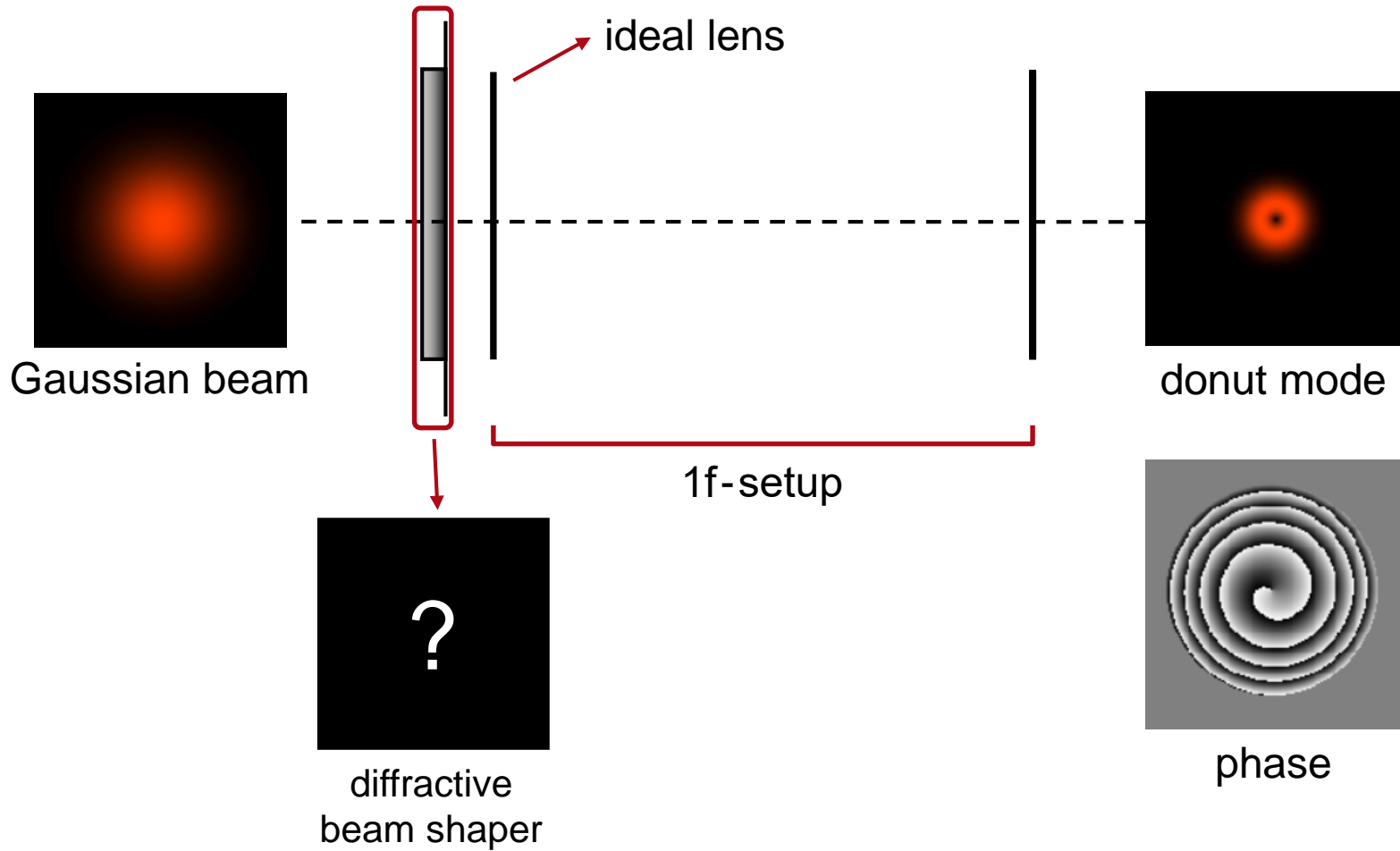


Light Shaping > Diffractive Optics

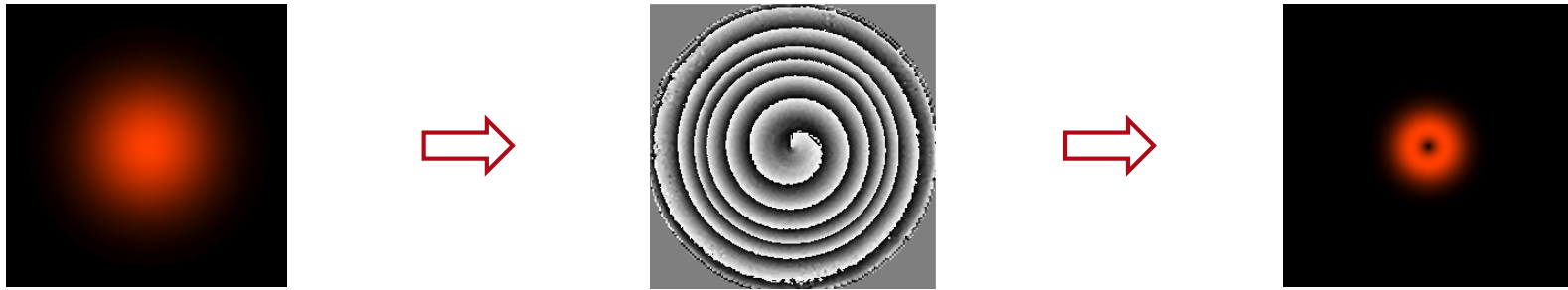
# Shaping of Gaussian Laser Beam into a Donut Mode

# Design Task Illustration



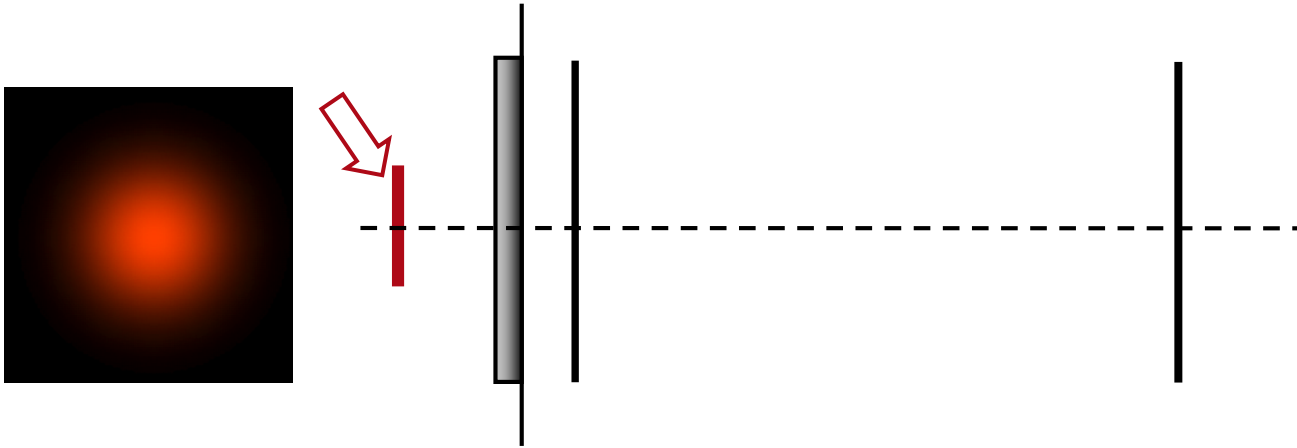
# Highlights

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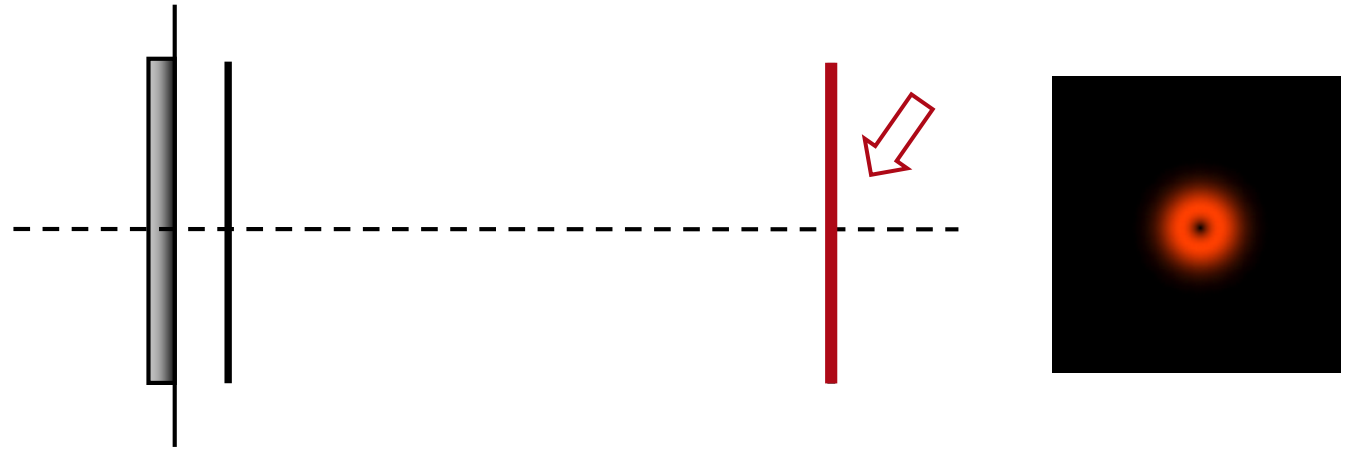
design of beam shaper to generate arbitrary pattern, which exhibits complex phase

# Specification: Illuminating Beam



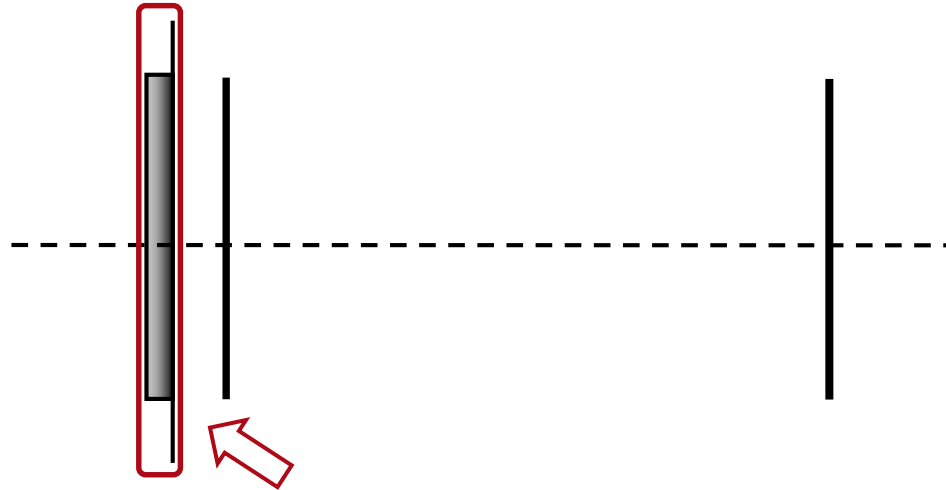
Parameter	Description / Value & Unit
type/number	Gaussian wave
coherence/mode	single Hermite Gaussian (0,0) mode
wavelength	632.8 nm
polarization	linear in x-direction (0°)
waist radius ( $1/e^2$ )	$500\mu\text{m} \times 500\mu\text{m}$

# Specification: Desired Output Field



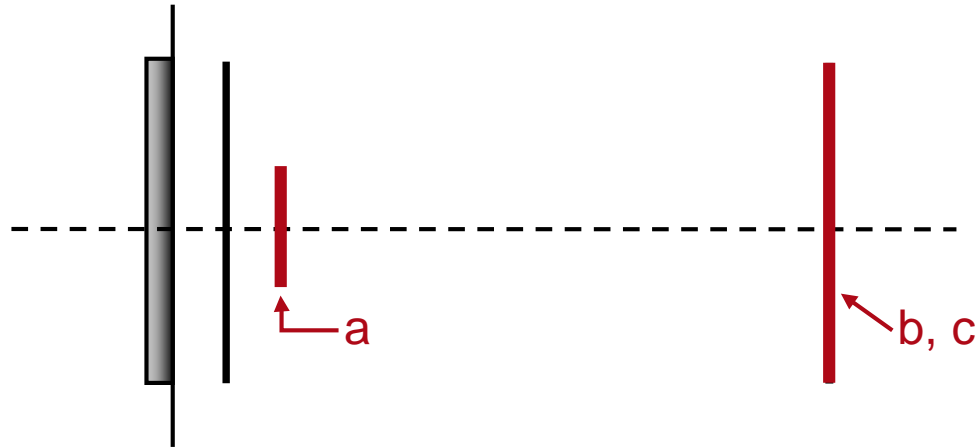
Parameter	Description / Value & Unit
type/number	donut mode
coherence/mode	single Laguerre Gaussian mode (0,1)
polarization	linear in x-direction (0°)
waist radius (1/e <sup>2</sup> )	250μm × 250μm

# Specification: Design Parameter



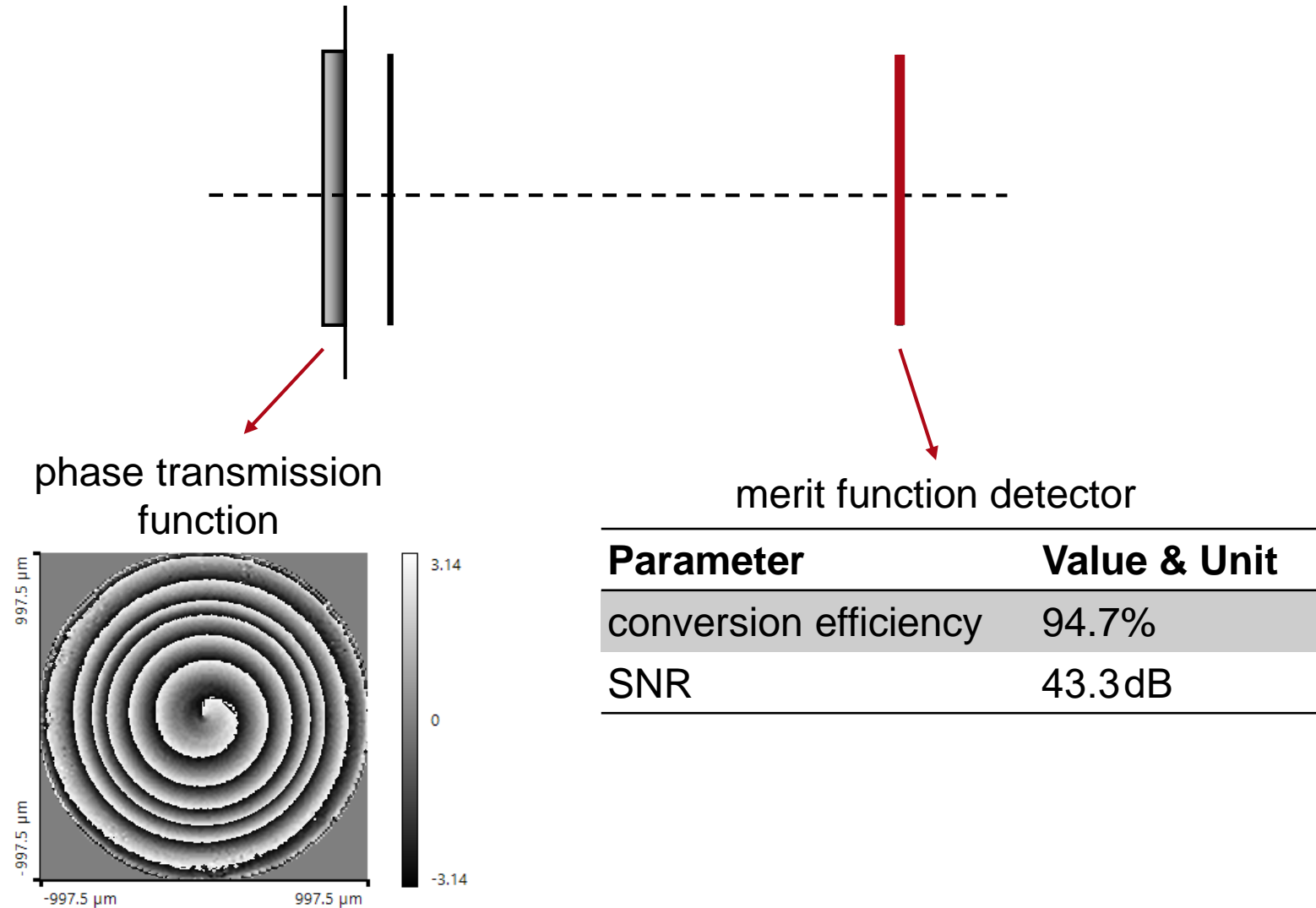
Parameter	Description / Value & Unit
diameter of diffractive element	2mm x 2mm (round)
quantized phase levels	16
type of setup	1f-setup (ideal lens, focal length 50mm)
pixel size	> 100nm
desired conversion efficiency	> 95%
desired signal to noise ratio (SNR)	> 30dB

# Specification: Detectors



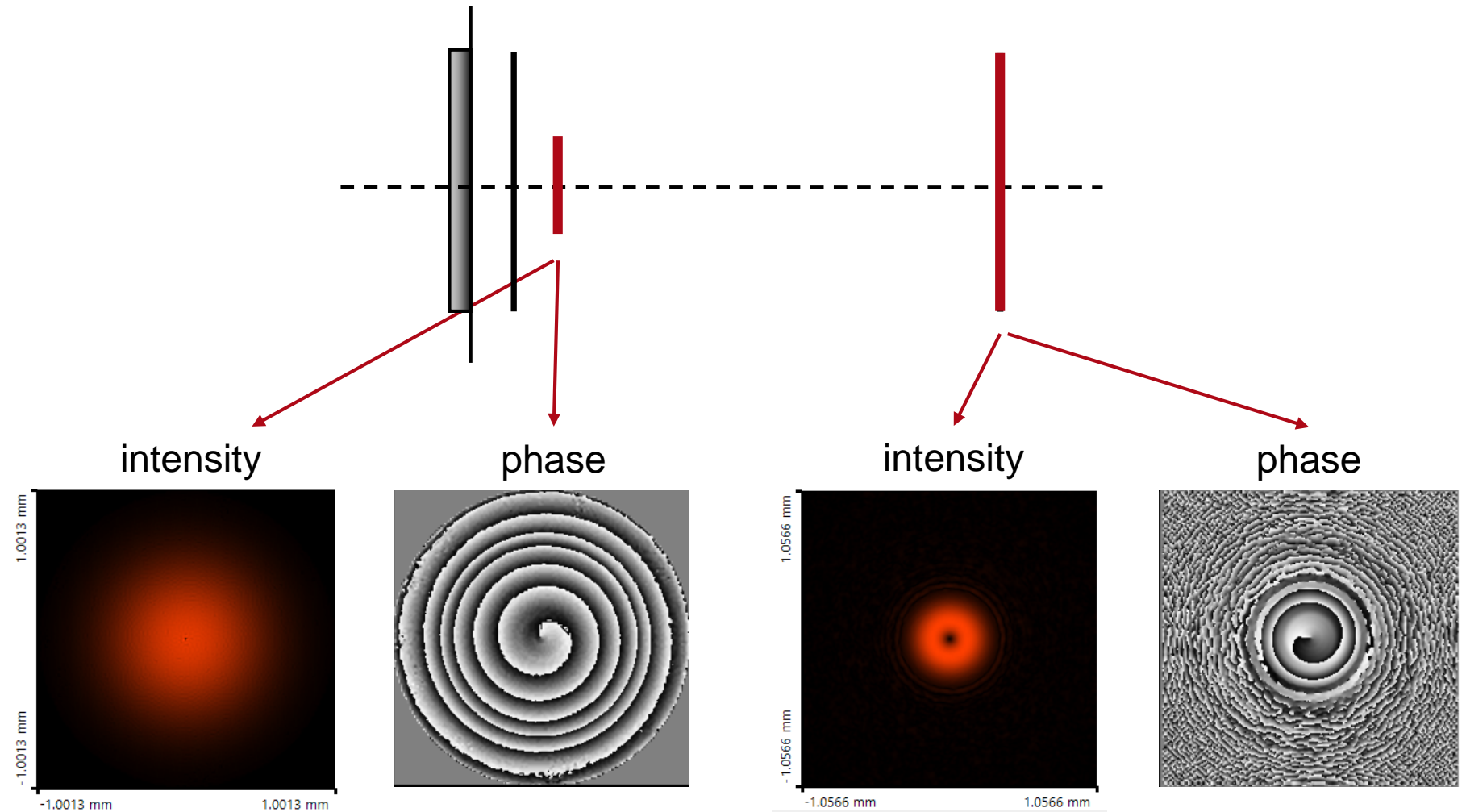
Position	Modeling Technique	Detector/Analyzer
a	field tracing	2D intensity distribution
b	field tracing	2D intensity distribution
c	field tracing	merit function detector

# Result: Diffractive Beam Shaper Design





# Result: Field Tracing



# Document & Technical Info

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code	DO.0001
version of document	1.0
title	Shaping of Gaussian Laser Beam into a Donut Mode
category	Diffractive Optics (DO)
created by	Zongzhao Wang (LightTrans)
used VL version	7.0.0.29

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## Specifications of PC Used for Simulation

Processor	i7-4700MQ (4 CPU cores)
RAM	16GB
Operating System	Windows 10