Q1-2015 Newsletter

What's New

In HOLO/OR we believe our customers success is our own success, thus we keep our NRE for custom solutions to be probably the lowest priced in the industry. This issue presents our latest customer inspired products.

M-Shape intensity distribution spot for scanning applications

HOLO/OR's M-Shaper, is a diffractive optical element (DOE) used to create a unique 2D M-shaped intensity profile, with sharp edges in a specific work plane.
The M-Shaper's optical function is not possible by conventional reflective or refractive optical elements.
The typical application is to create a uniform exposure over scanned lines. That is, when scanning a line with a regular Gaussian or even Top-Hat spot the center gets over exposed (influencing the heat distribution during laser material processing).
The M-Shape is the mathematical shape that gives a uniform

Figure 1- M-Shaped profile, in scanning mode.

exposure over the line when scanned. This provides higher quality of the process & enables more flexibility in the system configuration.
For example, it allows optimization of the intensity profile, and image size, without changing the laser, fiber cable and/or scanning optical head.
The benefits of our optimized M-shaped intensity profile include:

Figure 2 – Simulated intensity profiles of diffractive M-Shaper laser spots (Without integration). Left figure = Upper view, Right figure = Side view.

- Uniform exposure over the scanned line
- "Cleaner" results with scanned lines in almost any process
- Enables very strong weld seams

We have added 11 new designs which are now available for any wavelength.

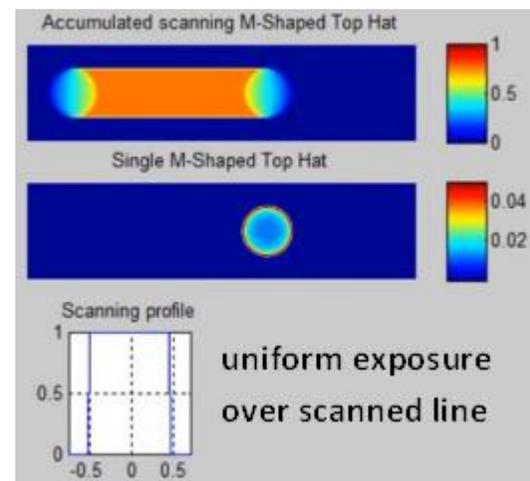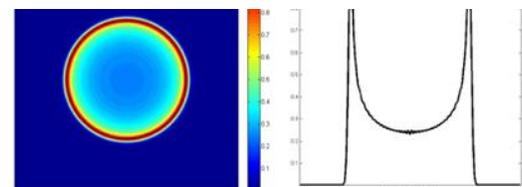Link to product page: http://www.holoor.co.il/Diffractive_Optics_Products/Diffractive_M_shaper/M_shape.php

Cost reduction in multi level (high eff.) elements.

HOLO/OR improved its design and fabrication yield of multi-level DOEs on large wafers, and now offers multi level parts as square elements. The square element can optionally be mounted to a round adaptor.

By utilizing the advantageous economy-to-scale of photolithography and RIE fabrication process of DOEs, <u>significant price reduction</u> can be achieved by moving from fabricating in batches to fabricating in large wafers.

**High efficiency quality at close to binary DOE prices.**

Top-Hat line, now with x1.5 Diffraction-Limited Length.

HOLO/OR released a new line of shapers that generate very small Top-Hat Line images.

One axis of the input is reshaped to a line with Top-Hat profile, while input in the other axis keeps traveling undisturbed. In combination with a lens this will generate a thin line with a Top-Hat profile in the long axis and a Gaussian profile in the short axis

Benefits of the designs include:

- Only x1.5 diffraction limited line length
- High Peak Power
- Short transfer region
- Attractive price
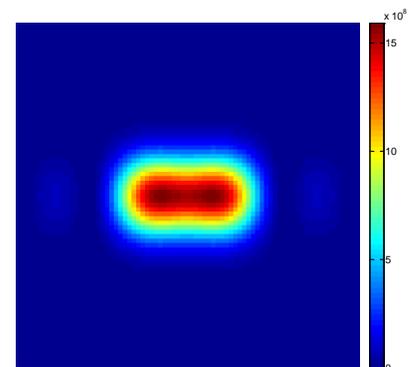
The available standard designs are optimized for input beams diameter between 2-10 [mm].

Link to product page:
http://www.holoor.co.il/Diffractive_Optics_Products/Diffractive_Beam_Shapers/AngularBeamShaper.php

Universal module for blocking undesired diffracted spots \ energy

For applications as metrology and sensitive material processing, HOLO/OR designed a compact universal module for blocking undesired spots of Multi-Spots or parasitic energy of Homogenizers. The module contains 6 lenses and a mask/aperture in the middle. Each DOE design requires a certain mask/aperture according to customer's specs.
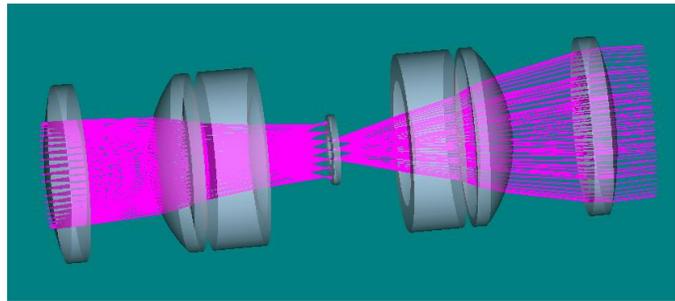
Parameters and features of the module:

- Max input beam diameter = 12 [mm]
- Max divergence/full angle of DOE for 12 [mm] input beam dia. = 5 [deg] @ 694 [nm].
- Input beam smaller than 12 [mm] enables larger than 5 [deg] full angle for DOE
- Module length = 90 [mm] (not including DOE and focusing lens)
- Outer diameter of module = 30.5 [mm] (lens diameter = 25.4 [mm])
- Lens material = N-SF11

Simulation results of two DOEs with the module (right) and without (left):

|	No module	With module
Round Homogenizer		
Multi-spot:		

http://holoor.co.il/Diffractive_optics_Solutions/Undesired_Diffracted_Orders_Blocker.php

DOE (fine) Tuner for lasers in the range of 266 to 1064[nm]

To answer the demand for fine-tuning abilities of various output parameters when using a DOE, as: shape/spot size, separation/divergence angle, etc. HOLO/OR designed a compact variable beam tuner, optimized for use with Top-Hat beam shaper, Homogenizer, Multi-Spot, and other DOE products. Another application is the fine-tuning of incident beam size before DOE for Top-Hat application, where precision of incident beam size is important.

The DOE tuner presents the following features:

- Very low wavefront error
- Beam expander x1-x1.2
- Can be used as beam reducer
- Input C.A. = 23 [mm]
- Module length = 60 [mm]
- Max. input beam size = 7 [mm]
- Max. output beam size = 8.4 [mm]
- Wavelength range = 266-1064 [nm]
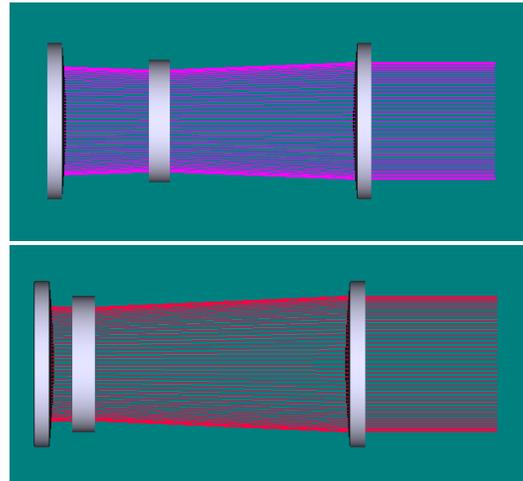
http://holoor.co.il/Diffractive_optics_Solutions/DOE_tuner.php

Customize Top-Hats for tilted surfaces

For applications involving projection of defined shapes on tilted surfaces, HOLO/OR introduces Elliptical and Trapezoid shape Top-Hats.

When projected on a tilted surface the Elliptical and Trapezoid Top-Hats create a round and square shape spot, correspondingly.

We can optimize this shape for any angle of tilted surface
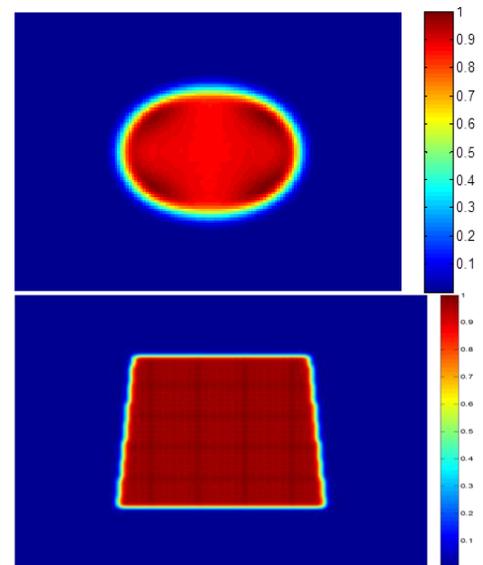
Industry news

Next exhibition – PW2015 – San Francisco, USA:

HOLO/OR is participating in the upcoming Photonics West exhibition, feel free to visit or set a meeting.

SPIE. PHOTONICS WEST

Date: February 10 - 12, 2015
Location: San Francisco, California, USA
Booth #: 209 in South Hall.