

## How to build basic setup using ZEMAX Black Box of Top Hat beam shaper? Holo/Or 2019

- 1. **Download Top Hat model** file from our <u>standard elements</u> 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

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## 4. Results analysis

There are many possible analysis methods presented in ZEMAX not including POP (physical optics propagation)

4.1 To use Geometric Image Analysis Edit the parameters of as follows

- 4.1.1. Image Size to be big enough to see the whole shape of Top Hat (in mm)
- 4.1.2. Show in False Color
- 4.1.3. Rays number and pixels the more the better

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RI	Re						
F	IMA and BIM file viewer						
	Bitmap File Viewer						

4.2 To Huygens PSF analysis (more accurate than geometrical analysis) edit parameters of as follows:

4.2.2. Pupil Sampling to define result precision (higher=better precision)

4.2.3. Image Sampling to define number of pixels in image plane (higher= more detailed result)4.2.4. Image Delta defines pixel size in um units in image plane

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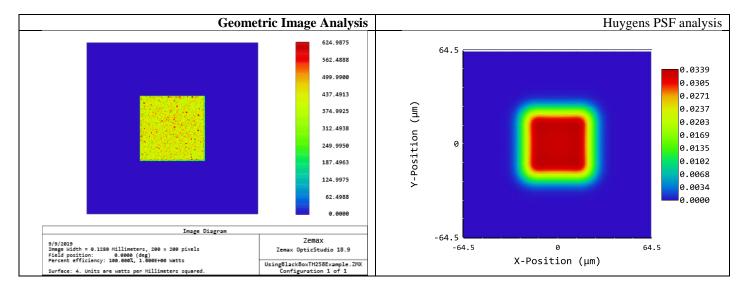
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## 5. Analysis results:



Comparison between the analysis methods.

Geometrical Image Analysis is faster than Huygens PSF. Huygens PSF gives much better evaluation of transfer region, aberrations and tolerances.

6. Link to example file for downloading

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