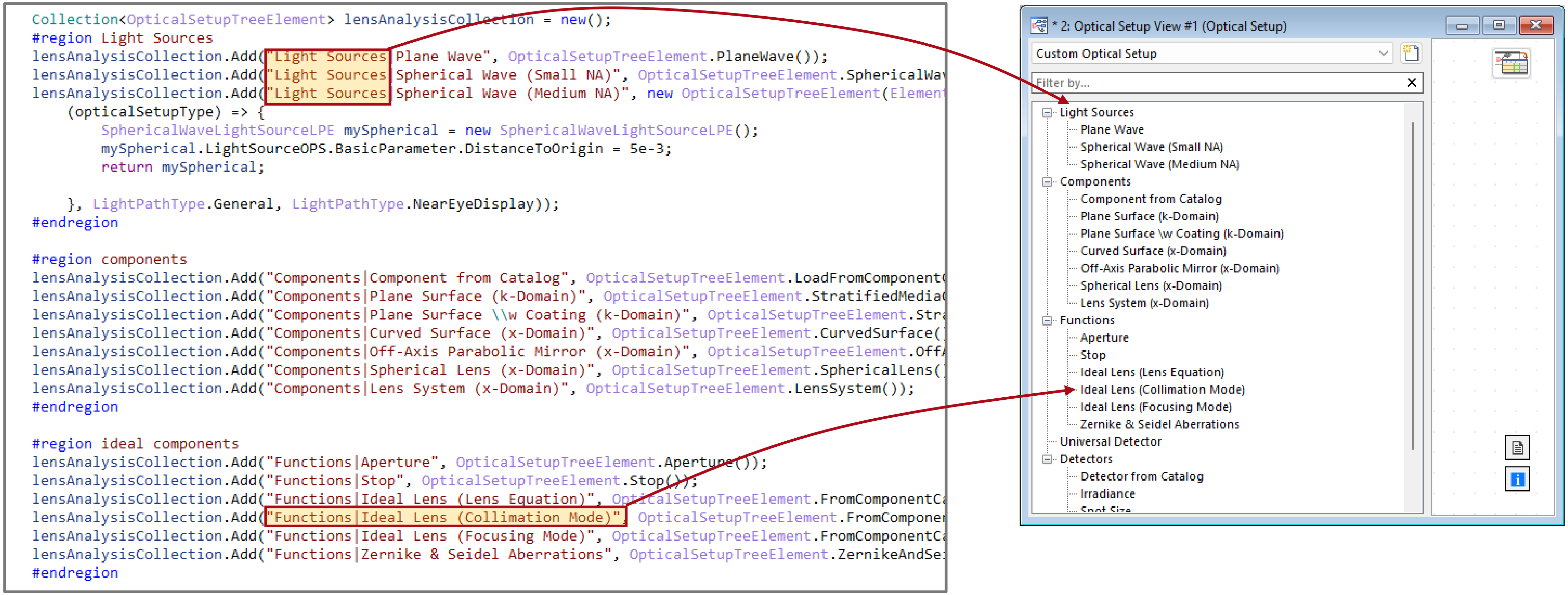
59: C:\Users\...\Custom Optical Setup.cs

```
using System.Collections.ObjectModel;
using System.Linq;

using VirtualLabAPI.Core.Common;
using VirtualLabAPI.Core.LightPath;
using VirtualLabAPI.UI.LightPath;

namespace OwnCode {
    /// <summary>
    /// Module for generating your own customized Tree of Optical Setup
    /// IOpticalSetupTreeGenerator.
    /// When you save this module somewhere within "%APPDATA%\Wyrowski
```

Module for Custom Optical Setup Trees



```
Collection<OpticalSetupTreeElement> lensAnalysisCollection = new();
#region Light Sources
lensAnalysisCollection.Add("Light Sources|Plane Wave", OpticalSetupTreeElement.PlaneWave());
lensAnalysisCollection.Add("Light Sources|Spherical Wave (Small NA)", OpticalSetupTreeElement.SphericalWa
lensAnalysisCollection.Add("Light Sources|Spherical Wave (Medium NA)", new OpticalSetupTreeElement(Element
    (opticalSetupType) => {
        SphericalWaveLightSourceLPE mySpherical = new SphericalWaveLightSourceLPE();
        mySpherical.LightSourceOPS.BasicParameter.DistanceToOrigin = 5e-3;
        return mySpherical;

    }, LightPathType.General, LightPathType.NearEyeDisplay));
#endregion

#region components
lensAnalysisCollection.Add("Components|Component from Catalog", OpticalSetupTreeElement.LoadFromComponent(
lensAnalysisCollection.Add("Components|Plane Surface (k-Domain)", OpticalSetupTreeElement.StratifiedMedia(
lensAnalysisCollection.Add("Components|Plane Surface \\w Coating (k-Domain)", OpticalSetupTreeElement.Stra
lensAnalysisCollection.Add("Components|Curved Surface (x-Domain)", OpticalSetupTreeElement.CurvedSurface(
lensAnalysisCollection.Add("Components|Off-Axis Parabolic Mirror (x-Domain)", OpticalSetupTreeElement.OffA
lensAnalysisCollection.Add("Components|Spherical Lens (x-Domain)", OpticalSetupTreeElement.SphericalLens(
lensAnalysisCollection.Add("Components|Lens System (x-Domain)", OpticalSetupTreeElement.LensSystem());
#endregion

#region ideal components
lensAnalysisCollection.Add("Functions|Aperture", OpticalSetupTreeElement.Aperture());
lensAnalysisCollection.Add("Functions|Stop", OpticalSetupTreeElement.Stop());
lensAnalysisCollection.Add("Functions|Ideal Lens (Lens Equation)", OpticalSetupTreeElement.FromComponentCa
lensAnalysisCollection.Add("Functions|Ideal Lens (Collimation Mode)", OpticalSetupTreeElement.FromCompone
lensAnalysisCollection.Add("Functions|Ideal Lens (Focusing Mode)", OpticalSetupTreeElement.FromComponentCa
lensAnalysisCollection.Add("Functions|Zernike & Seidel Aberrations", OpticalSetupTreeElement.ZernikeAndSe
#endregion
```

* 2: Optical Setup View #1 (Optical Setup)

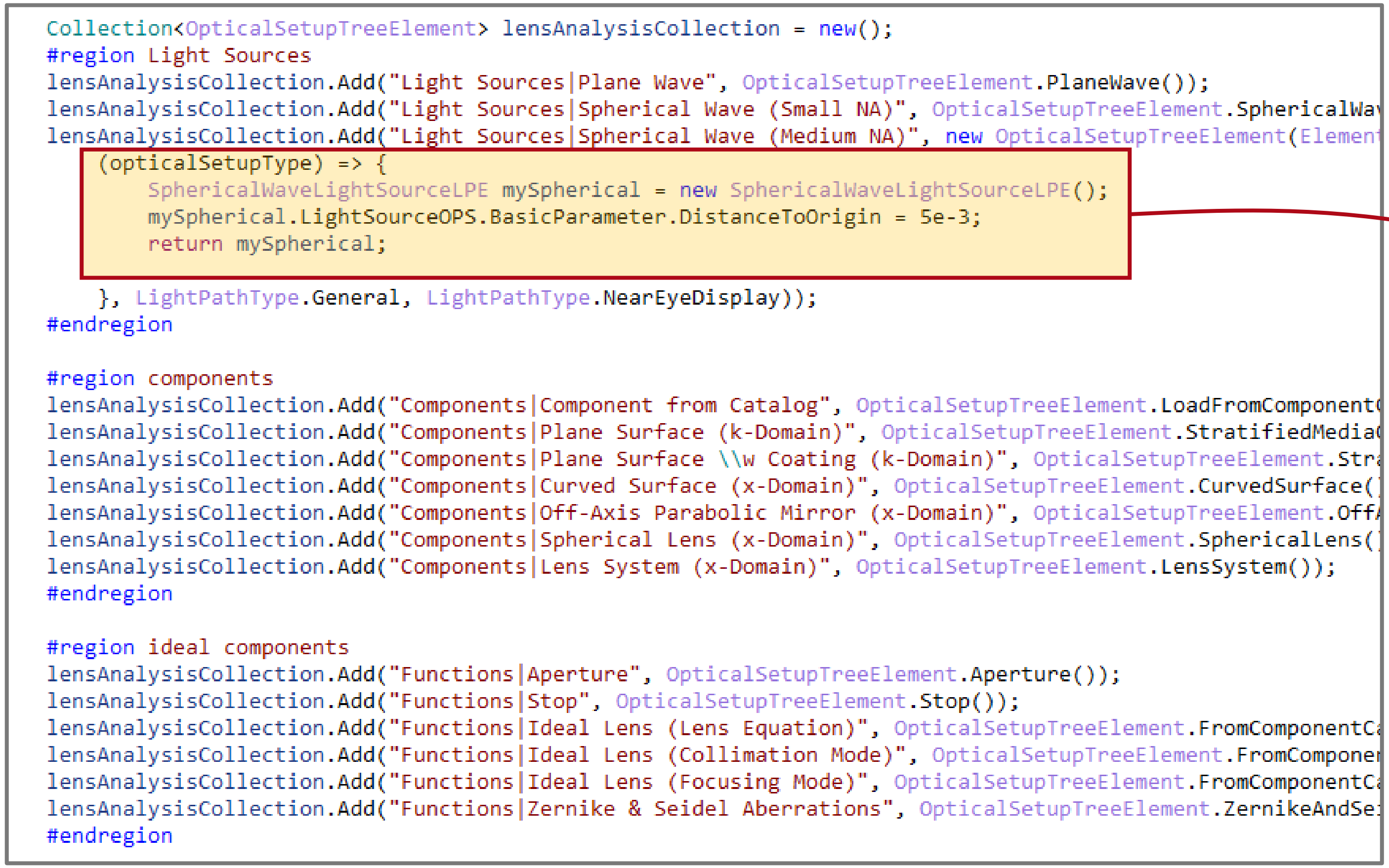
Custom Optical Setup

Filter by...

- Light Sources
  - Plane Wave
  - Spherical Wave (Small NA)
  - Spherical Wave (Medium NA)
- Components
  - Component from Catalog
  - Plane Surface (k-Domain)
  - Plane Surface \w Coating (k-Domain)
  - Curved Surface (x-Domain)
  - Off-Axis Parabolic Mirror (x-Domain)
  - Spherical Lens (x-Domain)
  - Lens System (x-Domain)
- Functions
  - Aperture
  - Stop
  - Ideal Lens (Lens Equation)
  - Ideal Lens (Collimation Mode)
  - Ideal Lens (Focusing Mode)
  - Zernike & Seidel Aberrations
- Universal Detector
- Detectors
  - Detector from Catalog
  - Irradiance
  - Spot Size

Using the inbuild module, the sections and entries of the Optical Setup can be customized.

Module for Custom Optical Setup Trees



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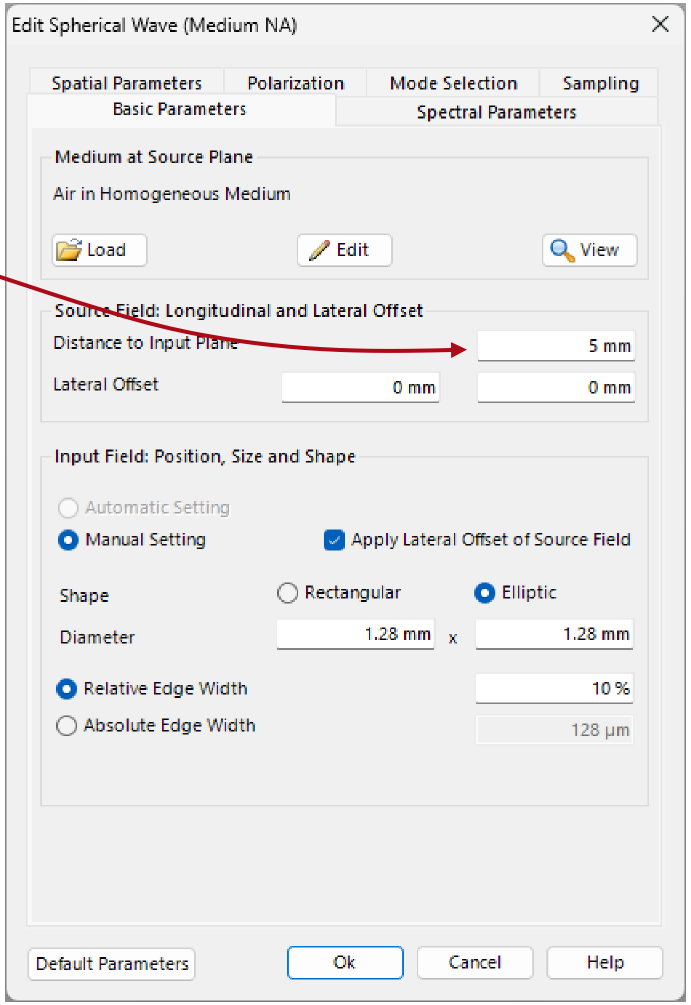
lensAnalysisCollection.Add("Light Sources|Spherical Wave (Small NA)", OpticalSetupTreeElement.SphericalWa
lensAnalysisCollection.Add("Light Sources|Spherical Wave (Medium NA)", new OpticalSetupTreeElement(Element
    (opticalSetupType) => {
        SphericalWaveLightSourceLPE mySpherical = new SphericalWaveLightSourceLPE();
        mySpherical.LightSourceOPS.BasicParameter.DistanceToOrigin = 5e-3;
        return mySpherical;

    }, LightPathType.General, LightPathType.NearEyeDisplay));
#endregion

#region components
lensAnalysisCollection.Add("Components|Component from Catalog", OpticalSetupTreeElement.LoadFromComponent
lensAnalysisCollection.Add("Components|Plane Surface (k-Domain)", OpticalSetupTreeElement.StratifiedMedia
lensAnalysisCollection.Add("Components|Plane Surface \\w Coating (k-Domain)", OpticalSetupTreeElement.Str
lensAnalysisCollection.Add("Components|Curved Surface (x-Domain)", OpticalSetupTreeElement.CurvedSurface(
lensAnalysisCollection.Add("Components|Off-Axis Parabolic Mirror (x-Domain)", OpticalSetupTreeElement.Off
lensAnalysisCollection.Add("Components|Spherical Lens (x-Domain)", OpticalSetupTreeElement.SphericalLens(
lensAnalysisCollection.Add("Components|Lens System (x-Domain)", OpticalSetupTreeElement.LensSystem());
#endregion

#region ideal components
lensAnalysisCollection.Add("Functions|Aperture", OpticalSetupTreeElement.Aperture());
lensAnalysisCollection.Add("Functions|Stop", OpticalSetupTreeElement.Stop());
lensAnalysisCollection.Add("Functions|Ideal Lens (Lens Equation)", OpticalSetupTreeElement.FromComponentC
lensAnalysisCollection.Add("Functions|Ideal Lens (Collimation Mode)", OpticalSetupTreeElement.FromCompone
lensAnalysisCollection.Add("Functions|Ideal Lens (Focusing Mode)", OpticalSetupTreeElement.FromComponentC
lensAnalysisCollection.Add("Functions|Zernike & Seidel Aberrations", OpticalSetupTreeElement.ZernikeAndSe
#endregion
```



Edit Spherical Wave (Medium NA)

Medium at Source Plane

Air in Homogeneous Medium

Source Field: Longitudinal and Lateral Offset

Distance to Input Plane: 5 mm

Lateral Offset: 0 mm 0 mm

Input Field: Position, Size and Shape

○ Automatic Setting

● Manual Setting ☑ Apply Lateral Offset of Source Field

Shape ○ Rectangular ● Elliptic

Diameter 1.28 mm x 1.28 mm

● Relative Edge Width 10 %

○ Absolute Edge Width 128 µm

It is also possible to directly pre-set parameters inside a component.

Document Information

title	Customize Optical Trees Suitable to your Workflows
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software version	2024.1 (Build 1.106)
category	Feature Use Case
further reading	- Working with the Property Browser in VirtualLab Fusion - Introduction to the Optical Setup