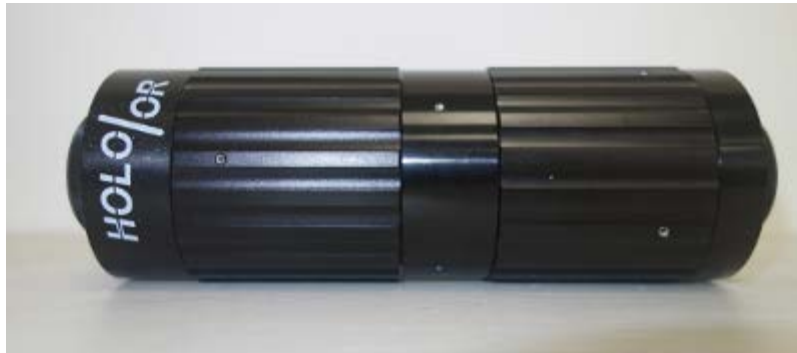


DOE Tuner Module

To answer the demand for fine-tuning abilities of various output parameters when using a DOE, such as: shape/spot size, separation/divergence angle, etc., HOLO/OR designed a variable beam tuner, optimized for use with Top-Hat beam shaper, Homogenizer, MultiSpot, 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
- No need to change module direction
- Sliding lenses
- Constant mechanical size
- Fused Silica lens material
- Wavelength range = 266-1064 [nm]
- Other wavelengths upon request



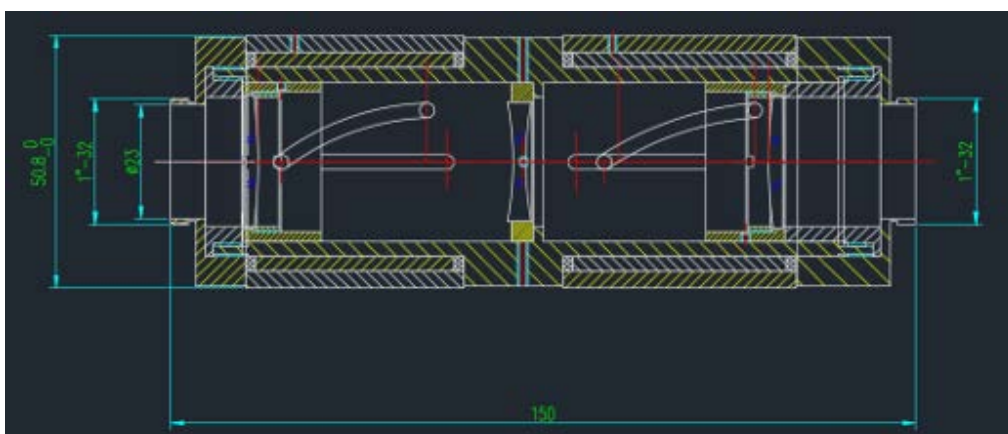
Optical Properties

Wavelength range	266-1064 nm
Beam expander	x0.8-x1.2
Clear aperture	23 mm
Max. input beam diameter ($1/e^2$)	Ø8.4 mm (0.8x), Ø7.0 mm (1.2x)
Max. output beam size	8.4 mm
Max. incident angle*	0.5 degrees

Mechanical Properties

Module length	150 mm
External diameter	50.8 mm
Adapter	C-mount
Lens material	Fused Silica

Mechanical drawing



Different configurations for using the DOE-Tuner module:

1.Placing the DOE-Tuner before a DOE

a.Purpose – Fine tuning for input beam size

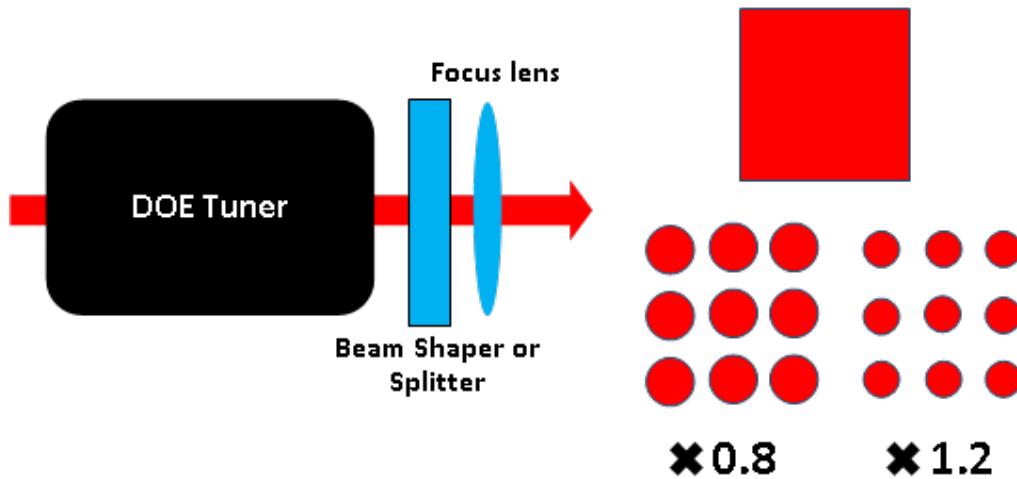
b.Benefit:

- For Top-Hat beam shaper – achieves nominal beam size
- For Beam-Splitters, Multi-Focal and Vortex phase plate – controls spot size

c.Key parameters:

Parameter:	Magnification < 1	Magnification > 1
Beam size:	Decreases	Increases
Spot size:	Increases	Decreases
Separation angle:	No change	No change

Figure 1: DOE-Tuner module placed before DOE



2.Placing the DOE-Tuner after a DOE

a.Purpose – controlling divergence of the output beam, allows to vary key parameters of DOE in range of 80-120 %

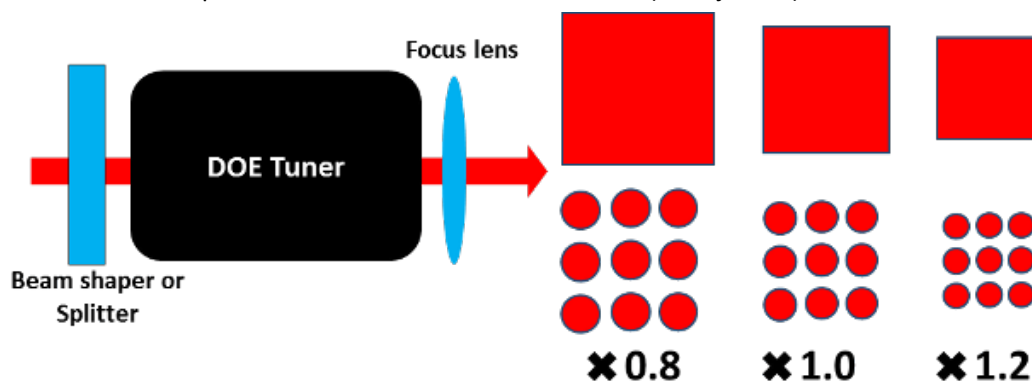
b.Benefit:

- Multi-Spot – controls the separation angle
- Multifocal – controls the separation between foci
- Top-Hat , Homogenizer & others – controls the image size

c.Key parameters:

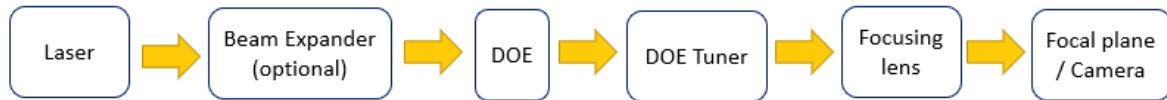
Parameter:	Magnification < 1	Magnification > 1
Beam size:	No change	No change
Spot size:	Increases	Decreases
Separation angle:	Increases	Decreases

Figure 2: DOE-Tuner module placed after DOE and before focus lens (or objective)



General Set-Up

Figure 3: A typical DOE tuner set-up with the DOE placed before the module



A Zemax Black Box of the DOE Tuner is available for different wavelengths:

- ZBB for 355nm
- ZBB for 532nm
- ZBB for 1064nm

A Zemax Black Box of the DOE tuner is also available for other wavelengths upon request.