

What is Diffractive Optics?

A Diffractive Optical Element (DOE) uses thin micro-structure patterns to alter the phase of the light propagated through it. Those micro-structures, once properly designed, can manipulate the light to almost any desired intensity profile or shape.

This technology enables many functions and light manipulations which are not feasible with standard refractive optics. In many applications those functions are very beneficial and significantly improve the system's performances.

HOLO/OR can produce DOEs out of Fused Silica, Sapphire, ZnSe, Polymer on Glass, Polycarbonate, PMMA and more.

Typically, a DOE is designed for a specific wavelength, but there are some exceptions.

Contact us with your specifications to discuss the suitable solution for your requirement!



Company Overview

HOLO/OR develops, designs and manufactures Diffractive Optical Elements (DOEs), micro-optical elements and opto-mechanical modules. Our products are being used for various applications mainly involving high-precision and high-power lasers. Hundreds of customers from around the globe are already using our technology.

HOLO/OR was founded in 1989, and was the very first company to develop high-efficiency DOEs for commercial use at affordable prices. thereafter, **HOLO/OR** developed a process for high laser damage threshold (LDT) DOEs which until today only a few companies worldwide are able to offer.

In the past decades, **HOLO/OR** gained considerable know-how experience in design, simulations and manufacture of DOEs, using its in-house IP software and tools. **HOLO/OR** works with hundreds of customers and 8 active distributors in 4 continents. We work with most of the largest laser companies in the USA, China, Japan, South Korea and Germany.



Beam Splitting Products

Beam splitter elements are used to split a single laser beam into several beams, each with the same characteristics as the original beam.

HOLO/OR's diffractive beam splitters can be manufactured either on a flat or plano-convex lens, producing a focused multi-spot (MS) pattern with an inter-spot distance at a specific working distance defined by the customer.

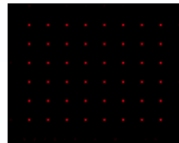
The spots pattern can be aligned in a line, matrix or in any other custom shape such as hexagon, cross, round, triangle and more.

In addition to standard beam splitters, **HOLO/OR** offers the possibility to choose the number of spots and their locations, as a part of its custom design and manufacturing capability.

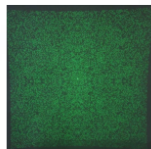
Our beam splitters are used in a wide variety of Medical, Industrial, Vision and Research applications.



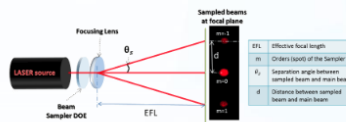
BEAM SPLITTER 1D STANDARD PRODUCTS



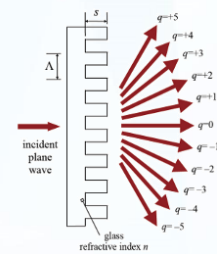
BEAM SPLITTER 2D STANDARD PRODUCTS



RANDOM DOT GENERATOR FOR 3D SENSING AND LIDAR APPLICATIONS



DIFFRACTIVE BEAM SAMPLERS



TRANSMISSION GRATINGS

Features

- Accurate custom separation angle
- Insensitive to X-Y-Z displacement
- Any input beam shape (SM / MM)
- Custom spots alignment
- Wavelength UV to IR
- High power threshold
- Optional AR/AR coating

Typical Applications

- Parallel material processing
- Fractional aesthetic treatment
- Laser scribing (solar cells)
- Machine vision & 3D sensing
- Glass dicing (LCD displays)
- Real-time laser monitoring and profiling
- Spectroscopy and microscopy

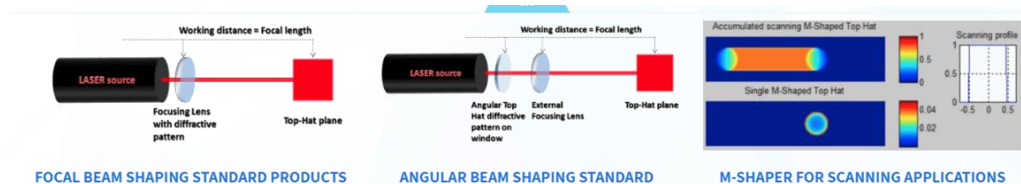
Beam Shaping Products

Beam shaping elements are used to transform a near-gaussian incident laser beam into a **uniform-intensity** spot of either round, rectangular, square, line or other shape with sharp edges in a specific work plane.

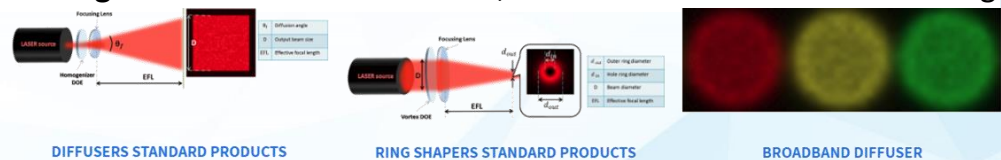
A uniform spot enables equal treatment to a surface, excluding over/under-exposure of specific areas. In addition, the spot is characterized by a sharp transition region that creates a clear border between the treated and untreated area.

For single mode lasers, we offer the following beam shaping solutions:

- **Focal Beam Shaping:** Hybrid element (lens) or module which gives a Top-Hat intensity distribution at a specific working distance (BFL of the lens or distance from exit location of the module to Top-Hat plane).
- **Angular Beam Shaping:** Optical element (window) which gives a Top-Hat intensity distribution at infinity or focal length of aberration free customer's lens.
- **M-Shaper:** Optical element (window) which gives a uniform exposure over scanned lines.



For multimode lasers, **HOLO/OR** offers a wide selection of **Flat-Top Diffusers / Homogenizers**, with shaping into round, square, line and rectangular spots. We also offer 3 families of **Ring Generators**: Vortex lenses, Diffractive Axicons and Multi-ring shapers.



Features

- Uniform / Tailored intensity profile
- Sharp edges (transfer region)
- Any desired output shape
- Any input beam shape (SM / MM)
- Wavelength UV to IR
- High power threshold
- Optional AR/AR coating

Typical Applications

- Laser Material processing: Cutting, Welding, Ablation, Scribing, Perforation and more)
- Surface treatments
- Aesthetic skin treatments
- Laser displays and projection
- Medical / aesthetic skin treatments
- Wafer inspection & Lithography
- Machine vision & 3D sensing

Beam Foci Products

Beam Foci products are DOEs, or modules containing DOEs, which can manipulate the focal properties of a laser beam.

These type of elements are capable of either increasing the depth of focus (**Elongated Focus DOE, DeepCleave™**), splitting the focus into several equal foci with controlled number of foci and separation distances (**Multi-Focal DOE**), or manipulate different harmonics of the same Nd:YAG laser source (355nm 532nm and 1064nm), or surgical laser with visible, to focus all on the same plane (**Diffractive Achromat, Focus Combiner**).

Our Beam Foci elements are widely used in transparent material processing such as laser glass cutting or drilling, microscopy applications, measurement and alignment and more.

Accessories

HOLO/OR provides a variety of optical systems and opto-mechanic accessories for diffractive optical elements.

- **UDOB:** A compact universal module for blocking undesired spots of Multi-Spots or parasitic energy of Homogenizers.
- **DOE Tuner:** A variable beam tuner, optimized for use with Top-Hats, Homogenizers, Beam Splitters, and other DOE products.
- **Dielectric Mask:** Glass substrate with a very thin (~1µm) patterned reflective coating. The coated part reflects the

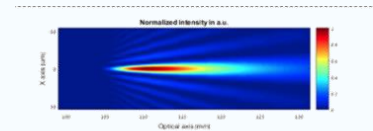
incoming beam while the uncoated part transmits the beam.

- **Beam Shaping Focuser:** Optimized focusing module to be used with our Beam Shapers. Useful in applications where an aberration-free image in focal plane with a high precision is required.
- **DOE Expander Module:** The module reduces or expands the full angle of a DOE output by a magnification factor.

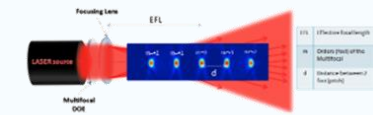
Services

HOLO/OR offers a complete set of solutions & services to support our customers' needs and the use of DOEs, including optical design of DOEs, refractive optics & opto-mechanical design.

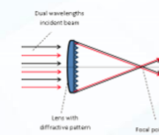
In addition, we provide simulation services of diffractive & refractive optics and feasibility studies for new solutions or applications.



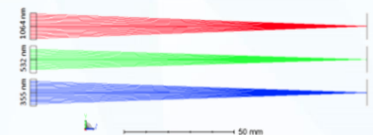
ELONGATED FOCUS STANDARD PRODUCTS



MULTIFOCAL STANDARD PRODUCTS



DUAL WAVELENGTH FOCUS COMBINER



DIFFRACTIVE ACHROMATIC LENS