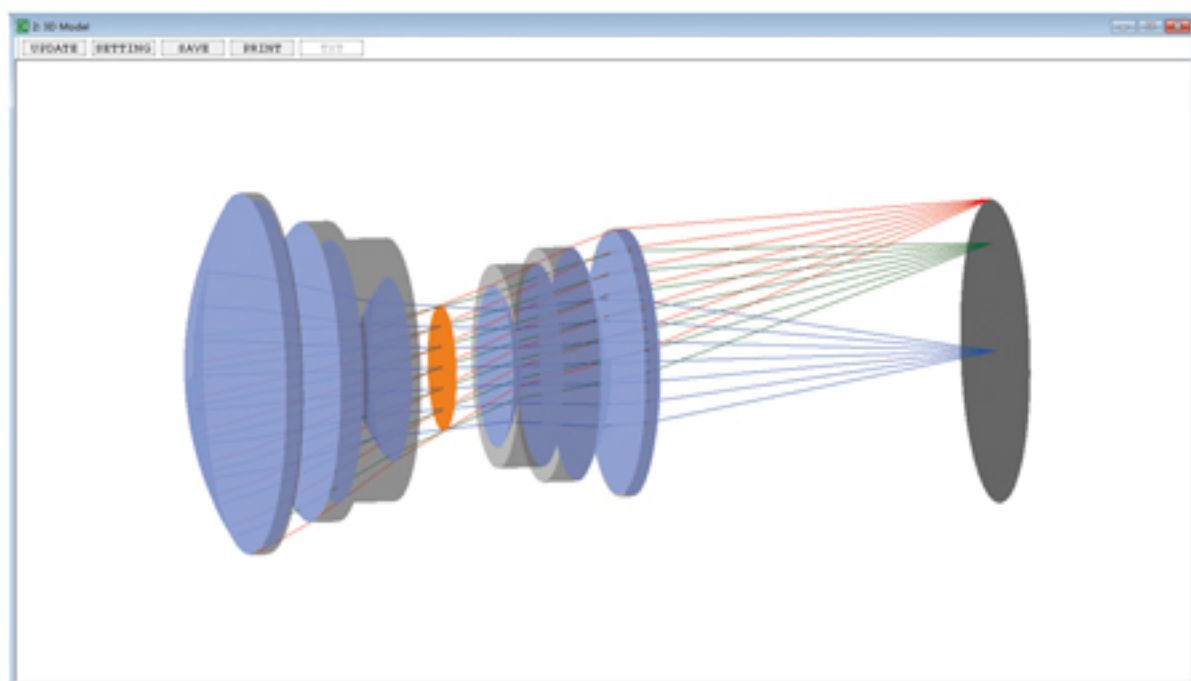
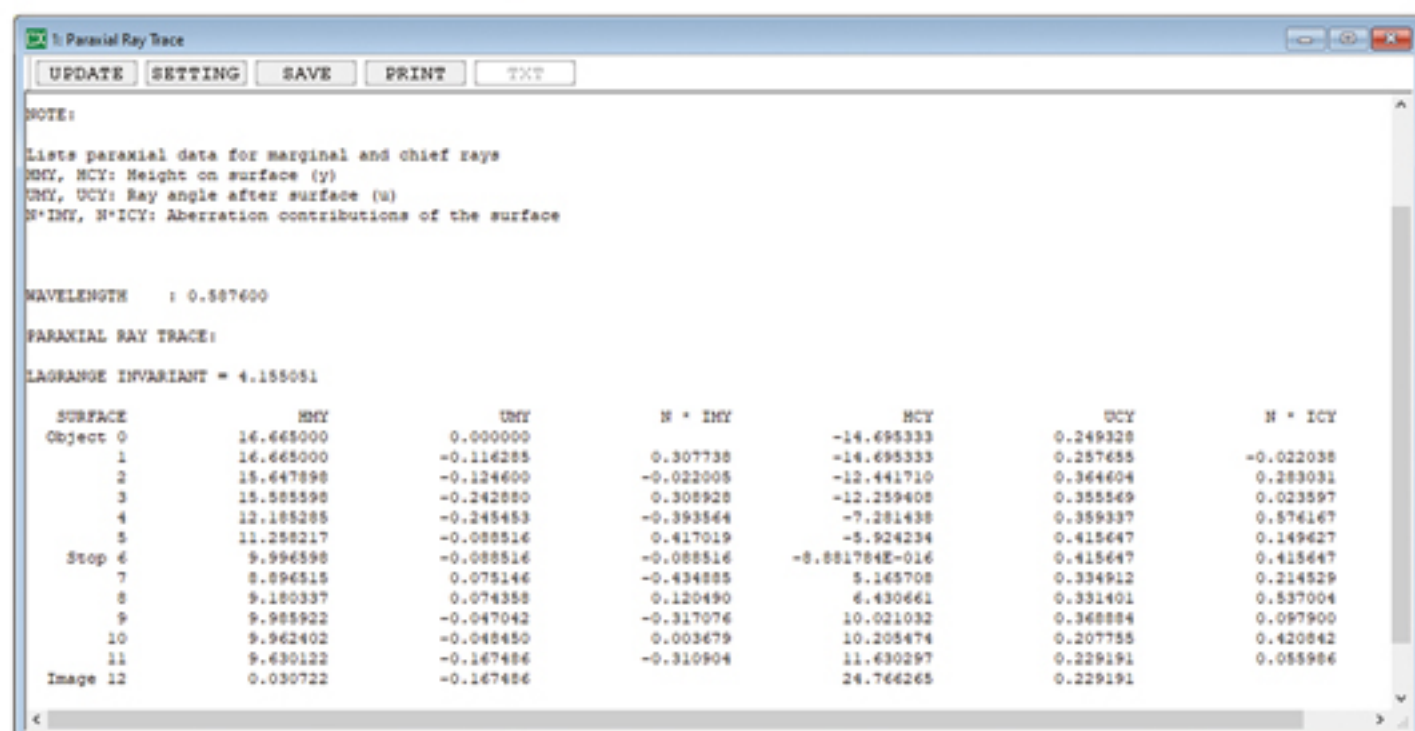
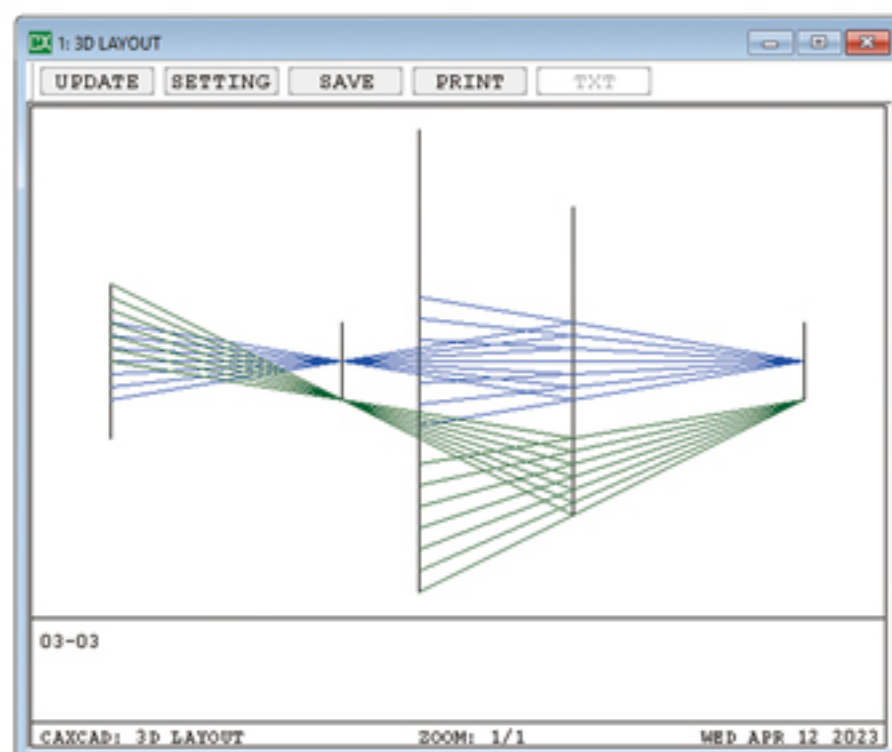
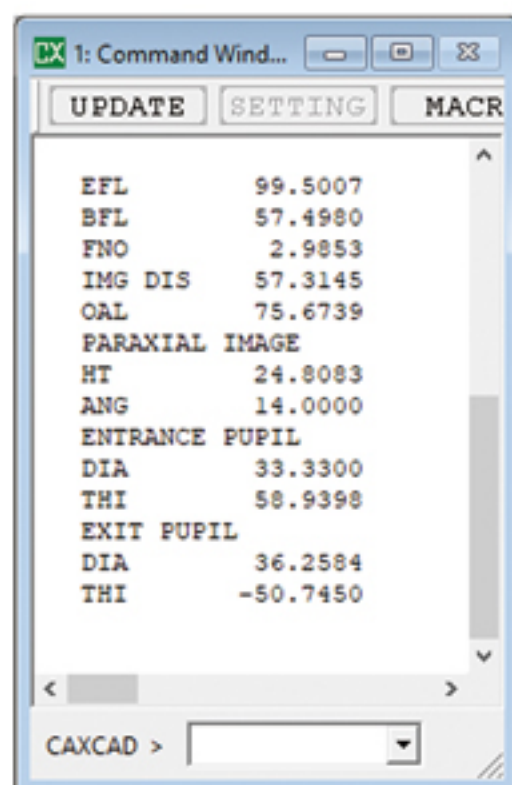


CAXCAD ® Optical Design Software



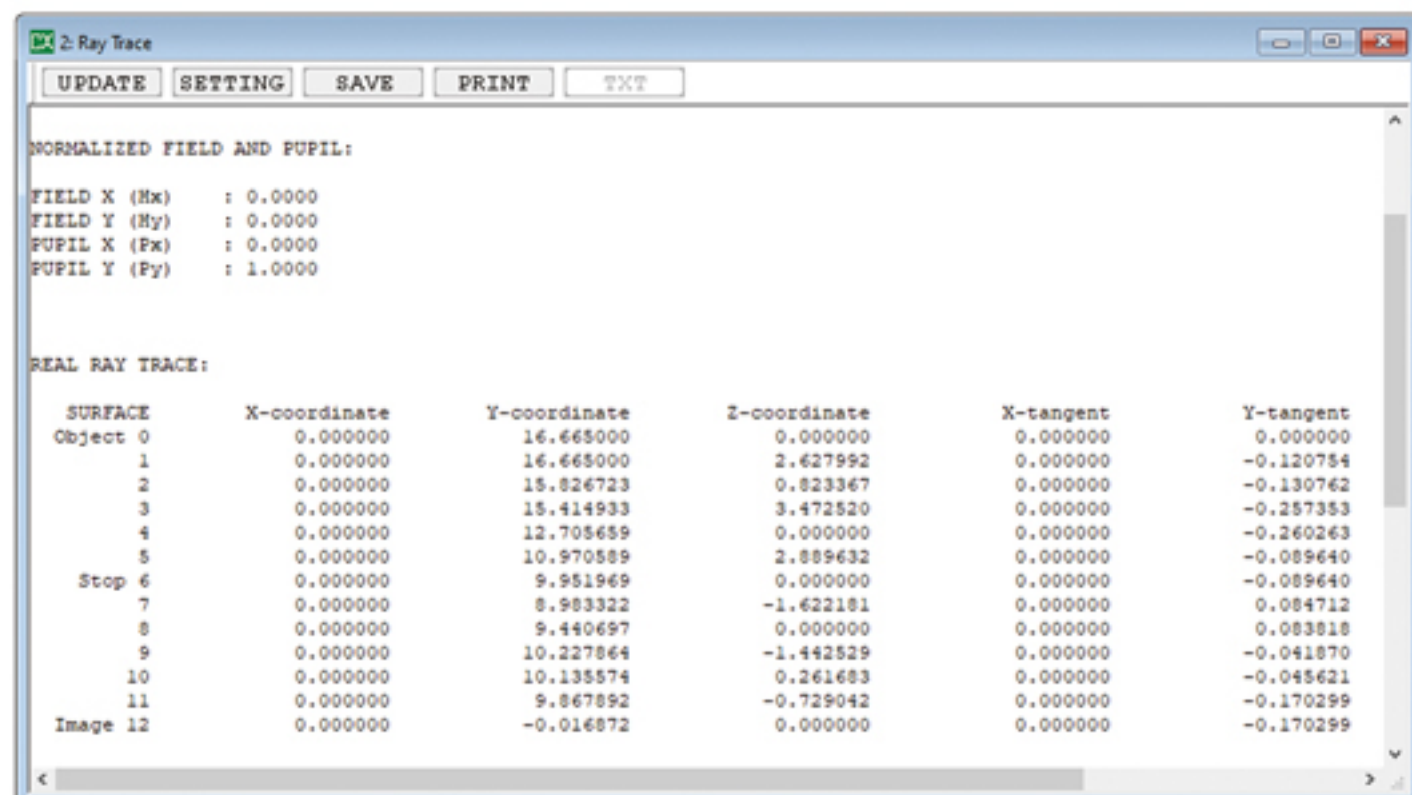
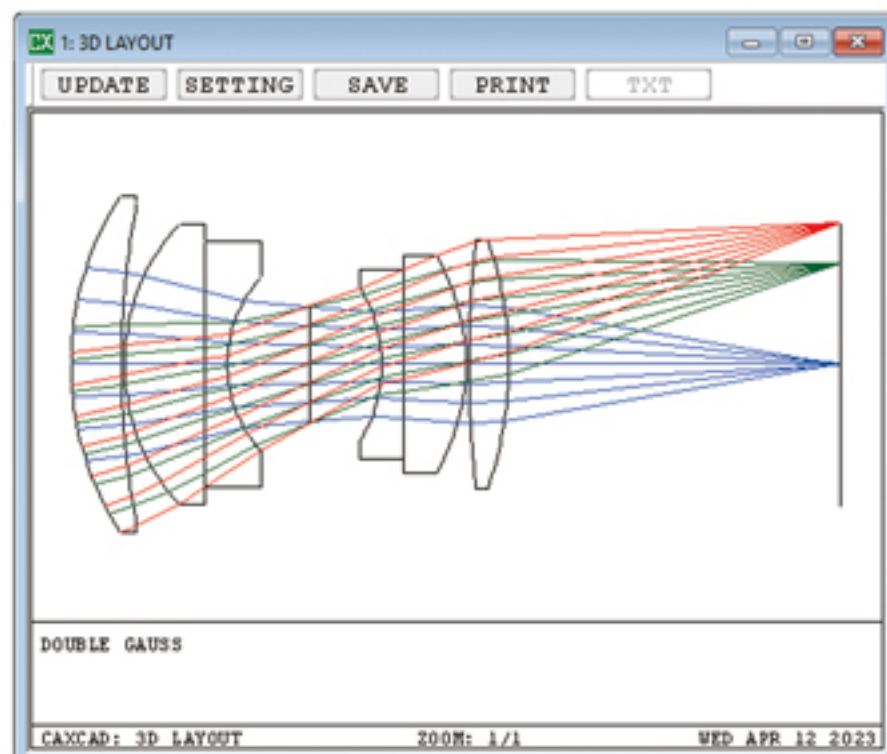
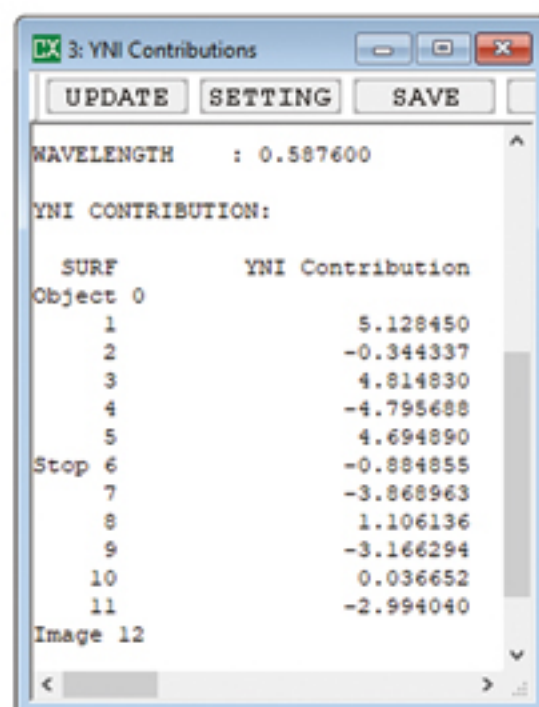
Paraxial Optics

CAXCAD supports calculations of paraxial ray, ideal surface shape, Seidel aberration coefficients, etc. It is worth mentioning that the YNI function of CAXCAD is particularly helpful for designing infrared cold stops.



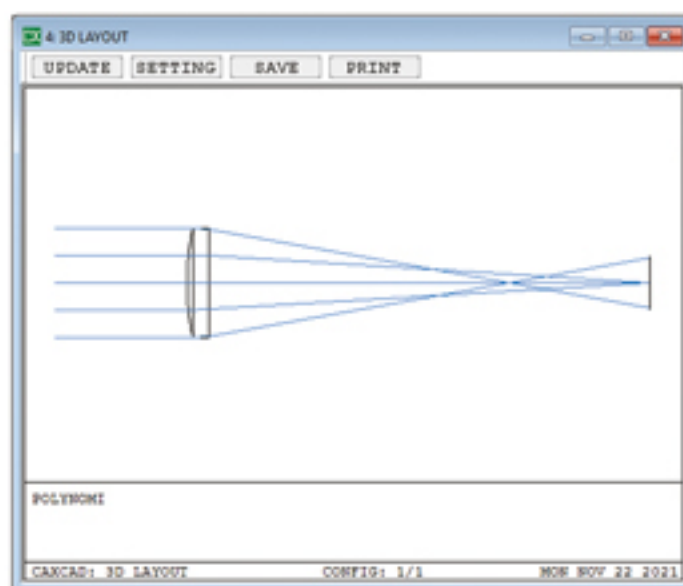
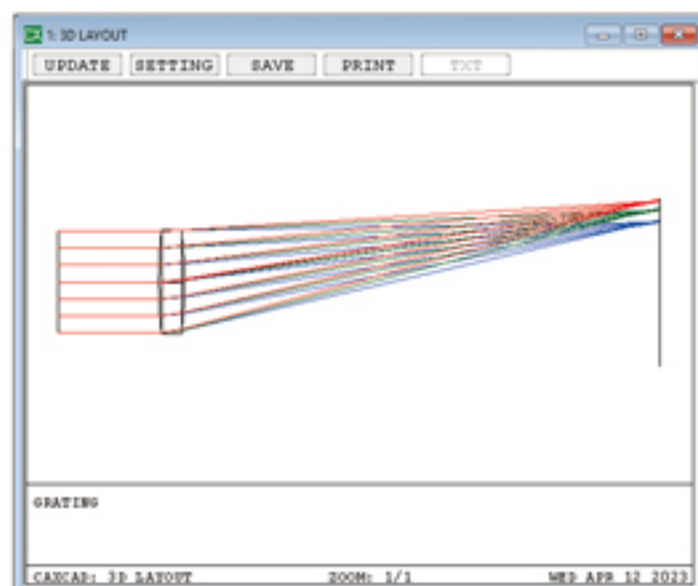
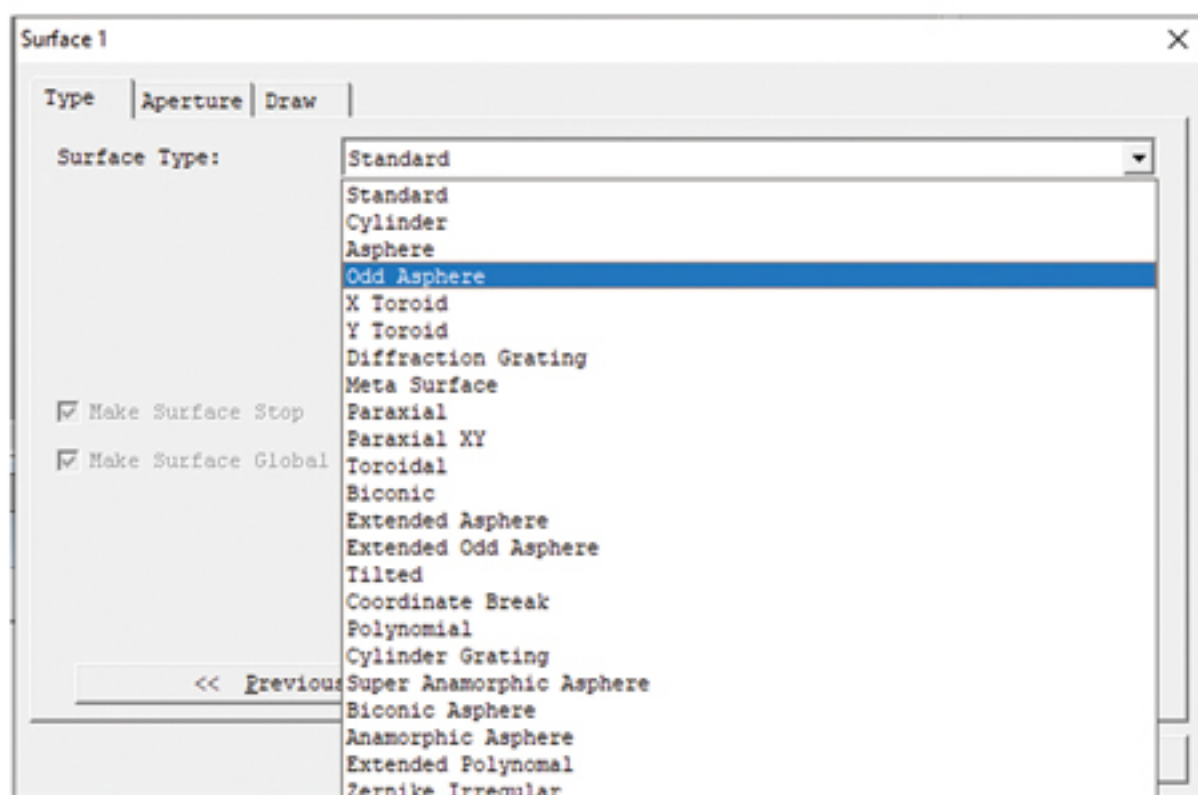
Real Ray Trace

The core functionality of CAXCAD is based on real ray tracing and it also uses normalized aperture to meet the needs of customers for any ray calculation.



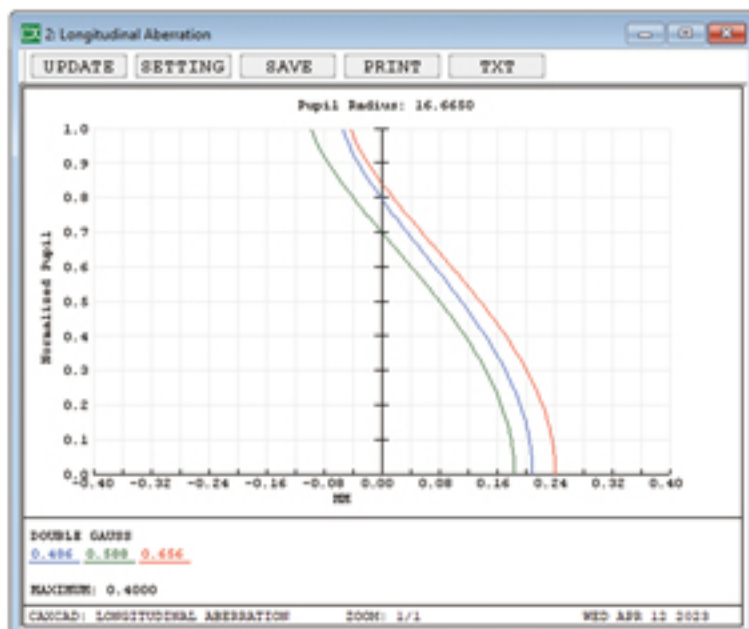
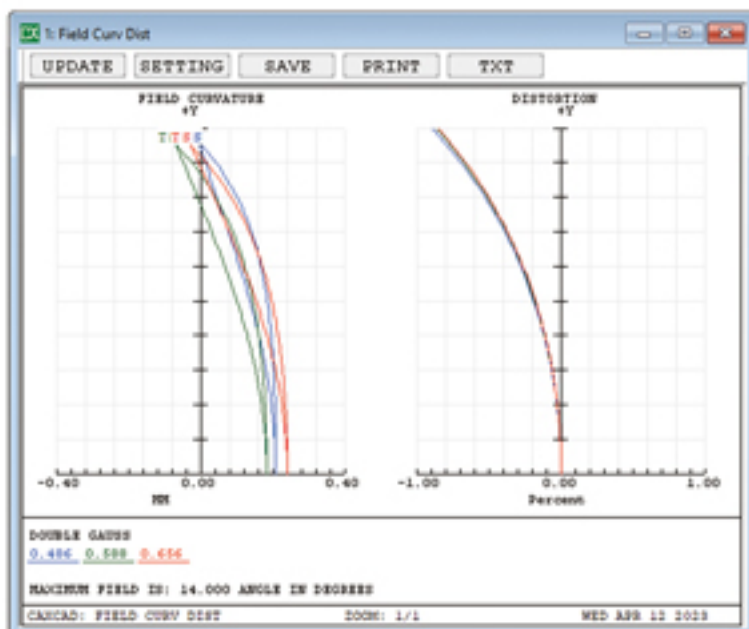
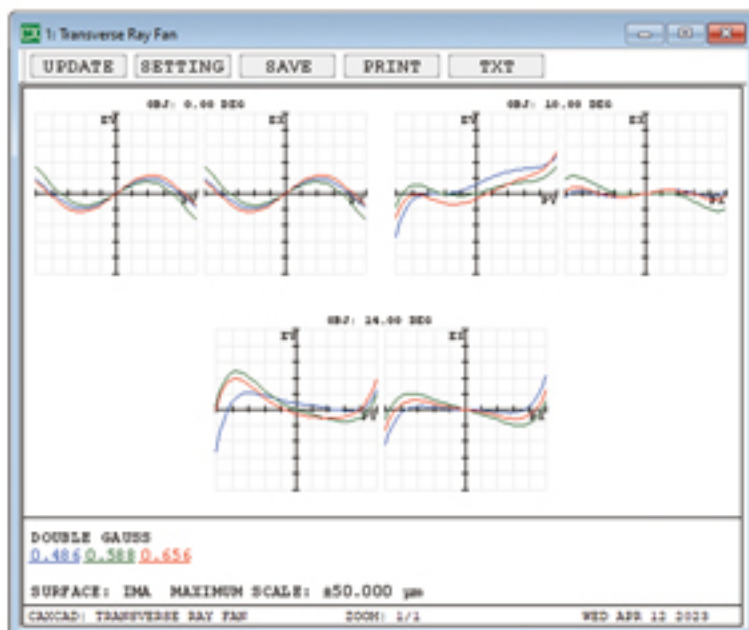
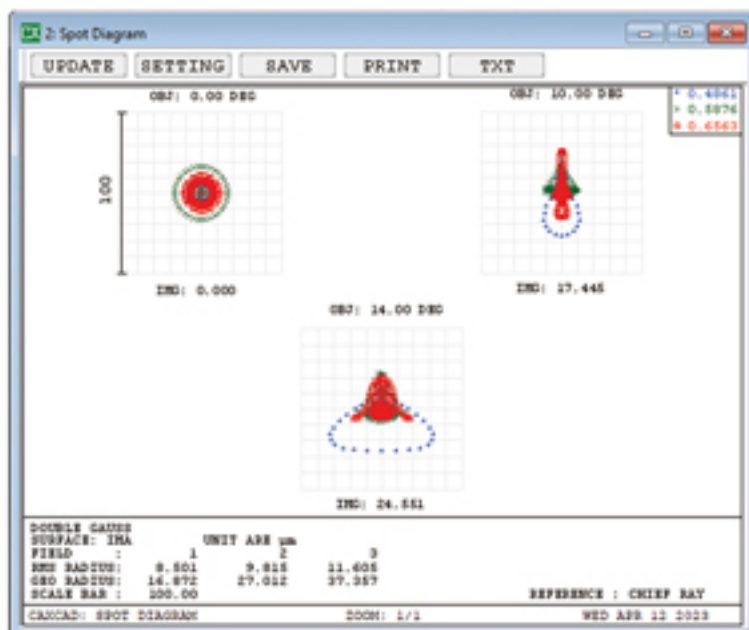
Surface Type

CAXCAD offers various optical surface types, including conventional surfaces as well as high-order aspheric and super-aspheric surfaces. For diffractive optical elements, it provides gratings and binary optical surfaces.



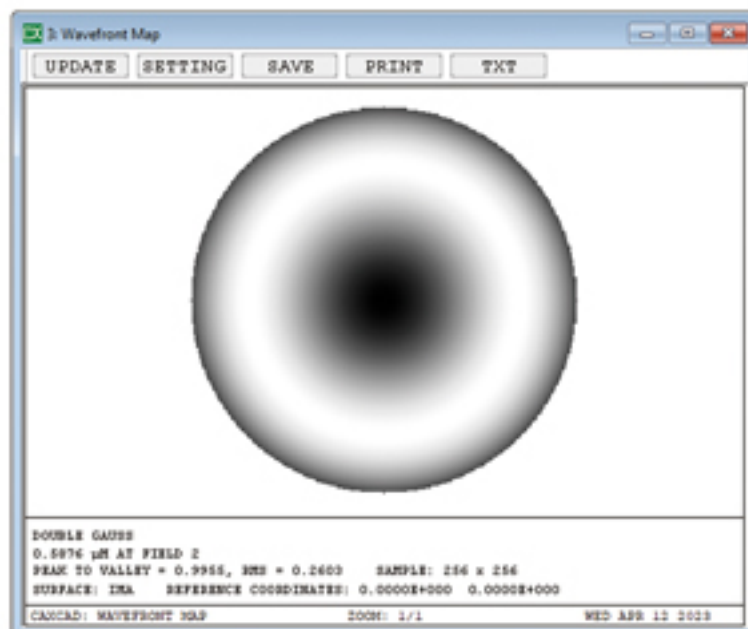
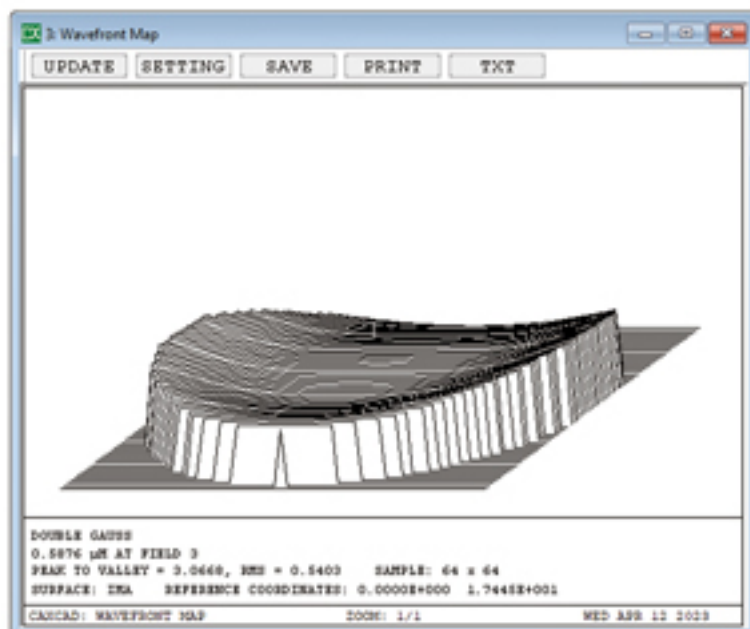
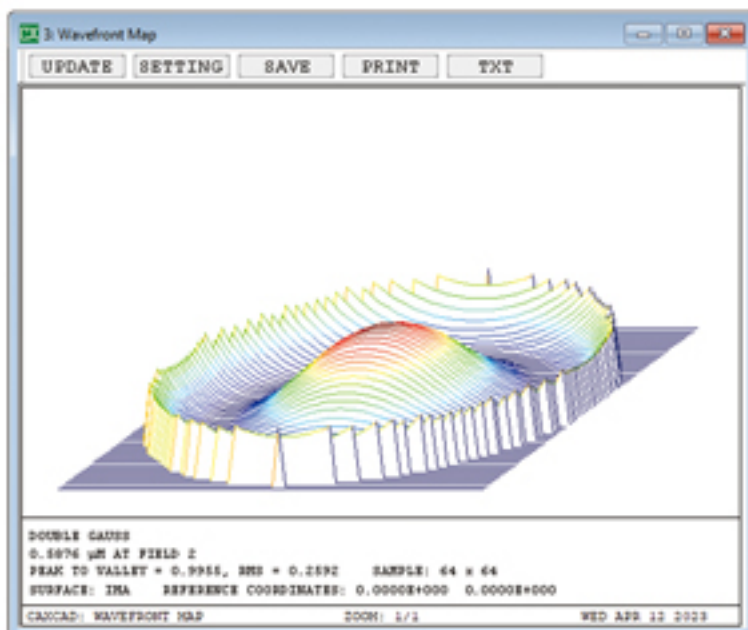
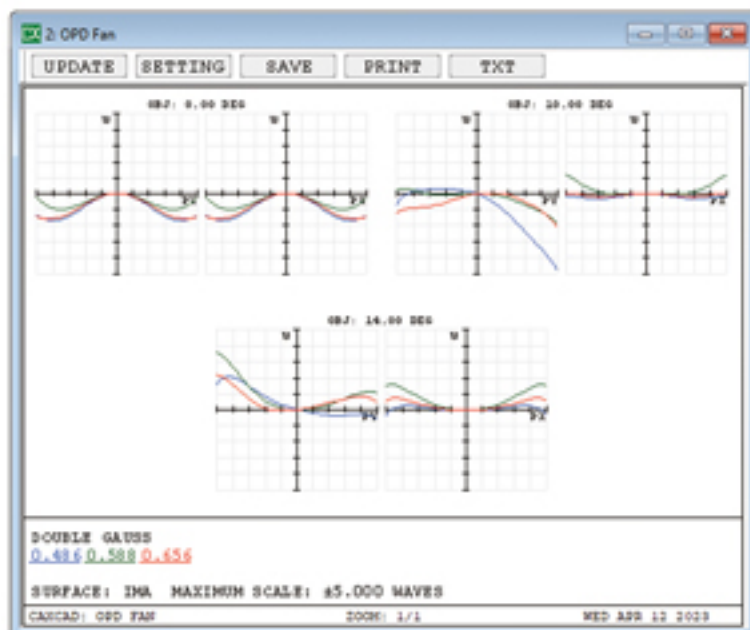
Geometry Analysis

CAXCAD's analysis functions include universal spot diagrams, fan diagrams, spherical aberration, relative illuminance, field curvature, and distortion.



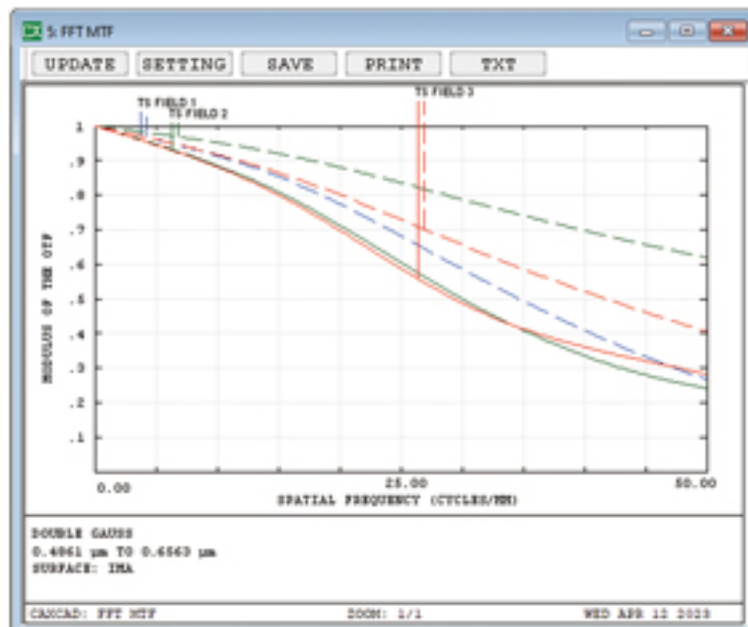
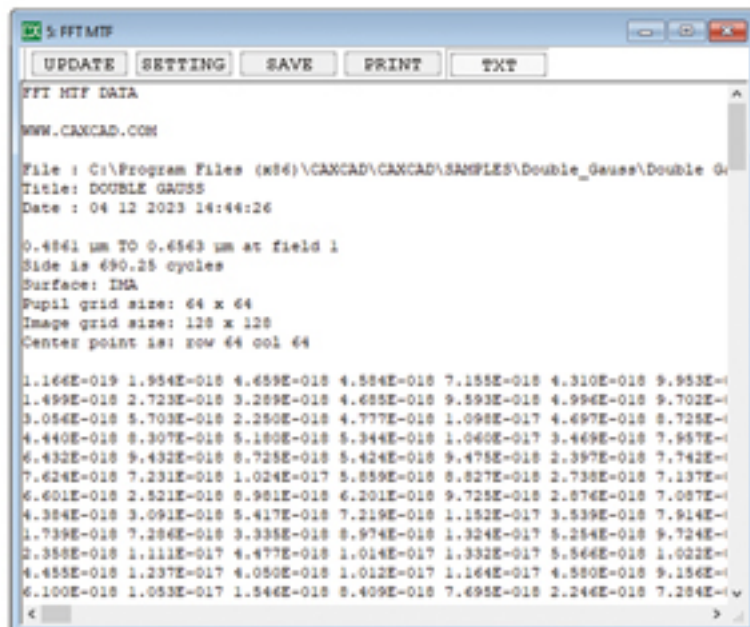
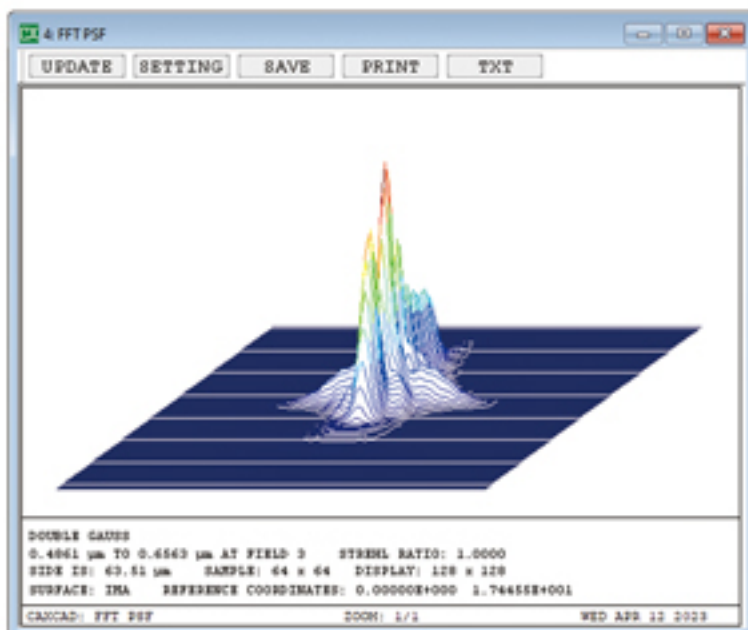
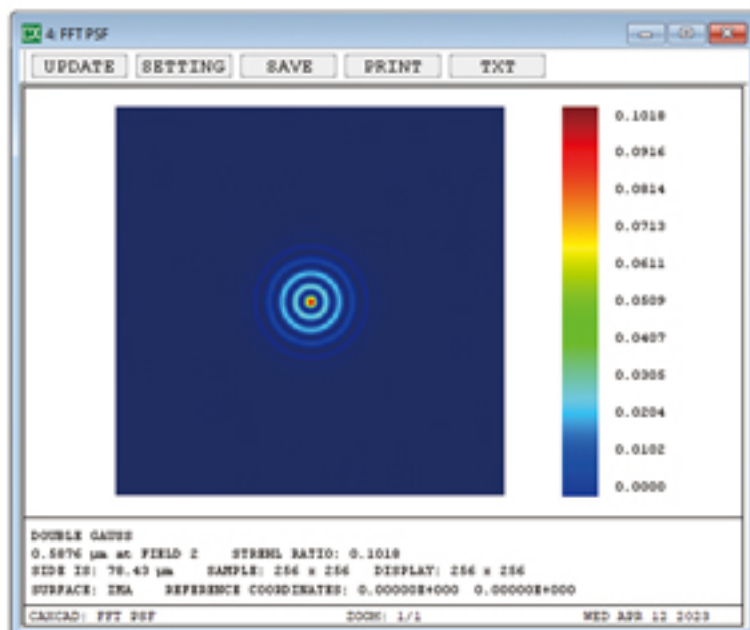
Wavefront Analysis

CAXCAD provides wavefront analysis based on optical path difference (OPD), and the analysis results can be presented in different forms. Both OPD and wavefront can be optimized as the design objectives.



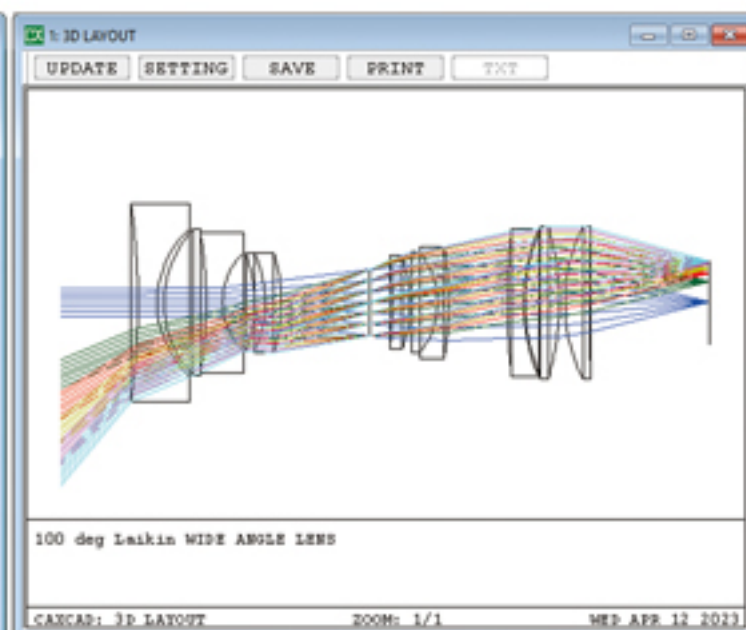
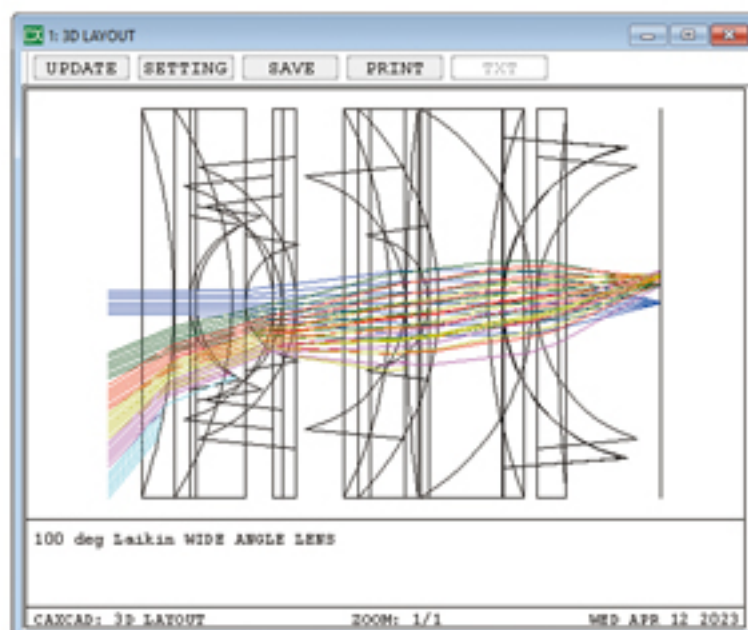
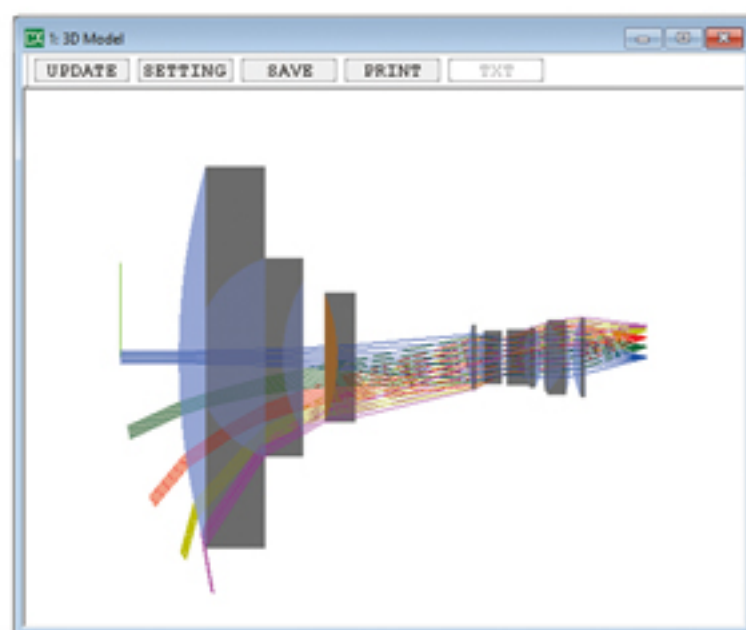
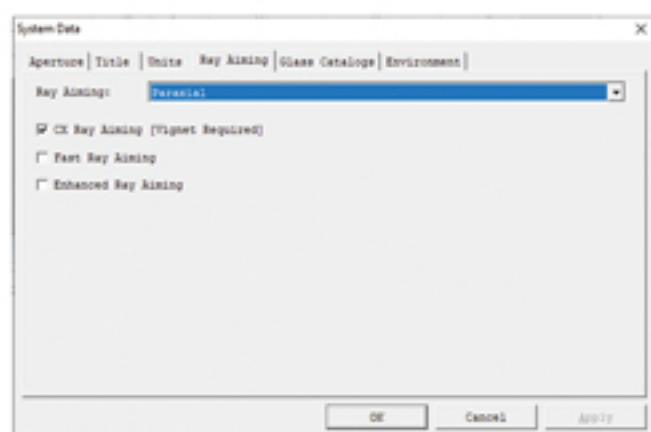
FFT Diffraction Analysis

CAXCAD provides diffraction analysis based on efficient FFT (Fast Fourier Transform), offering universal analysis of PSF (Point Spread Function) and MTF (Modulation Transfer Function) and convenient data-saving methods.



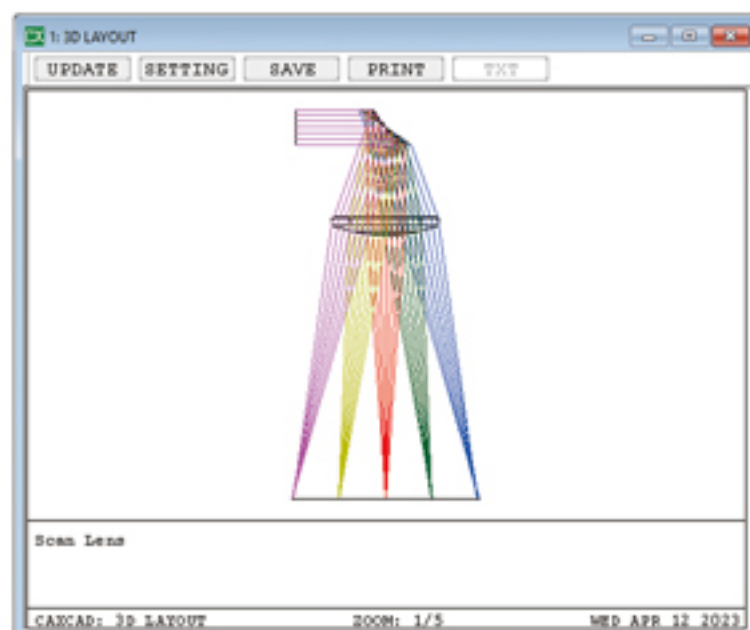
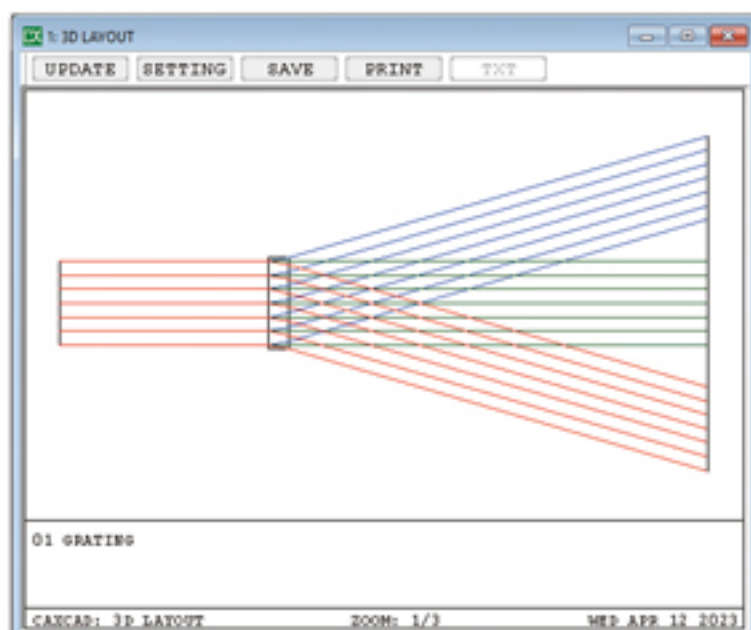
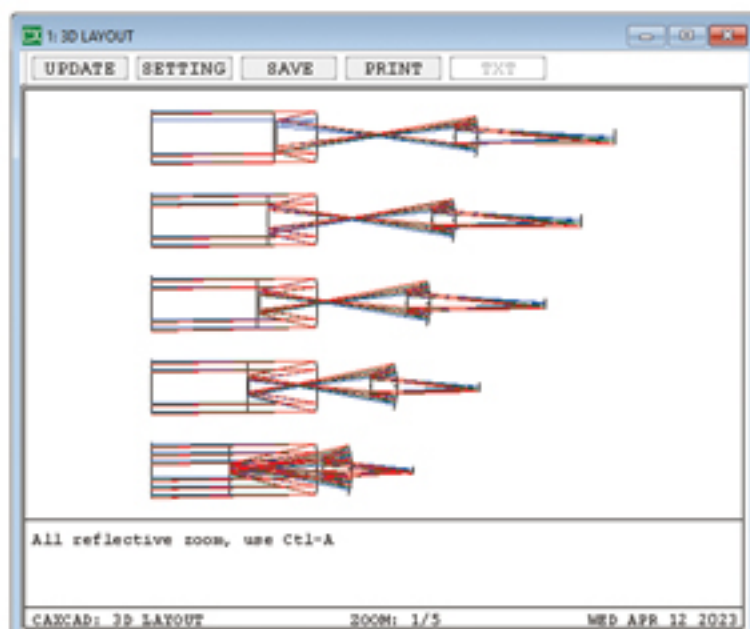
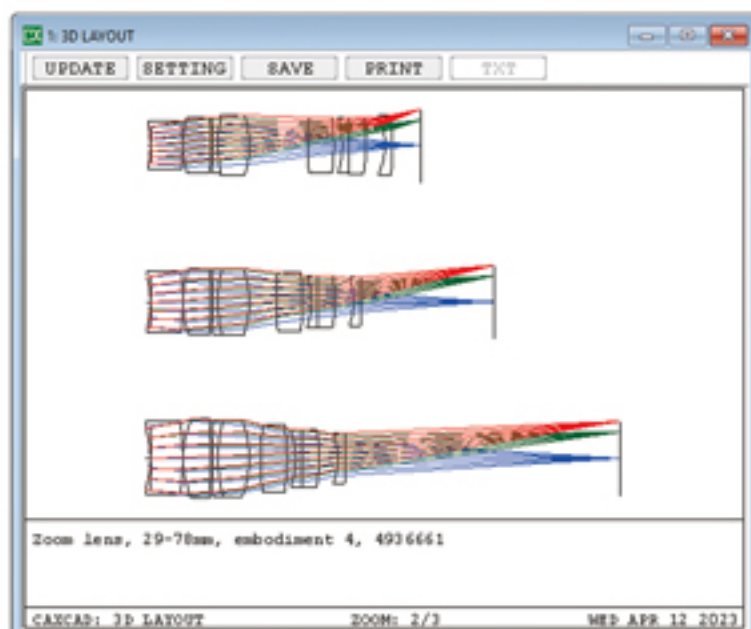
Ray Aiming

CAXCAD provides three types of ray aiming techniques, including the CX ray aiming technique that does not require iterative calculations, enabling optical systems to be analyzed and optimized at a faster speed.



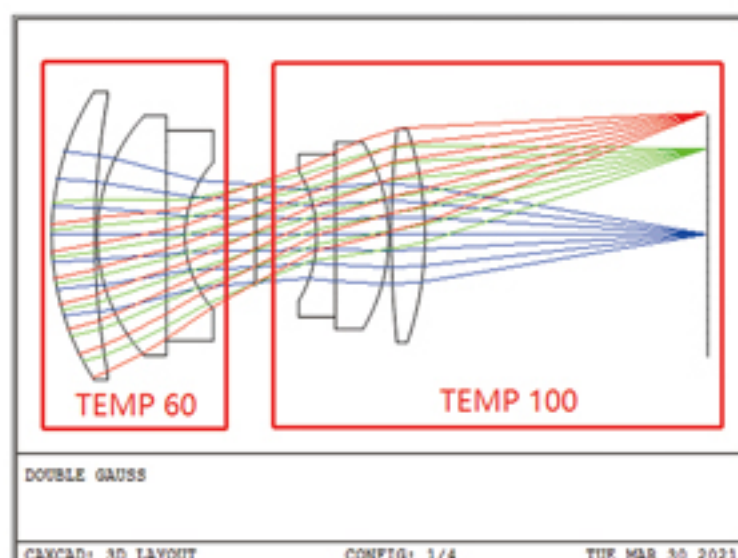
Multi-Configuration

CAXCAD employs built-in clever methods to facilitate the design of optical lenses under different environments and structures. This feature allows for easy design of zoom or scanning systems.



Thermal Analysis

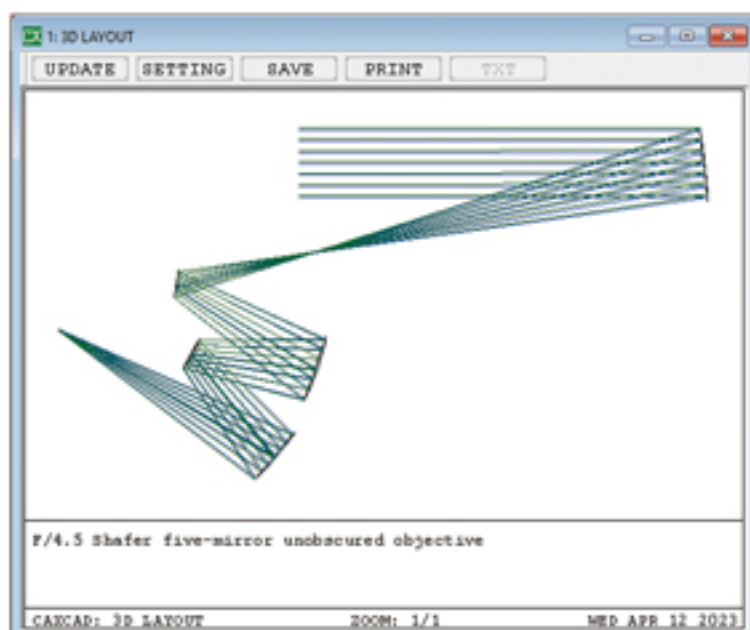
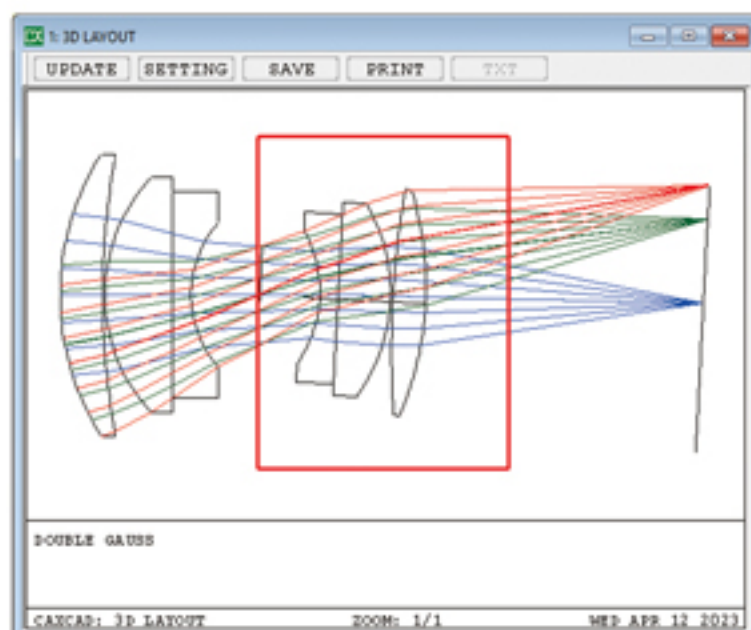
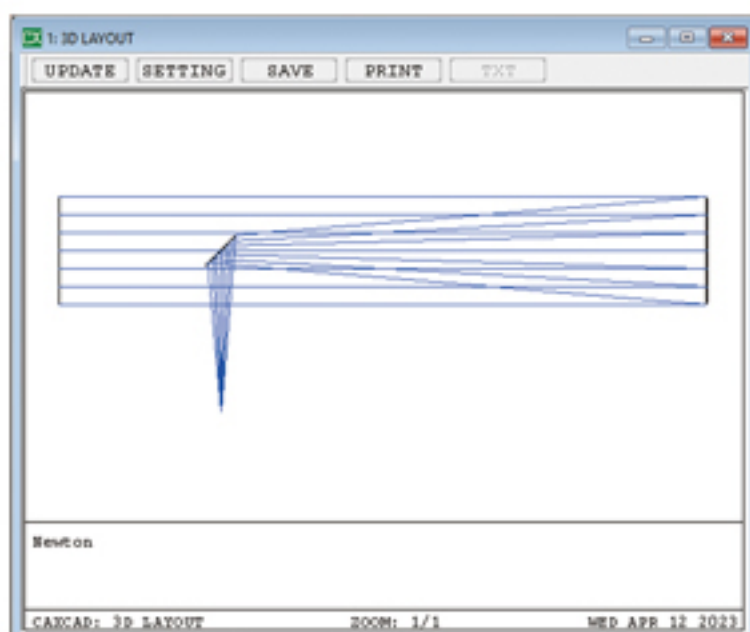
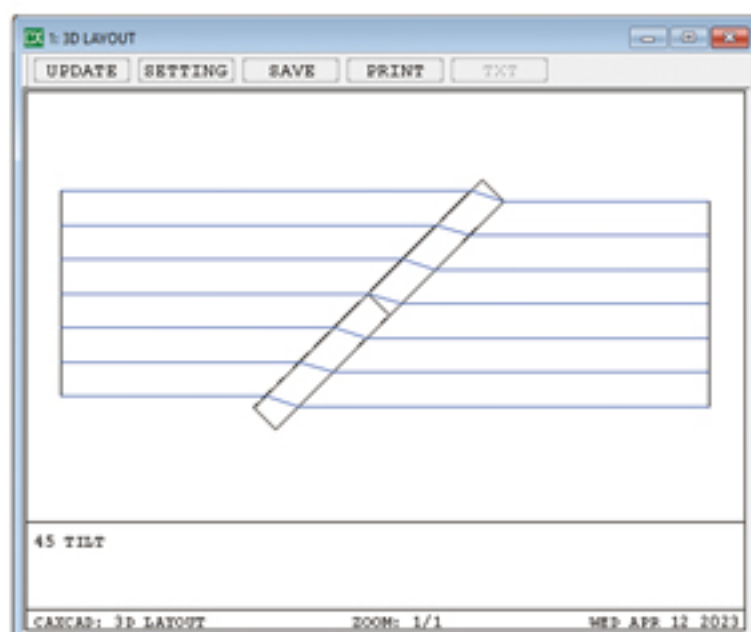
CAXCAD can perform thermal analysis on optical systems at different temperatures and conduct thermal design that eliminates the influence of temperature by using thermal expansion data of optical materials.



MCE	1/4	[Zoom 1]	Zoom 2	Zoom 3	Zoom 4
1 MC-TEMP	0	120.000000	20.000000	60.000000	100.000000
2 MC-PRES	0	1.000000	1.000000	1.000000	1.000000
3 MC-CRVT	2	0.000000	0.000000 T	0.000000 T	0.000000 T
4 MC-CRVT	3	-0.020000	-0.020014 T	-0.020009 T	-0.020003 T
5 MC-CRVT	4	0.020000	0.020014 T	0.020009 T	0.020003 T
6 MC-CRVT	5	0.000000	0.000000 T	0.000000 T	0.000000 T
7 MC-THIC	1	10.000000	10.000000 T	10.000000 T	10.000000 T
8 MC-THIC	2	5.000000	4.996450 T	4.997870 T	4.999290 T
9 MC-THIC	3	5.000000	4.996127 T	4.997676 T	4.999225 T
10 MC-THIC	4	5.000000	4.996450 T	4.997870 T	4.999290 T
11 MC-THIC	5	10.000000	10.000000 T	10.000000 T	10.000000 T
12 MC-GLSS	2	BK7	BK7	BK7	BK7
13 MC-GLSS	4	BK7	BK7	BK7	BK7
14 MC-SDIA	2	10.000000	9.992900 T	9.995740 T	9.998580 T
15 MC-SDIA	3	10.000000	9.992900 T	9.995740 T	9.998580 T
16 MC-SDIA	4	10.000000	9.992900 T	9.995740 T	9.998580 T
17 MC-SDIA	5	10.000000	9.992900 T	9.995740 T	9.998580 T
18 MC-MOFF	0				

Coordinate Break

CAXCAD uses the technique of optical rotation matrix to achieve off-axis real ray tracing, enabling users to easily simulate and design asymmetric optical systems.



Optimization

CAXCAD provides optimization for lens design using the DLS algorithm, and also offers a unique manual simulated annealing Multi-Start Jump, which supports hundreds of controllable target operations for optimization.,

Automatic Design

The automatic optimization function includes RMS, PTV geometric aberrations, wavefront aberrations, and angle optimization controls.

Optimization control operations - MFO

CAXCAD supports hundreds of operations, including first-order optics, geometric aberrations, real ray tracing, boundary control, and more.

High-fidelity optimization - SSN2

The tolerance factors of manufacturing are incorporated into the optimization process to improve the feasibility and reduce the cost of the final design results.

Discrete optimization of glass materials

Glass materials can be used as variables for discrete optimization, and real glass materials can be automatically controlled and selected.

Merit Function

Optimization Function

Type:

Function:

Reference:

☒ Assume Axial Symmetry

☐ Ignore Lateral Color

☐ Improve the Manufacturability (SSN2)

Weight:

Pupil Integration:

☒ Gaussian Quadrature

Rings:

Arms:

☐ Rectangular Array

Grid:

Thickness Boundary Values

☐ Glass: Min: Max: Edge:

☐ Air: Min: Max: Edge:

Wavelength:

Field:

Configuration:

Boundary Weight:

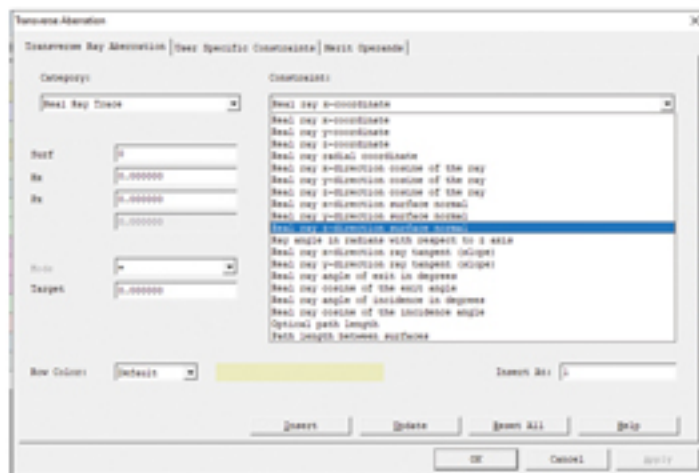
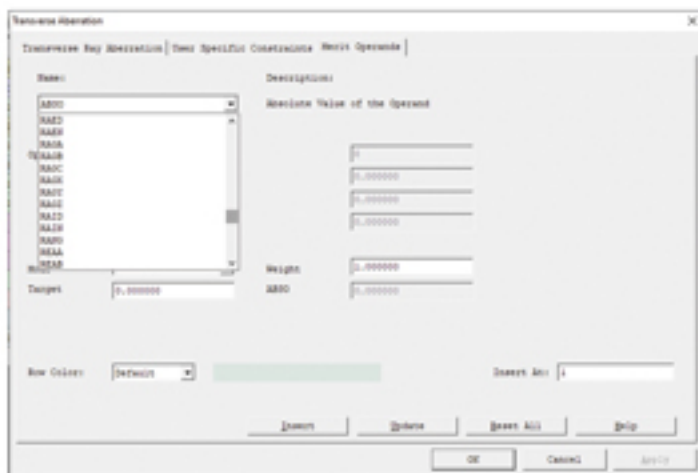
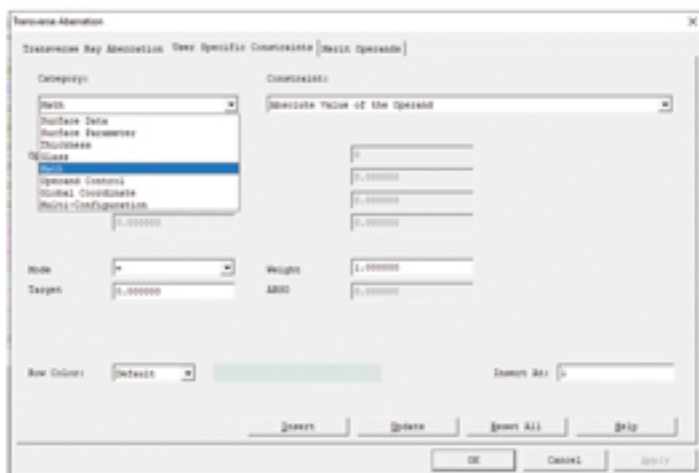
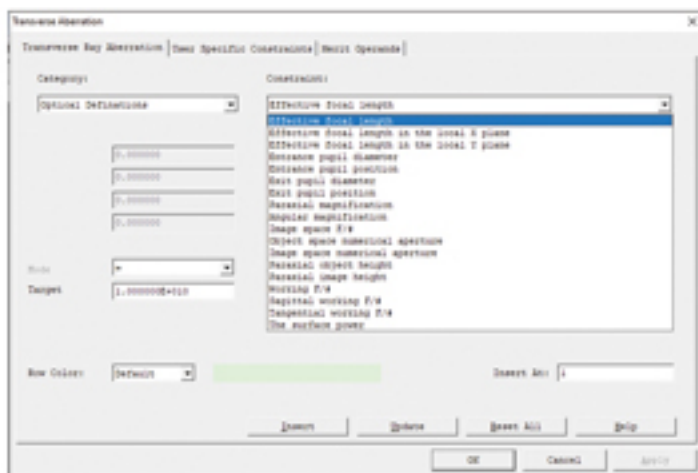
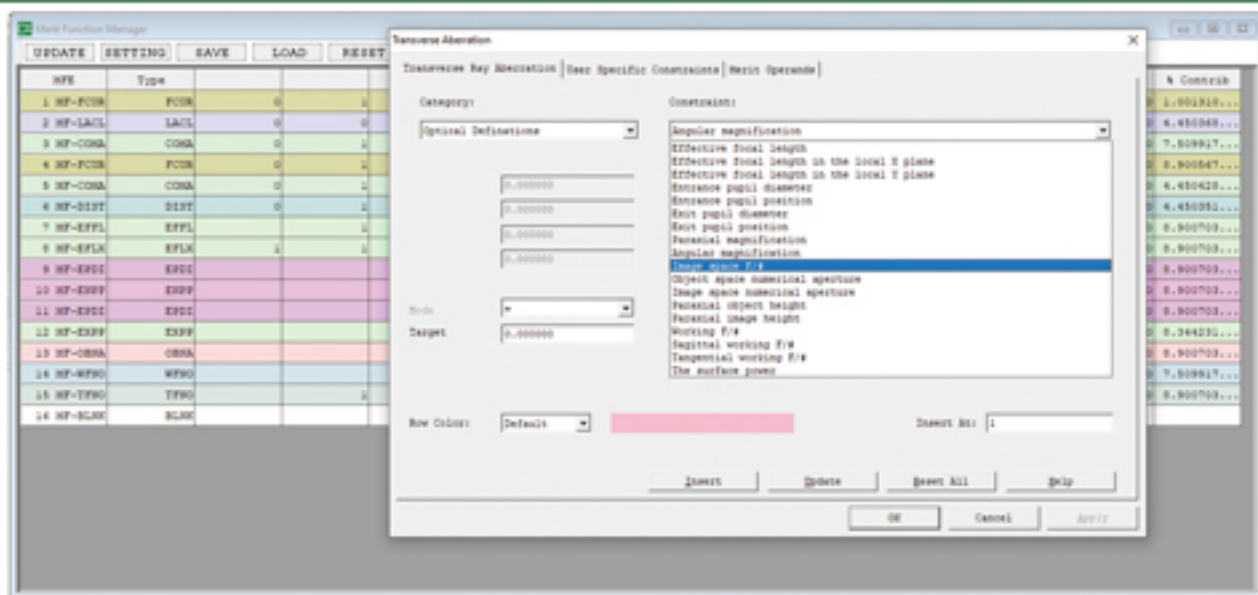
Start At:

Overall Weight:

OK Cancel Save Load Reset Help

Automatic Design

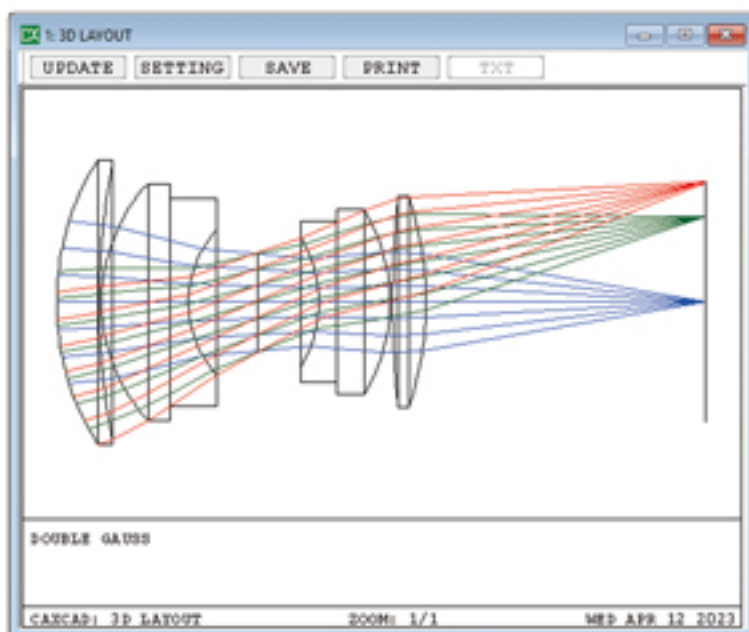
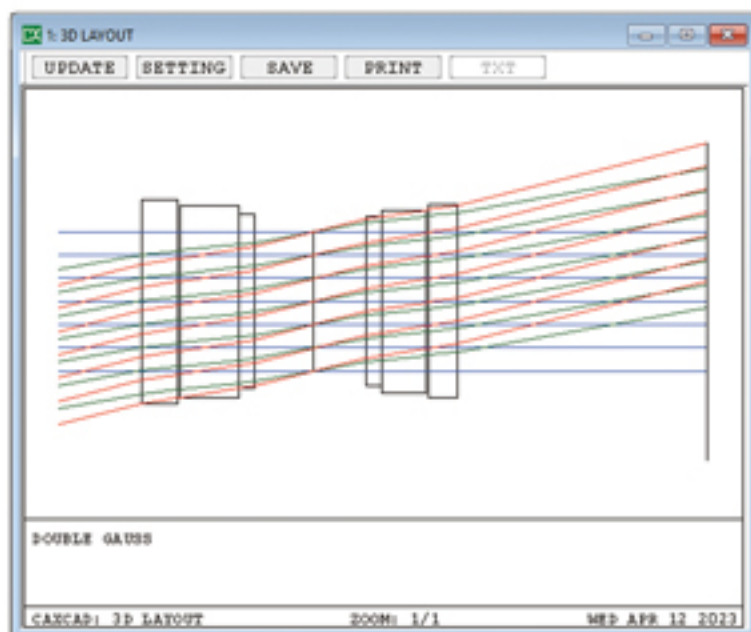
CAXCAD's automatic design tool classifies and organizes the guide windows and optimization operations, allowing users to quickly build target evaluation functions without the need for memorization.



CAXCAD OPTICAL DESIGN

Global and High Yield Optimization

CAXCAD has mastered advanced high-fidelity optimization techniques and global optimization techniques, and the combination of the two allows users to obtain the best design solutions.



Global Optimization

GL_001: 0.2875354154	Load	DLS
GL_002: 0.3736691633	Load	DLS
GL_003: 0.4851629027	Load	DLS
GL_004: 0.5223438000	Load	DLS
GL_005: 0.5780646355	Load	DLS
GL_006: 0.5834930613	Load	DLS
GL_007: 0.6092439917	Load	DLS
GL_008: 0.6847603081	Load	DLS
GL_009: 0.7307132125	Load	DLS
GL_010: 0.7806240674	Load	DLS

<< Previous Next >>

Start Stop Continue Exit

Save Files: 10
CPU Cores: 4
☐ Auto Update
☐ Fast Engine
Systems: 8395
Time:

Tolerance

The tolerance analysis function provided by CAXCAD for sensitivity to lens manufacturing can help users better control dimensional deviations in the design process, thereby reducing manufacturing defects and product failure rates.

The screenshot displays the CAXCAD Tolerance Analysis interface, which includes a 'Tolerance' dialog box and a 'Tolerance Data Manager' window.

Tolerance Dialog Box:

- Default Tolerance:** Surface Tolerances (Radius, Thickness, S & A Irreg, Deviate Irregularity) and Element Tolerances (Decenter X, Decenter Y, Tilt X, Tilt Y) are set to 0.02 mm or 0.02 degrees.
- Index Tolerances:** Index is set to 0.0005 and Abbe N is set to 1.

Tolerance Data Manager:

TDE	Type				Nominal	Min	Max
1	COMP	COMP	11	0	57.314538	-2.000000	2.000000
2	TWAV	TWAV	-	-	-	0.632800	-
3	TFRN	TFRN	1	-	0.018466	-3.000000	3.000000
4	TFRN	TFRN	2	-	0.006556	-3.000000	3.000000
5	TFRN	TFRN	3	-	0.027816	-3.000000	3.000000
6	TFRN	TFRN	4	-	0.000000	-3.000000	3.000000
7	TFRN	TFRN	5	-	0.044904	-3.000000	3.000000
8	TFRN	TFRN	7	-	-0.038933	-3.000000	3.000000
9	TFRN	TFRN	8	-	0.000000	-3.000000	3.000000
10	TFRN	TFRN	9	-	-0.027041	-3.000000	3.000000
11	TFRN	TFRN	10	-	0.005091	-3.000000	3.000000
12	TFRN	TFRN	11	-	-0.014893	-3.000000	3.000000
13	TTHI	TTHI	1	2	8.746658	-0.020000	0.020000

Command Window:

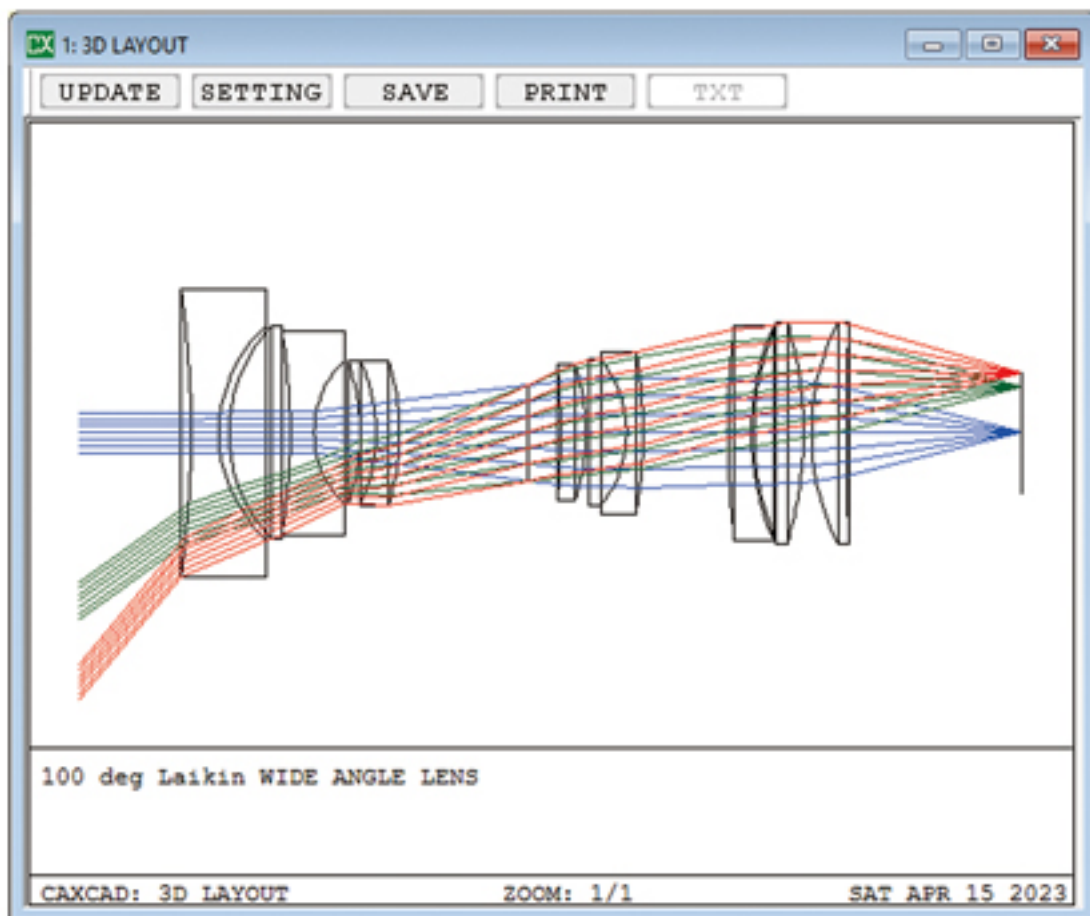
TECH	10	11	-0.02000000	0.00813430	0.00001800	0.02000000	0.00813433	0.00001803
TEDY	1	2	-0.02000000	0.00815519	0.00003890	0.02000000	0.00809915	-0.00001715
TEDY	3	5	-0.02000000	0.00807872	-0.00003758	0.02000000	0.00823763	0.00001214
TEDY	7	9	-0.02000000	0.00823710	0.00012081	0.02000000	0.00809423	-0.00002207
TEDY	10	11	-0.02000000	0.00812229	0.00000600	0.02000000	0.00814575	0.00002946
TETX	1	2	-0.02000000	0.00808628	-0.00003002	0.02000000	0.00815664	0.00004035
TETX	3	5	-0.02000000	0.00819582	0.00007953	0.02000000	0.00808044	-0.00003585
TETX	7	9	-0.02000000	0.00816157	0.00004528	0.02000000	0.00808863	-0.00002766
TETX	10	11	-0.02000000	0.00810706	-0.00000923	0.02000000	0.00812863	0.00001234
TETY	1	2	-0.02000000	0.00812101	0.00000472	0.02000000	0.00812101	0.00000472
TETY	3	5	-0.02000000	0.00812581	0.00000952	0.02000000	0.00812581	0.00000952
TETY	7	9	-0.02000000	0.00812143	0.00000514	0.02000000	0.00812143	0.00000514
TETY	10	11	-0.02000000	0.00811765	0.00000136	0.02000000	0.00811765	0.00000136

Estimated RMS Spot Radius Performance (RSS method):

- Nominal Performance : 0.00811629
- Estimated Change : 0.00067406
- Estimated Performance : 0.00879035

CAXCAD >

CAXCAD ®



<http://www.caxcad.com>