

How to build basic setup using ZEMAX Black Box of Top Hat beam shaper? Holo/Or 2016

1. **Download Top Hat model** file from our [standard elements](#) and place ZBB file into ZEMAX Black Boxes folder
C:\Users\????\Documents\Zemax\BlackBoxes
2. **Open new ZEMAX file** with follow surfaces:
 - 2.1. Dummy surface (1) before Black Box Lens surface
 - 2.2. Black Box Lens: in Comment parameter enter ZBB file name
 - 2.3. Paraxial lens (just for example): enter values of Focal Length and Thickness, or user system with objective or real lenses.
3. **Define environment parameters:**
 - 3.1. Change wavelength to desired one
 - 3.2. Modify beam size
 - 3.3. Apodization Type should be Gaussian
 - 3.4. Apodization Factor 6.25 (equivalent to 2.5 times beam size) recommended
 - 3.5. Aperture Value should be nominal beam size x2.5 recommended

View of Lens Data Editor (in the example below, the beam size is 10mm at 1/e²)

Surf.	Type	Comment	Radius	Thickness	Material	Coating	Semi-Diameter	Conic	TCE x 1E-6	Par 1(unuse)
0	OBJECT	Standard	Infinity	Infinity			0.000	0.000	0.000	
1		Standard	DUMMY	Infinity			12.500	0.000	0.000	
2	STOP (aper)	Black Box Lens	TH258.ZBB	<3.000>			12.700 U		0.000	
3		Paraxial		100.000			12.500		0.000	100.000
4	IMAGE	Standard	Infinity	-			0.024	0.000	0.000	

Wavelength definition

System Explorer ?

Update: All Windows ▾

- ▶ Aperture
- ▶ Fields
- ▼ Wavelengths
 - ▶ Settings
 - ▼ Wavelength 1 (1.064 um, Weight = 1.0)
 - Enable
 - Primary
 - Wavelength (µm):
1.064

Aperture definition

System Explorer ?

Update: All Windows ▾

- ▼ Aperture
 - Aperture Type:
Entrance Pupil Diameter
 - Aperture Value:
25.0
 - Apodization Type:
Gaussian
 - Apodization Factor:
6.25

4. Results analysis

There are many possible analysis methods presented in ZEMAX. Unfortunately Using Black Box Lens model limited to geometric optics method, so the effects of diffraction and interference will not be seen.

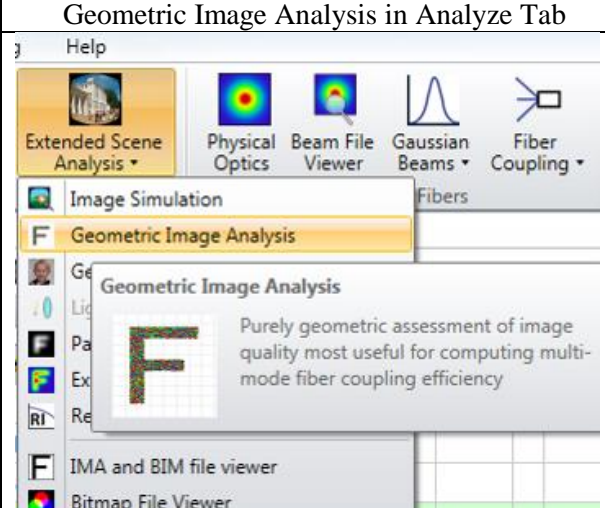
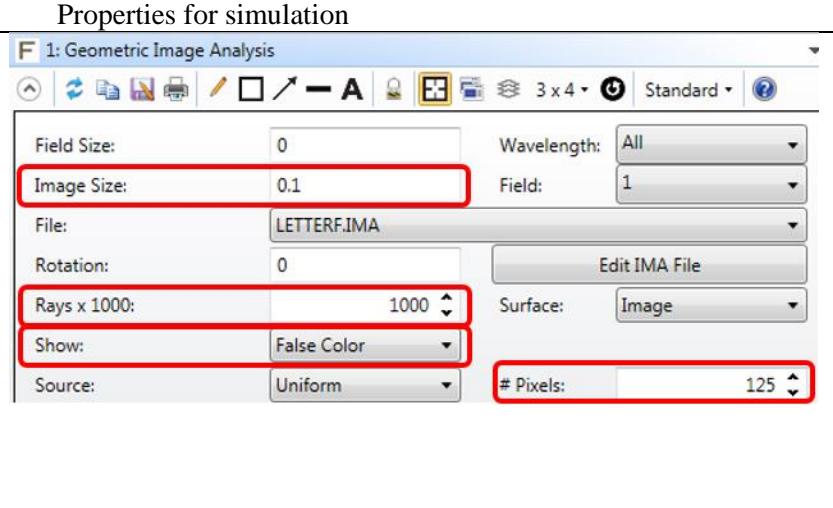
4.1. One of the commons can be performed with using Geometric Image Analysis

Edit parameters of as follow

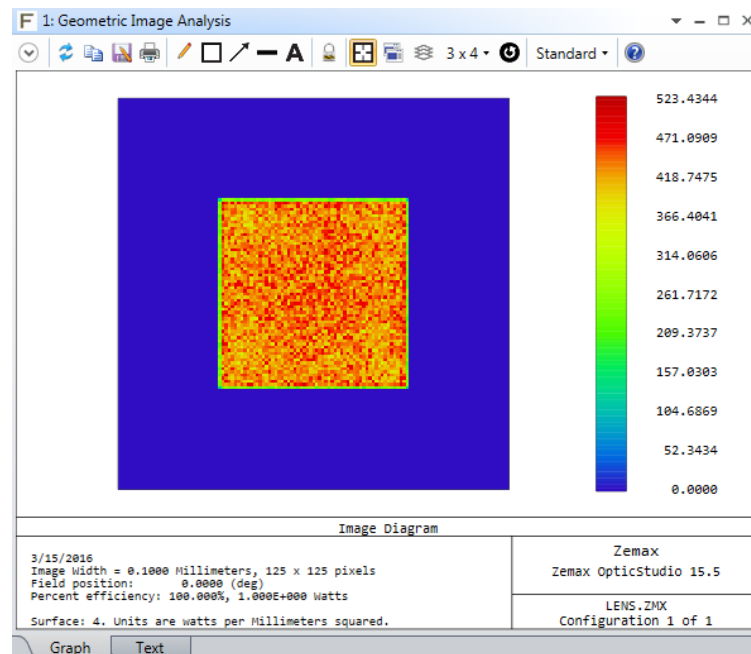
4.1.1. Image Size to be big enough to see whole shape of Top Hat

4.1.2. Show in False Color

4.1.3. Rays number and pixels – more is better

Geometric Image Analysis in Analyze Tab	Properties for simulation
	

5. Geometric Image Analysis result:



6. [Link to example file for downloading](#)