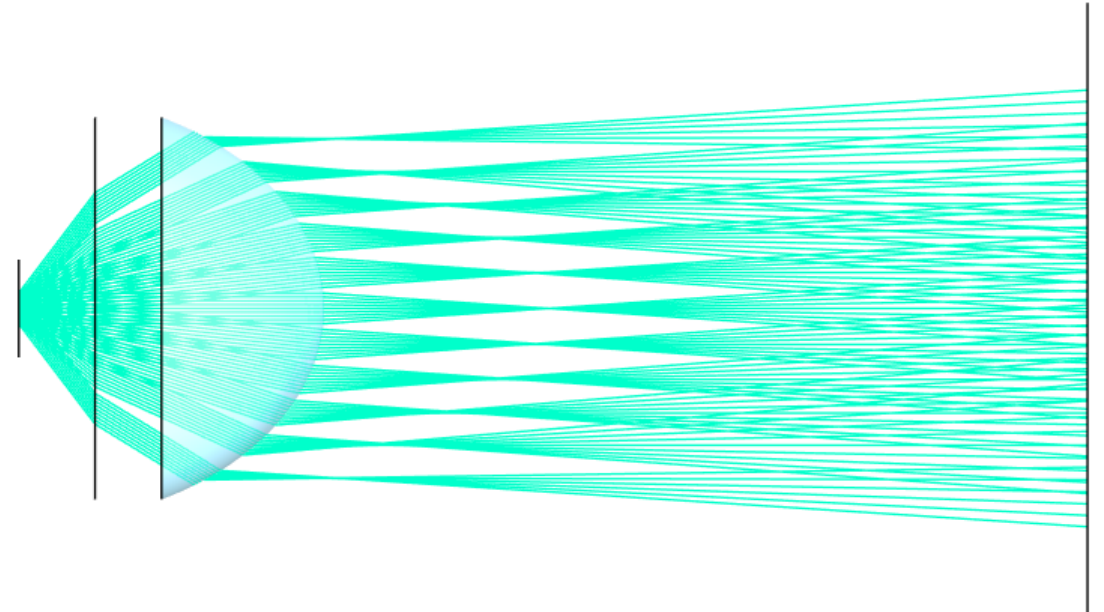


Collimating an Extended LED Source with a Wavefront Phase Modifier

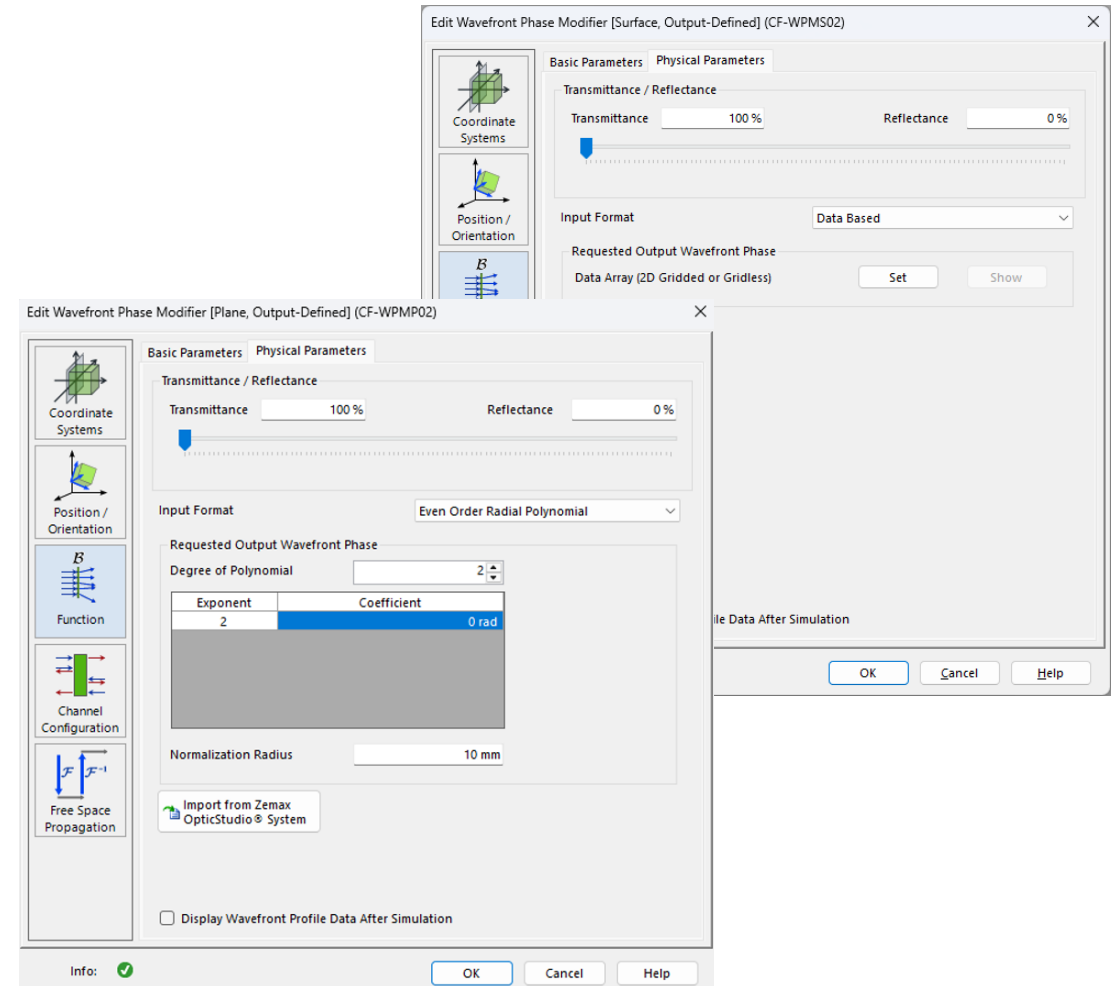
Document ID:	FD-WPM-LED
Version:	1.1
Date:	August 21, 2026
Author:	LightTrans International GmbH
Version:	2026.2
Package:	Platform



What Can Wavefront Phase Modifiers Be Used For?

Wavefront Phase Modifier Twins

- **CF-WPMP01: Wavefront Phase Modifier [Plane, Profile-Defined]** — Applies a prescribed phase profile on a plane.
- **CF-WPMP02: Wavefront Phase Modifier [Plane, Output-Defined]** — Derives and applies the required phase modification on a plane from the desired outgoing wavefront.
- **CF-WPMS01: Wavefront Phase Modifier [Surface, Profile-Defined]** — Applies a prescribed phase profile on a surface.
- **CF-WPMS02: Wavefront Phase Modifier [Surface, Output-Defined]** — Derives and applies the required phase modification on a surface from the desired outgoing wavefront.



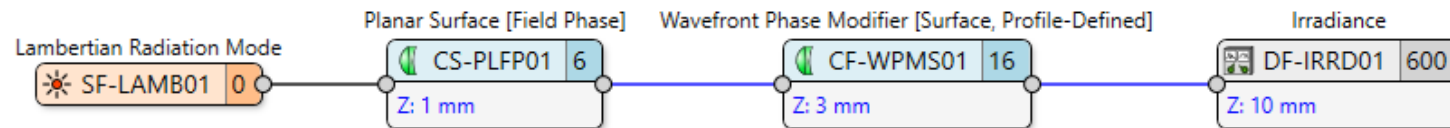
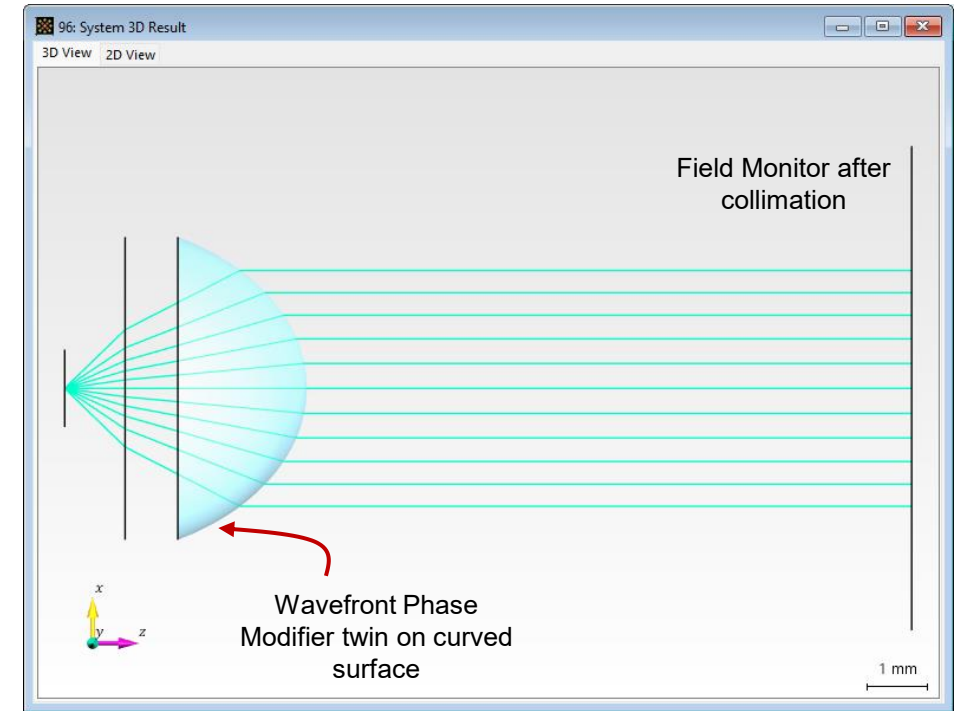
Configuring a Wavefront Phase Modifier Twin

* Find the specification sheets in the Documentation Ecosystem using the twin codes.

Demo: Collimating with a Wavefront Phase Modifier [Surface]

💡 Collimation of a Single Mode

- The demo uses an LED source represented by Lambertian modes.
- The LED emission is collimated by a dome lens.
- The dome lens is modeled as a Wavefront Phase Modifier on a spherical surface.
- The central Lambertian mode is used to determine the phase function required for collimation.

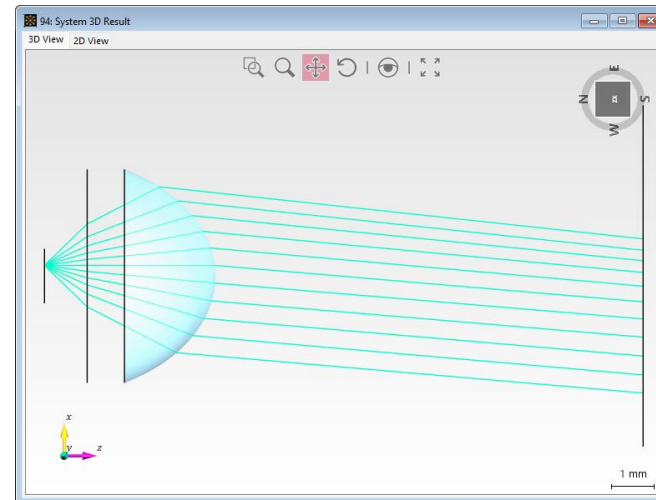
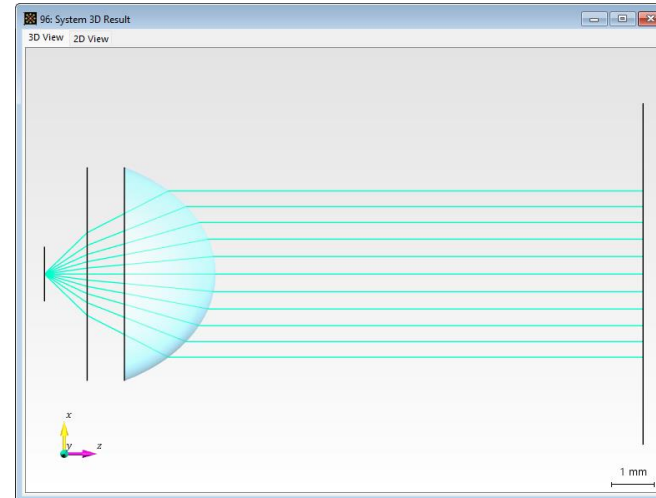


Results – Individual Modes

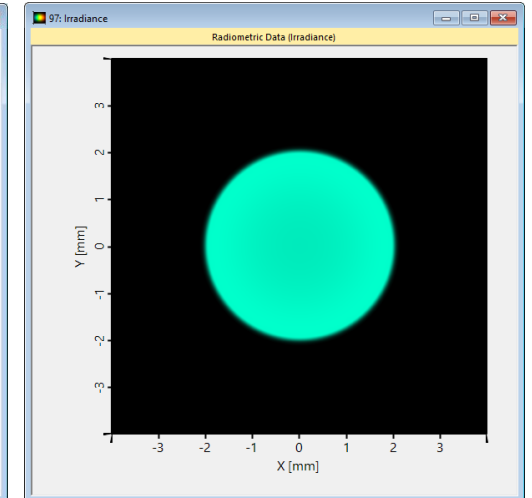
💡 Main Observation

- The central Lambertian mode is well collimated by the Wavefront Phase Modifier.
- Spatially shifted modes are also affected by the same collimating phase function.
- However, because these modes start from different source positions, they are not perfectly collimated in the same direction.

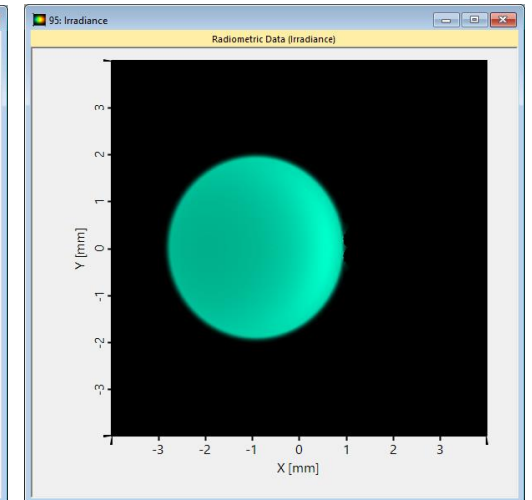
System visualization



Irradiance



On-axis Mode

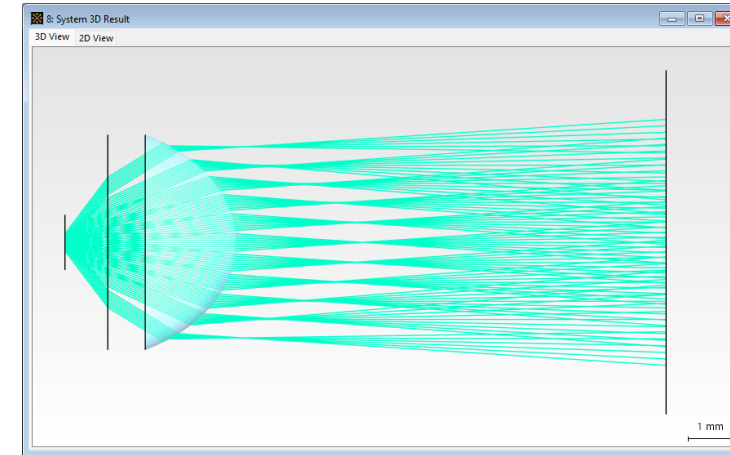


Off-axis Mode

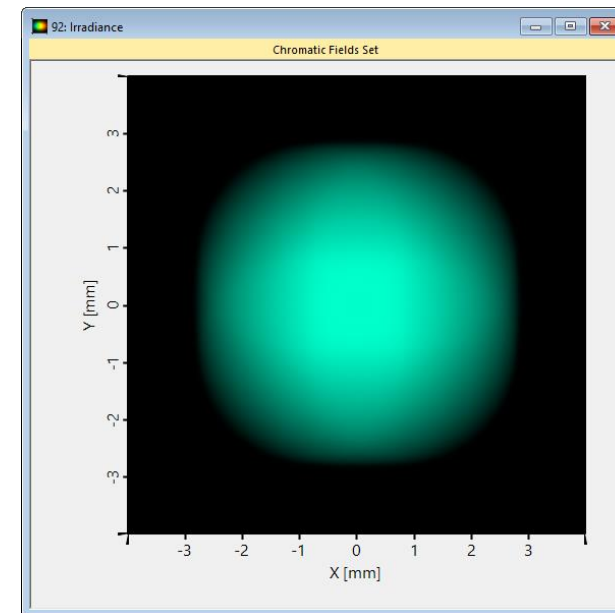
Results – Extended Source

💡 Main Observation

- As a result, the field after the dome lens still shows residual divergence.
- Because the modes of the extended source are mutually incoherent, their irradiance contributions can be added at the detector, resulting in a symmetric spot again.



System
Visualization

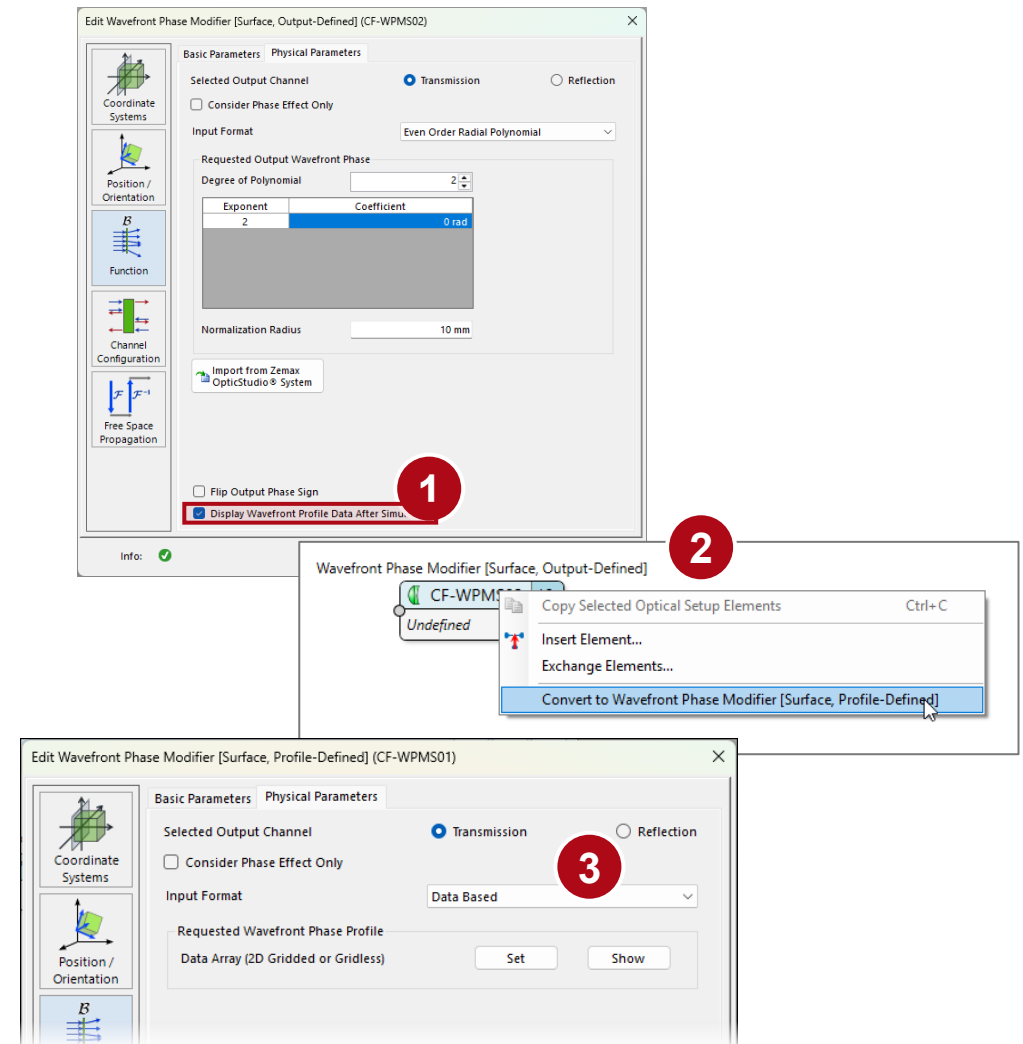


Irradiance
Pattern

Workflow

What the User Does

1. Add *Lambertian Radiation Mode*, *Wavefront Phase Modifier [Surface,Output]* and an *Irradiance* detector to your system.
2. Set desired wavefront in the *Wavefront Phase Modifier [Surface,Output]* to 0. Extract wavefront phase profile.
3. Convert *Wavefront Phase Modifier [Surface,Output]* to *Wavefront Phase Modifier [Surface,Profile]*.
4. Set *Input Format* to *Data Based*. Load your extracted wavefront phase profile.
5. Perform a *Parameter Run* shifting the coordinates of the *Lambertian Radiation Mode*.



Related Documents

Use Cases and Feature Demos

- [Beam Expander Simulation with Wavefront Phase Modifier Twins](#)
- [Transfer Wavefront Phase Profile to Metalens Twin](#)
- [Off-Axis Focus Correction for a Reflective Conical Surface](#)

Tutorials

- [Wavefront Phase Modifiers](#)