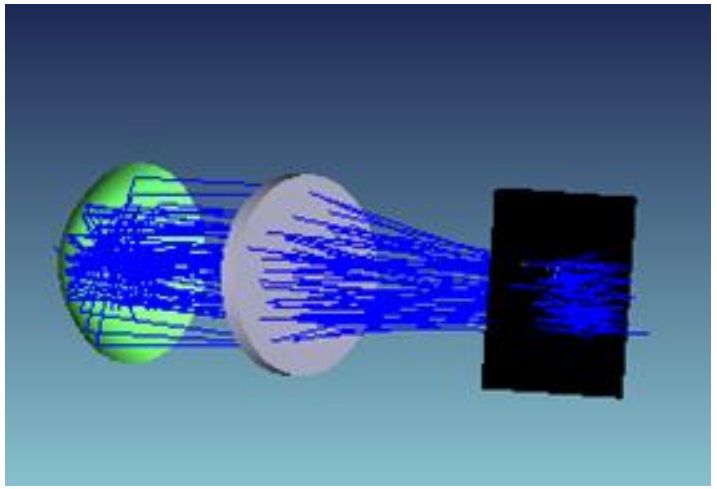
Lecture 20

Non-Sequential Mode in Zemax 2



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Dec 2024

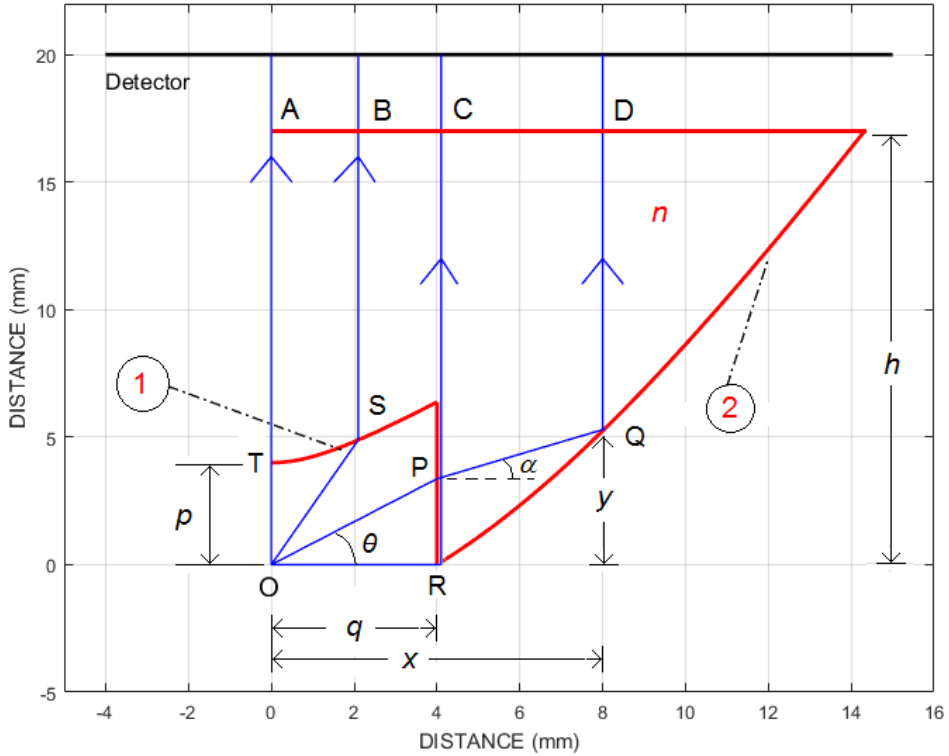
Example: How to use Pre-designed Freeform Lens

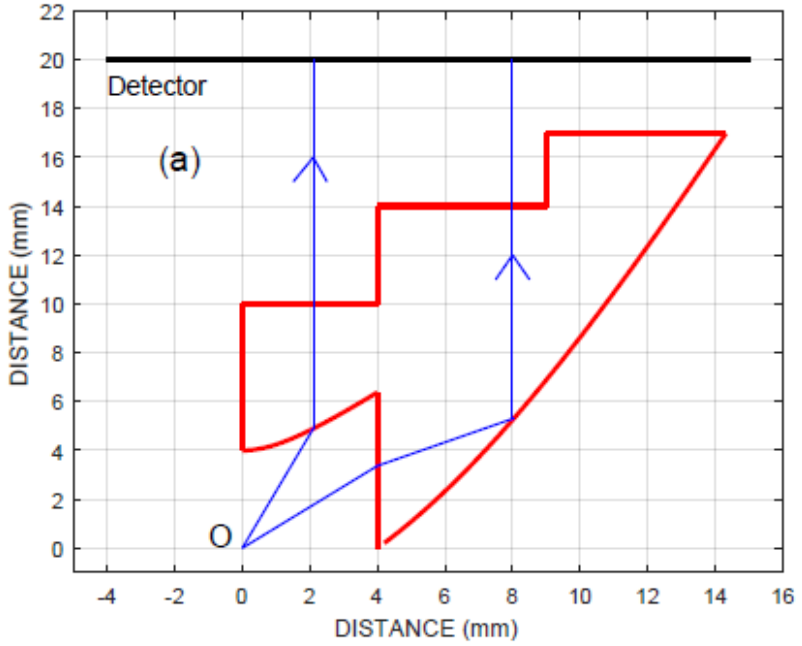
In this example, you will see adding a specific lens designed first in **Matlab**.

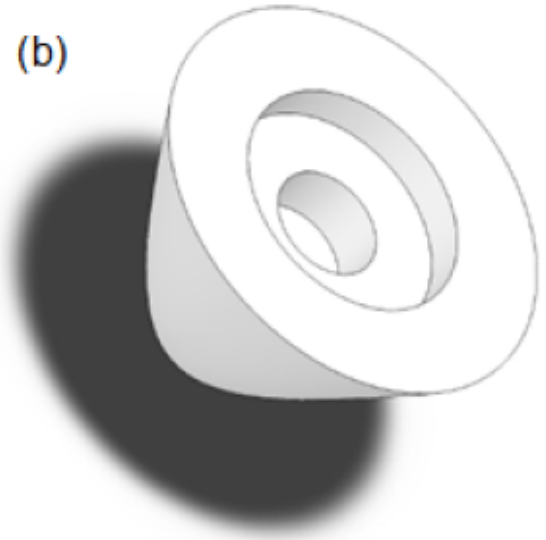
Solid model of the lens is then produced via **SolidWorks** program.

Osram SFH 4718A IR LED used to test.

This was a TUBITAK 1005 Project (118M568).



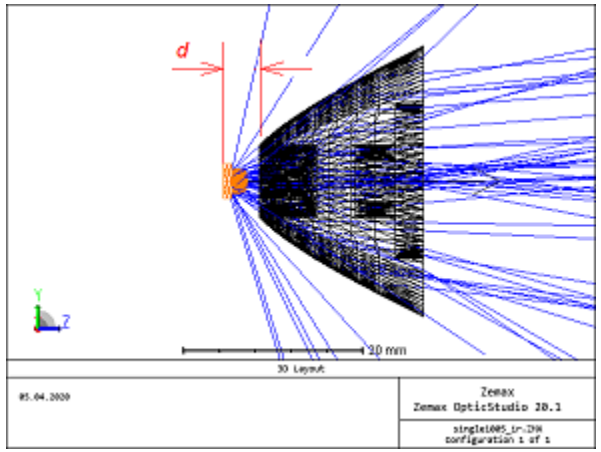


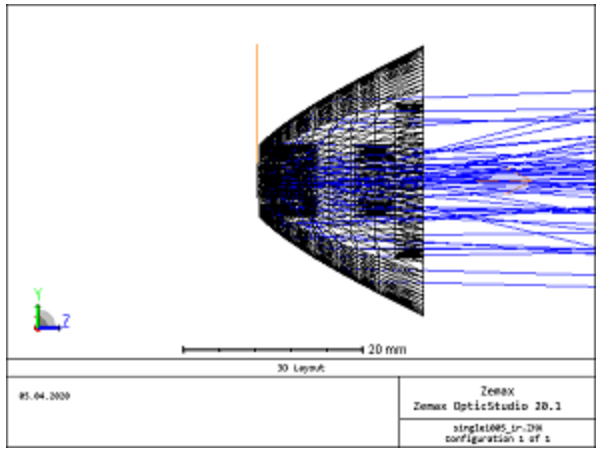


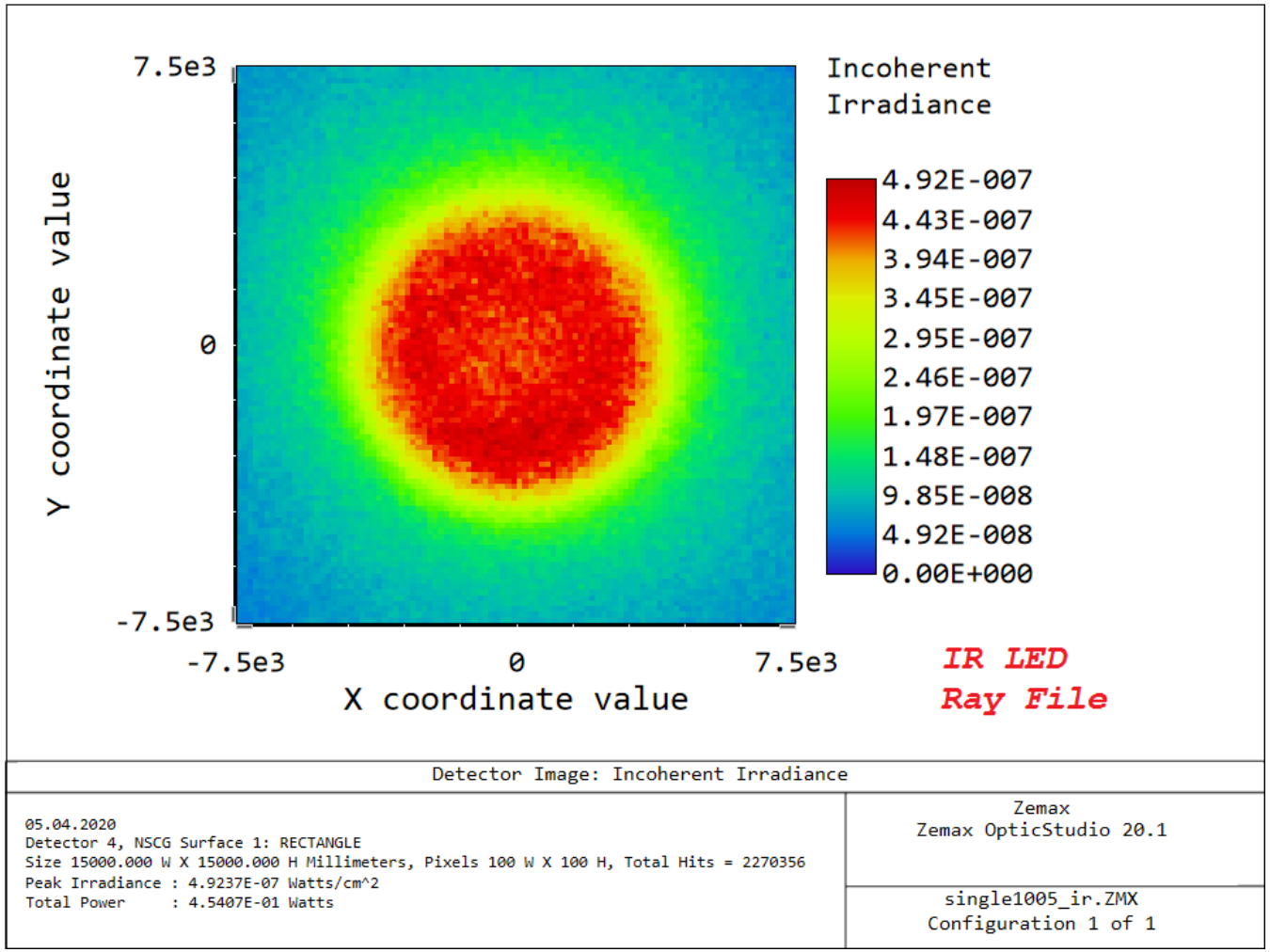
You can download **pmmaLEDcollimator-small.stp** the file from the course web page.

The lens file must be placed under:

C:\<ZEMAX>\Objects\CAD Files

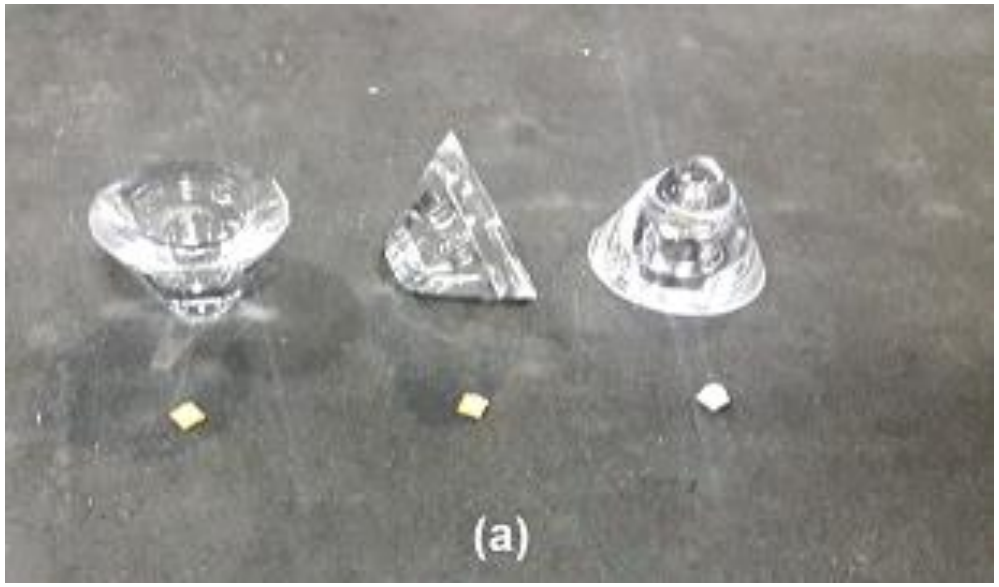


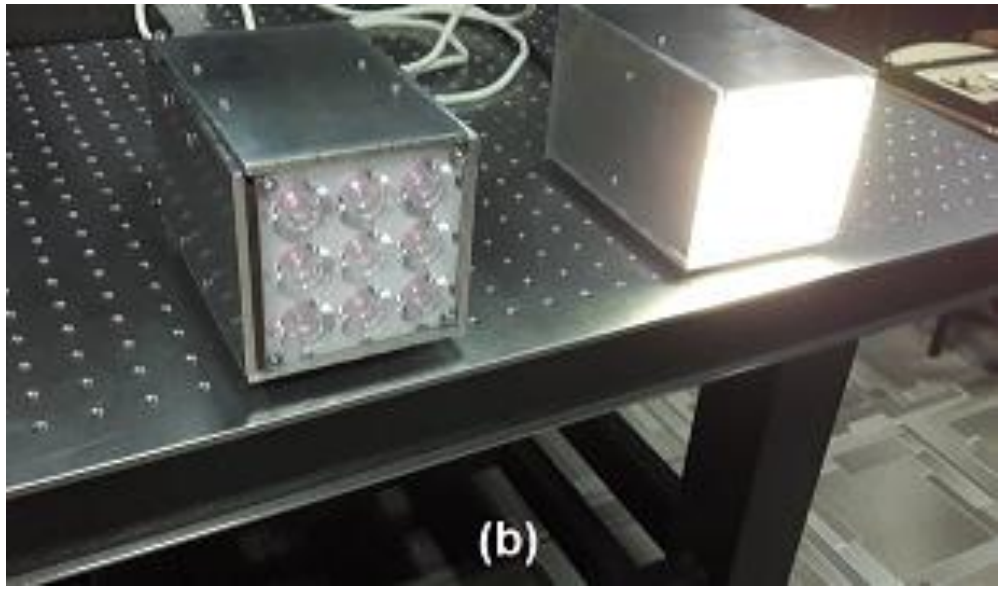




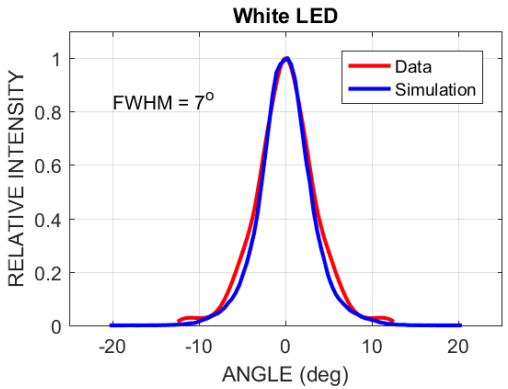
Manufacturing the lens

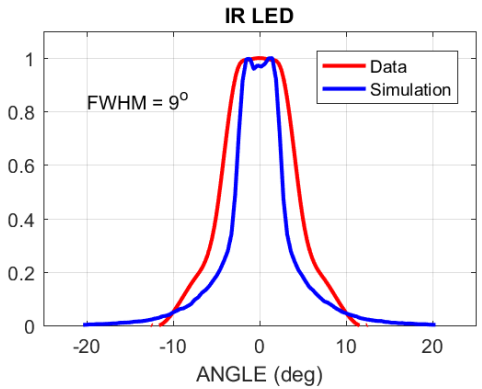
A prototype of a solid free-form lens is manufactured by using PMMA via plastic injection molding method.

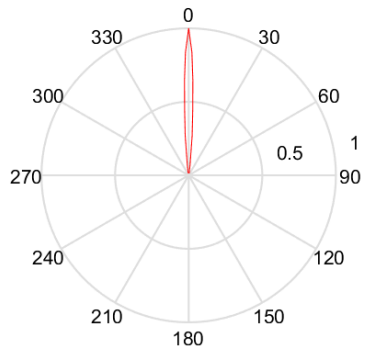


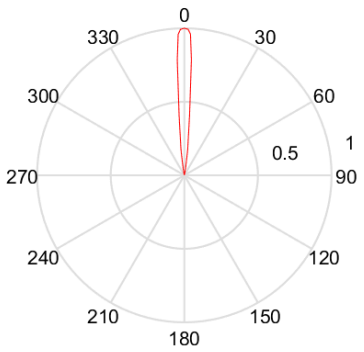


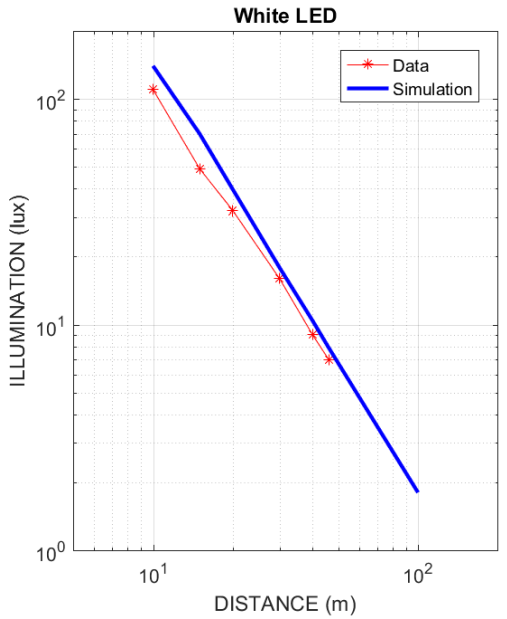
Optical Performance

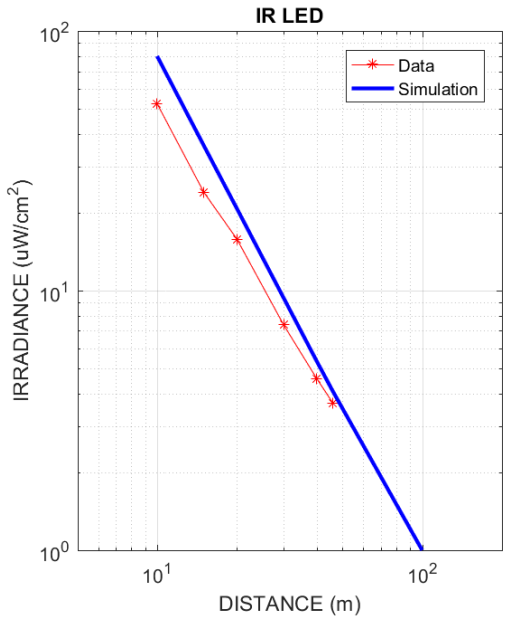












50 m uzunluğundaki karanlık bir koridorun aydınlatılması.
Solda görünür bölge ve sağda sadece kızılötesi aydınlatma yapılmıştır.

Ayrıca bkz: http://www1.gantep.edu.tr/~bingul/irwalk.gif

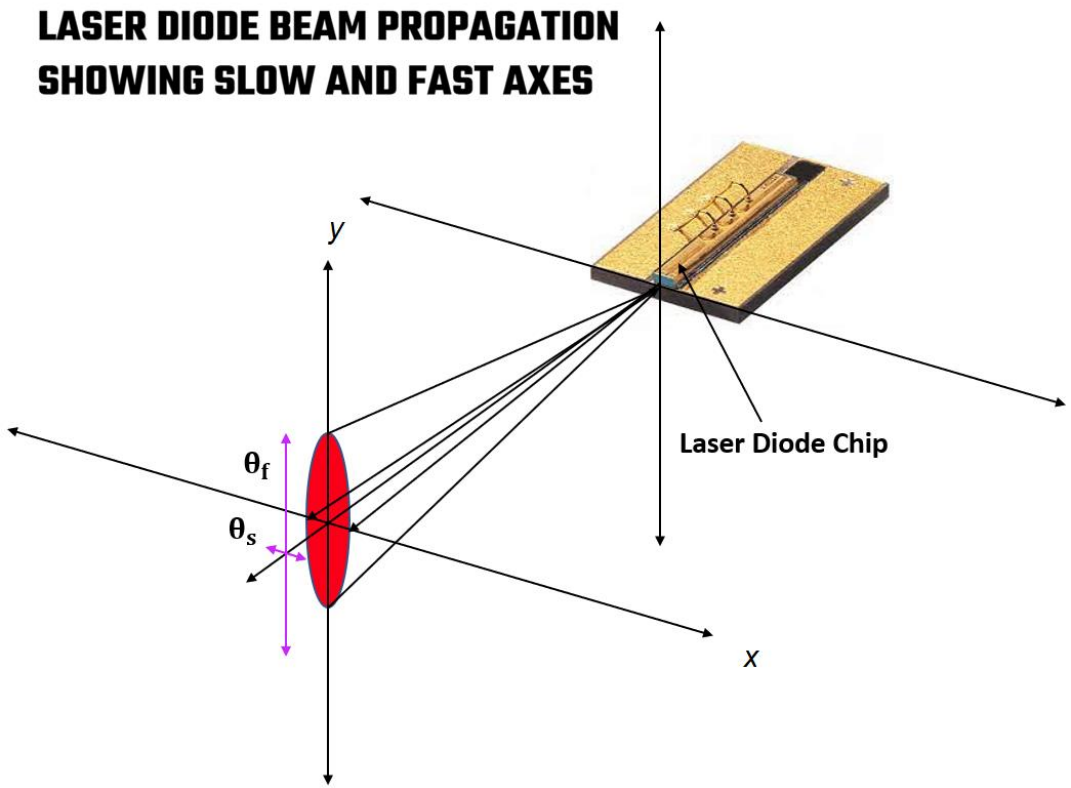
Example 5: Defining Diode Laser Source

Consider a diode laser* given right:

This is the product

OPD000082 FL-COC11-10-808

laser from focuslight



Optical Data[2]	Unit	Value
Centroid Wavelength	nm	808
Wavelength Tolerance	nm	± 3
Emitter Width	µm	200
Output Power[3]	W	10
Spectral Width FWHM	nm	≤ 3
Spectral Width 90% Energy	nm	≤ 5
Fast Axis Divergence (FWHM)	°	~ 30
Slow Axis Divergence (FWHM)	°	8
Polarization Mode	-	TE
Wavelength Temp. Coefficient	nm / °C	~ 0.28
Electrical Data [2]		
Operation Current	A	≤ 11.8
Threshold Current	A	≤ 1.8
Operating Voltage	V	≤ 2.2
Slope Efficiency	W / A	≥ 1
Power Conversion Efficiency	%	≥ 44
Thermal Data		
Operating Temperature	°C	15 ~ 30
Storage Temperature [4]	°C	-40 ~ 55
Recommended Heatsink Capacity	W	≥ 20

A laser diode source can be defined in zemax via **Source Diode**.

For this laser:

Wavelength = 808 nm

X-divergence = 8 * 0.849 = 6.792º (Slow Axis)

Y-divergence = 30 * 0.849 = 25.47º (Fast Axis)

X-SuperGauss = Y-SuperGauss = 1

X-width = 200/2 = 100 µm = 0.1 mm

Y-width = 2/2 = 1 µm = 0.001 mm

X-sigma = 1 mm

Y-sigma = 1 mm

X-sigma Hx = X-sigma Hy = 1

Detector Rectangle:

Z-position = 100 mm

Optical Data[2]	Unit	Value
Centroid Wavelength	nm	808
Wavelength Tolerance	nm	± 3
Emitter Width	µm	200
Output Power[3]	W	10
Spectral Width FWHM	nm	≤ 3
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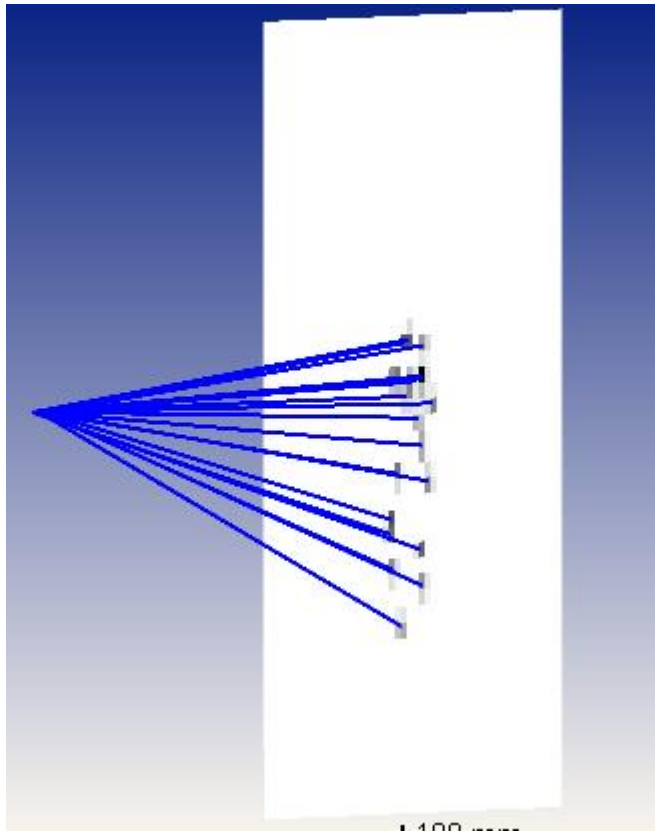
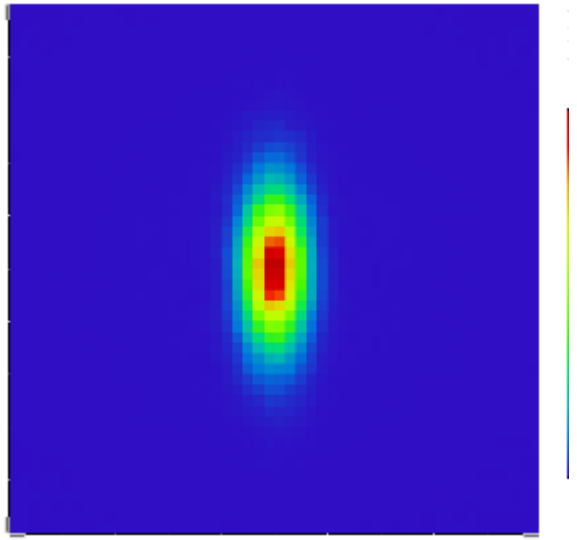
Power Conversion Efficiency	%	≥ 44
Thermal Data		
Operating Temperature	°C	15 ~ 30
Storage Temperature [4]	°C	-40 ~ 55
Recommended Heatsink Capacity	W	≥ 20

I will mention about FAC lenses in Lens Catalog for vendor from LIMO.





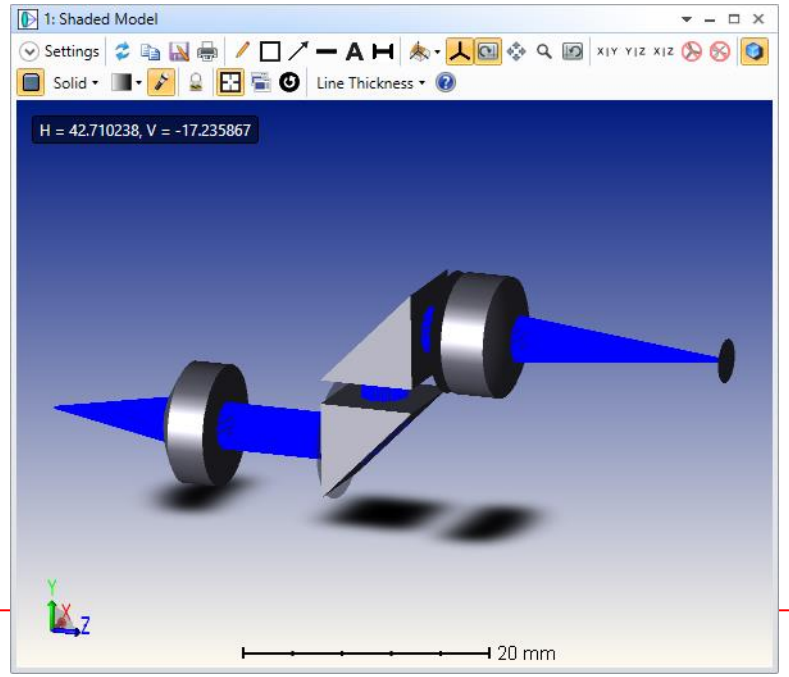
Example: FAC / SAC

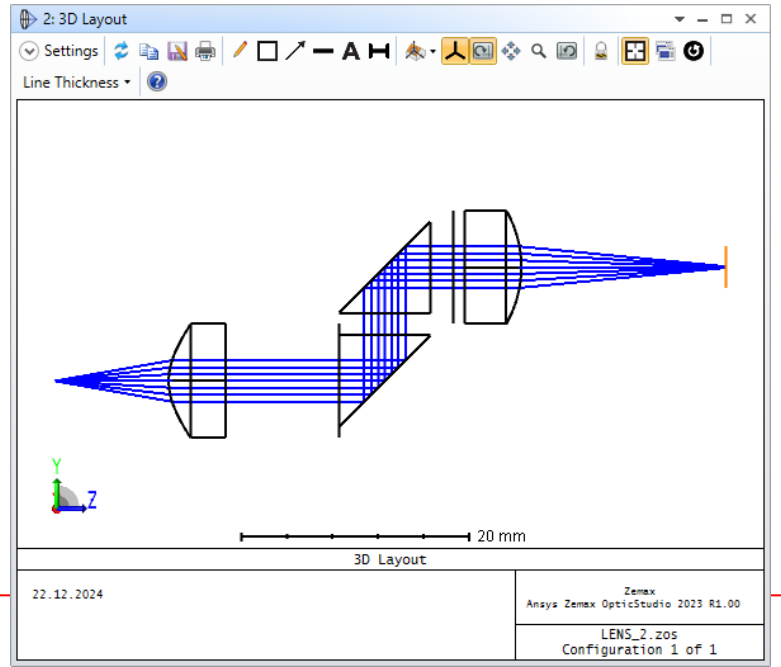
Details will be given in the lecture.

Example: Hybrid Mode in Zemax

	Surface Type	Comme	Radius	Thickness	Material	Coating	Clear Semi-Di	Chip Zone	Mech Sem	Conic
0	Standard		Infinity	10.000			0.000	0.000	0.000	0.000
1	Standard		5.185	5.000	BK7		5.000 U	0.000	5.000	-2.306
2	Standard		Infinity	10.000			5.000 U	0.000	5.000	0.000
3	Non-Sequential Component		Infinity	-			5.000 U	-	-	0.000
4	Standard		Infinity	1.000			5.000 U	0.000	5.000	0.000
5	Standard		Infinity	5.000	BK7		5.000 U	0.000	5.000	0.000
6	Standard		-10.000	18.000			5.000 U	0.000	5.000	0.000
7	Standard		Infinity	-			1.817 U	0.000	1.817	0.000

	Object Type	Comment	Ref Object	Inside Of	X Position	Y Position	Z Position	Tilt About X	Tilt About Y	Tilt About Z	Material	Scale
1	Polygon Object	Prism45.POB	0	0	0.000	0.000	0.000	0.000	0.000	0.000	BK7	4.000
2	Polygon Object	Prism45.POB	0	0	0.000	10.000	8.000	180.000	0.000	0.000	BK7	4.000





[download zemax file]

Example: ZPL

```
# Hello World example
F = 5
S$ = "centimeter"
print "Hello World"
print "Value of F is ", F
print "S = ",S$
```

```
# Basic optimization in NSC.
# We need the following config
# Src Ellipse-Std.Lens-Rec.Det.
format .8 # 8 digits
clearDetector = NSDD(1,0,0,0)
NSTR 1,0,1,0,1,1,1,0
# optical power
power = NSDD(1,3,0,0)
# rms value
rms   = NSDD(1,3,-9,0)
print power
print rms
```

```
# Advanced optimization in NSC.
# We need the following config
# Src Ellipse->Std.Lens->Rec.Det.
for z,10,90,1
   SETNSCPOSITION 1,3,3,z
   cleanUp = NSDD(1,0,0,0)
   NSTR 1,0,1,0,1,1,1,0
   power = NSDD(1,3,0,0)  # optical power
   rms   = NSDD(1,3,-9,0) # rms value
   print "z=", z, " power=", power, " rms=",rms
next
```