Vortex Lens

Holo-Or introduces the VL series Vortex lenses that consist of pure fused silica or ZnSe with an optional high power AR V-Coating on both surfaces, which makes them superior to competing solutions. This can reduce the back reflection to a typical 0.2% (0.1% per surface).

Vortex DOEs are used in laser applications to improve the performance in applications by modifying the M^2 of the laser.

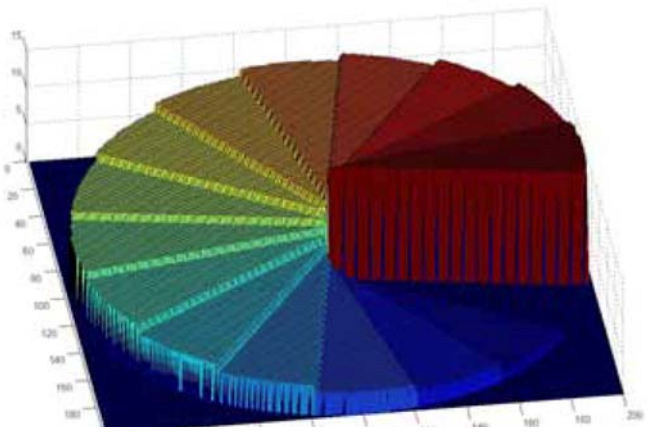
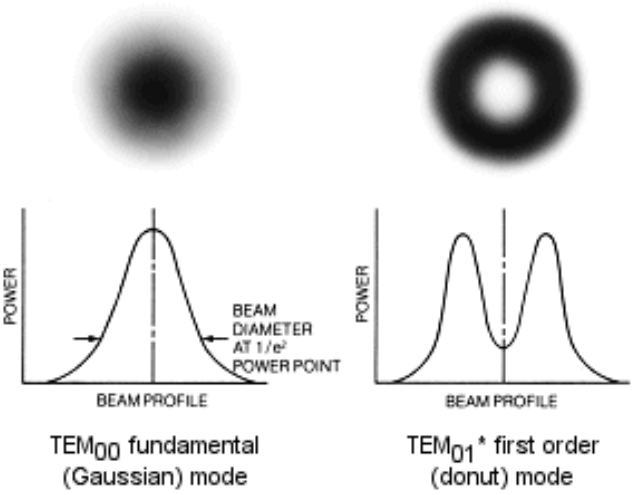


Fig 1.
False color image of the surface profile of a Vortex lens having 16 levels

POSSIBLE MODIFICATIONS ARE:

- Turn TEM_{00} to TEM_{01}
- Modify modes of laser
- Change a Gaussian beam into a ring profile



TEM_{00} fundamental (Gaussian) mode

TEM_{01}* first order (donut) mode

DESIGN CONSIDERATIONS

- Steep transition region
- Not sensitve to beam diameter
- Long working depth

FEATURES

- High damage threshold
- Low back reflection
- Ar/Ar coated option
- High efficiency

APPLICATIONS

- Astronomy
- Laser Physics
- Optical tweezers
- Optical pattern recognition
- Encryption

Application note: The Vortex Lens has a variety of applications. Some of them can be found at www.u.arizona.edu/~grovers/SO//so.html

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STANDARD VORTEX LENS

Wavelength	Material	Part number	Levels	Part number	Levels	Part number	Levels
532 nm	Fused Silica	VL-4-532	4	VL-8-532	8	VL-209-Q-Y-A	16
800 nm	Fused Silica	VL-4-080	4	VL-8-080	8	VL-209-M-Y-A	16
1064 nm	Fused Silica	VL-4-106	4	VL-8-106	8	VL-209-I-Y-A	16
10600 nm	ZnSe	VL-4-1060	4	VL-8-1060	8	VL-209-A-Y-A	16
Diffraction Efficiency (Estimated Grade A)			77%		~92%		~95%

OPTIONS

Coating	ARAR	Back Reflection < 0.5%
	NC	Back Reflection < 9%
Grades	A	Less than 5% energy in Zero Order
	B	Less than 20% energy in Zero Order
	C	Typical less than 30% energy in Zero Order

DIMENSIONS

Dimensions	25.4 mm dia	11 mm dia
Clear Aperture	22 mm dia	9.0 mm dia

GENERAL SPECIFICATIONS

	Ar/Ar Coated	Uncoated	Possible for Custom design
Transmission Efficiency	> 95%	> 85%	> 97%
Zero Order	Depend on Grade	Depend on Grade	< 2.5%
Back Reflection	< 0.5%	< 9%	< 0.2%

Angle of incidence	0°
Damage threshold coating @ 1064 nm	> 10 J/cm² (@ 5 ns)
Damage Threshold Part	Depends on wavelength and end of life definition, generally close to threshold coating

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