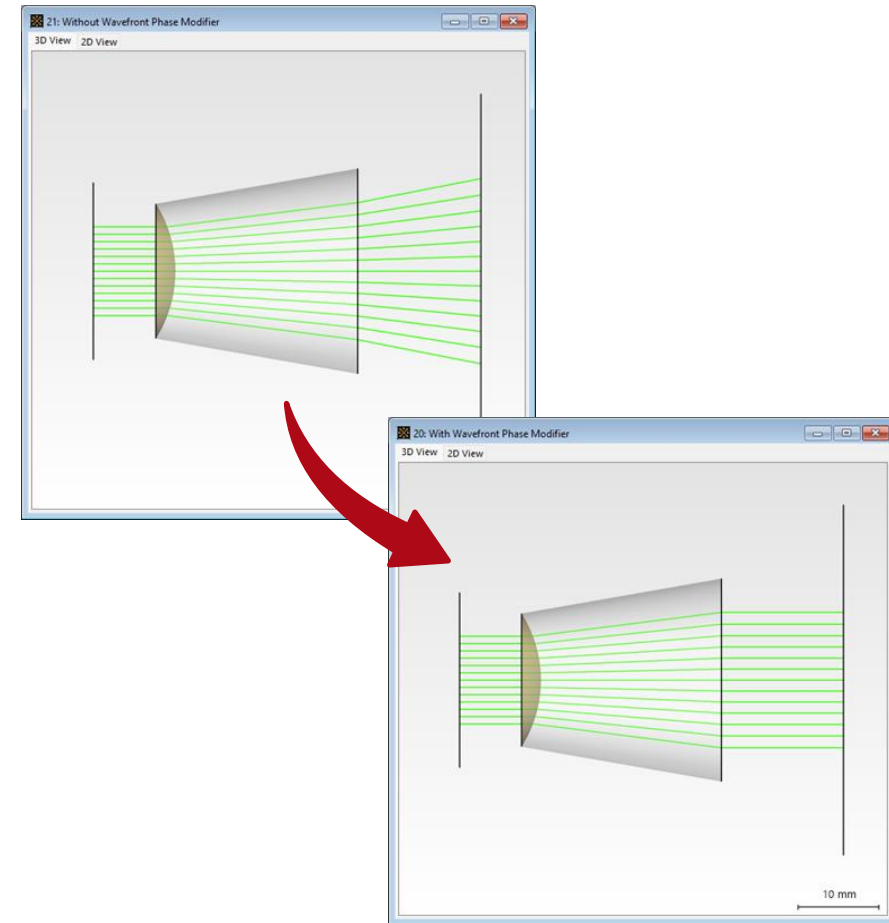


Beam Expander Simulation with Wavefront Phase Modifier Twins

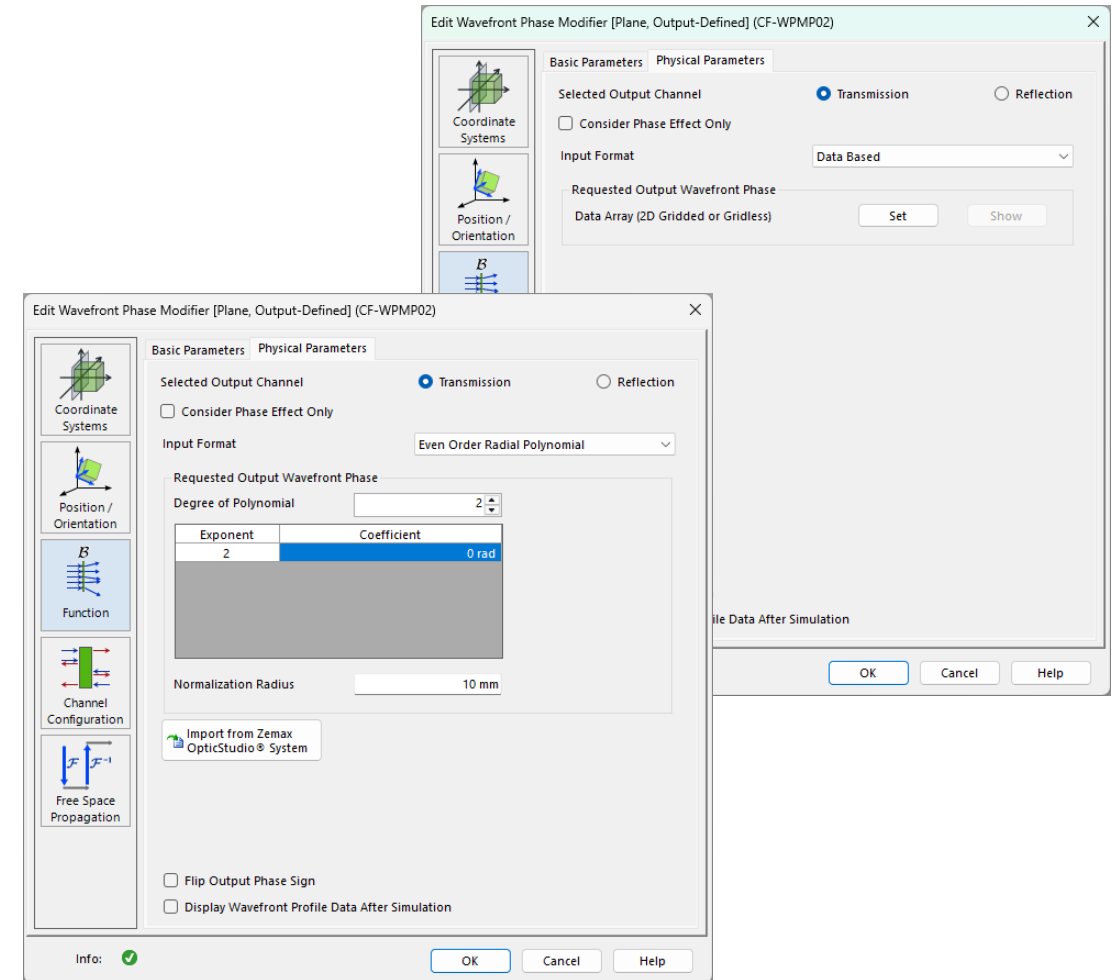
Document ID:	FD-WPM-EXPANDER
Version:	1.1
Date:	August 21, 2026
Author:	LightTrans International GmbH
Version:	2026.2
Package:	Platform



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 the phase correction on a plane from the desired output.
- **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 the phase correction on a surface from the desired output.



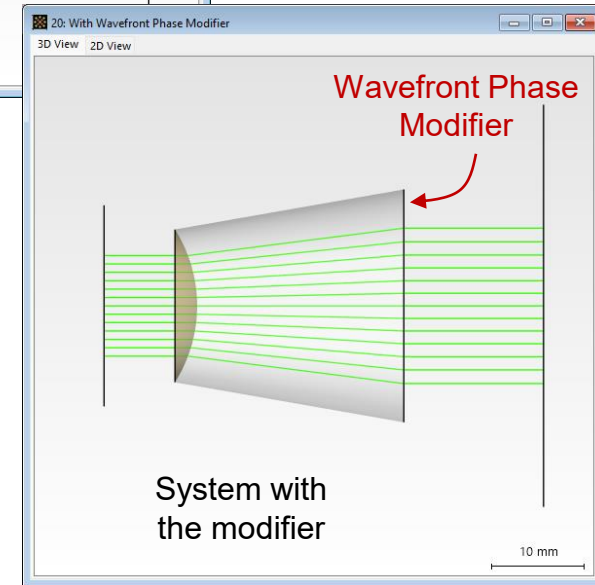
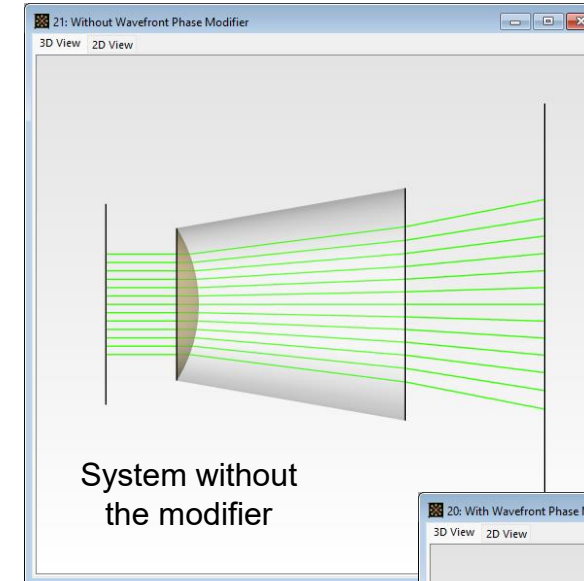
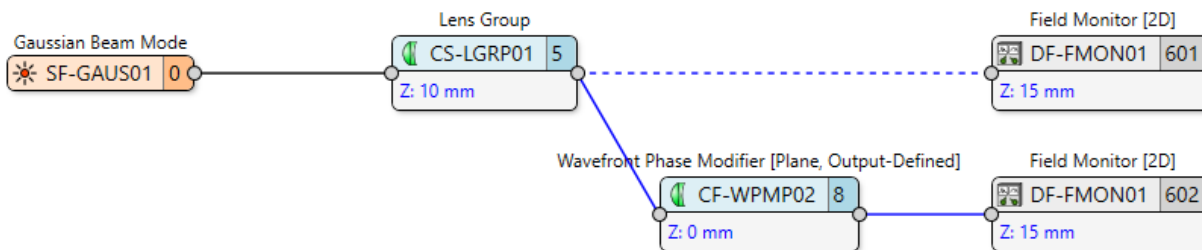
Configuring a Wavefront Phase Modifier Twin

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

Example: Wavefront Phase Modifier [Plane, Output-Defined]

Demonstrated Optical Setup

Component	Specification
Source	Gaussian, 532 nm, 3 mm waist radius
Beam-Expander	Convex-Plano, 1.5x beam expansion
Medium	N-BK7
Detector	EM-field & Wavefront

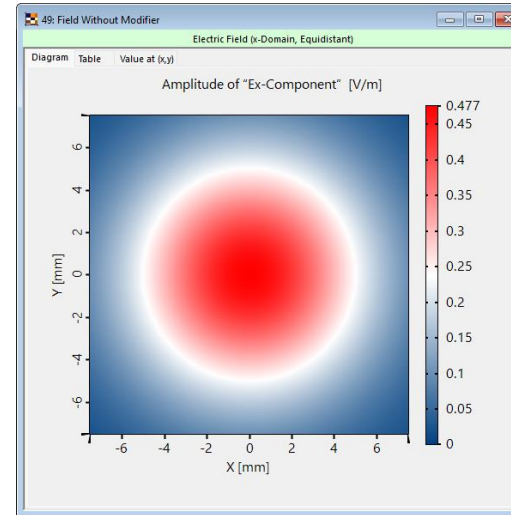


Results

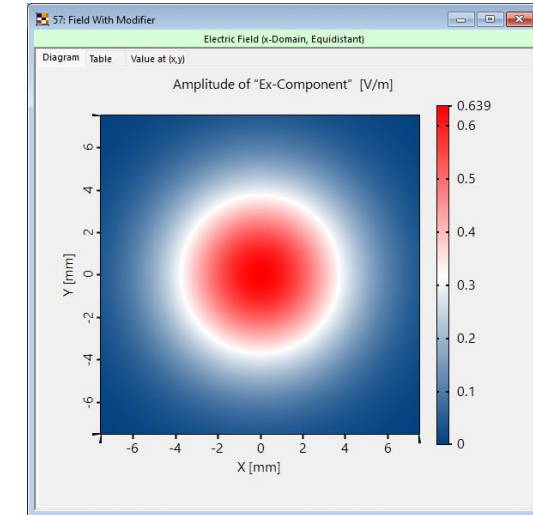
💡 Main Observation

- Without the modifier, the output beam is divergent and its wavefront phase is no longer planar.
- With correction, the beam is re-collimated and has a planar wavefront phase.
- The extracted $\Delta\psi$ describes the required phase correction. It can then be implemented as an HOE or metasurface on a planar surface.

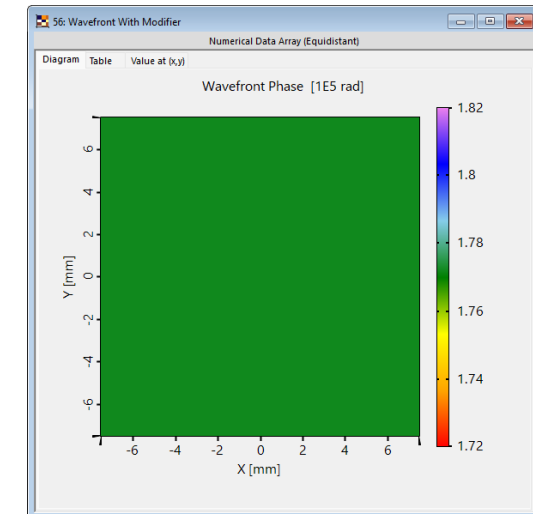
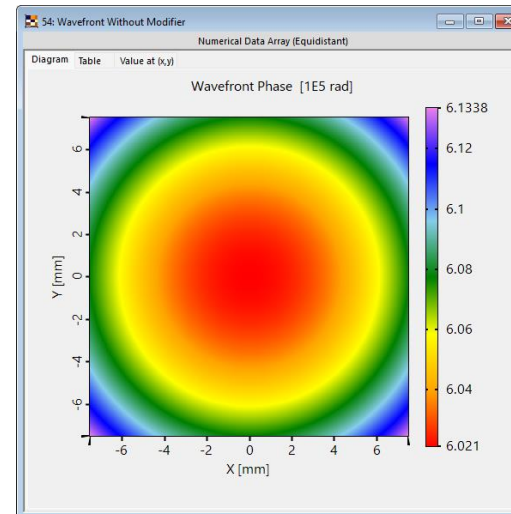
Without WPM



With WPM



Field Amplitude

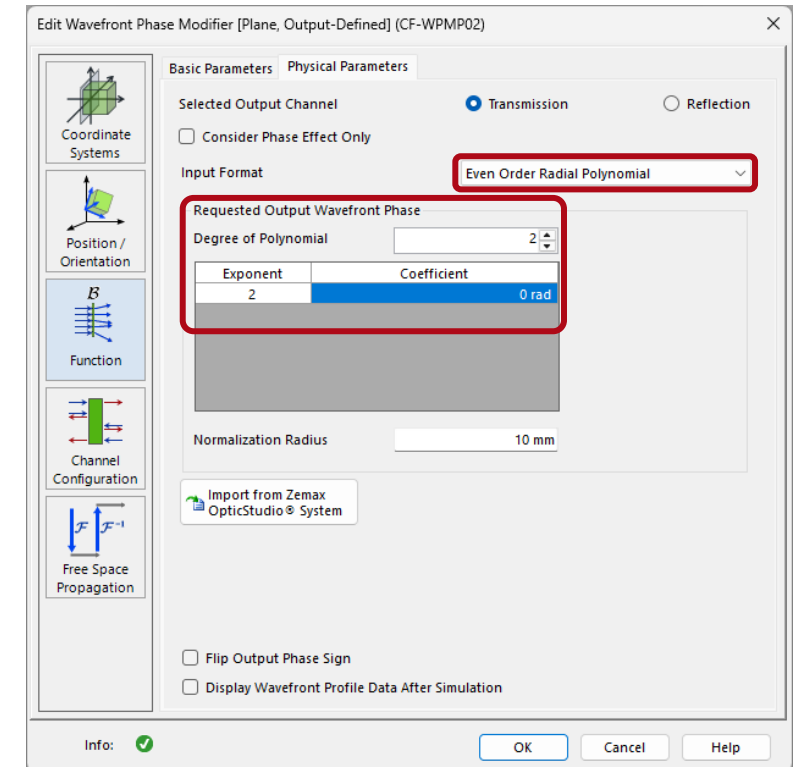
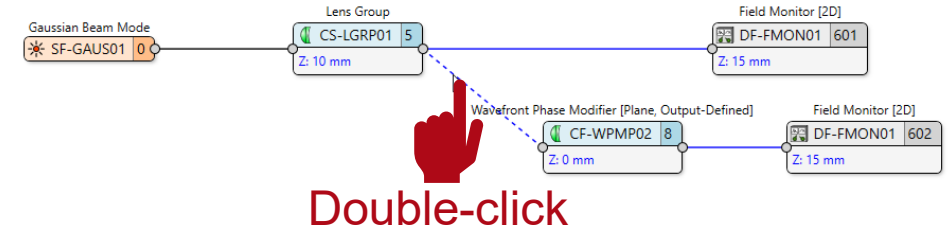


Wavefront Phase

Workflow

1 2 3 What the User Does

1. Open the optical system and run it without the Wavefront Phase Modifier twin.
2. Inspect the divergent output without the modifier.
3. Activate the connection towards the Wavefront Phase Modifier [Plane, Output-Defined] twin.
4. Select Even Order Radial Polynomial and set all coefficients to zero to define a plane target wavefront.
5. Run the simulation and inspect the re-collimated beam and extracted $\Delta\psi$.



Related Documents

Use Cases and Feature Demos

- [Collimation with a Metalens Based on Nanopillars](#)
- [Aberration Control via Metalens](#)
- [Wavefront Modifier Twins \(Aberration Correction\)](#)
- [Transfer Wavefront Phase Profile to a Metalens](#)

Tutorials

- [Wavefront Phase Modifiers](#)

→ Suggested Next Steps

- Apply Wavefront Phase Modifier twins on curved surfaces.
- Use a Wavefront Phase Modifier twin to compensate aberrations in an existing optical system.