Beam Shaper

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1 Keplerian Type Beam Shaper

Simulation with parameters given in *Laser Beam Shaping Techniques*

1.1 Initial system

TABLE 7.1
Design Data for Plano-Aspheric Lens Pair of Keplerian Beam Shaper Calculated Based on the Third-Order Aberration Theory

No.	r_c	t_c	Glass	k	n_{532}
		Infinity			1
1	Infinity	3	Fused silica		1.46071
2	−20.182	150		−48.71	1
3	48.925	3	Fused silica	17.08	1.46071
4	Infinity				1

Figure 1: Initial Keplerian type beam shaper system.

This system gives a profile as below in Zemax OpticStudio:

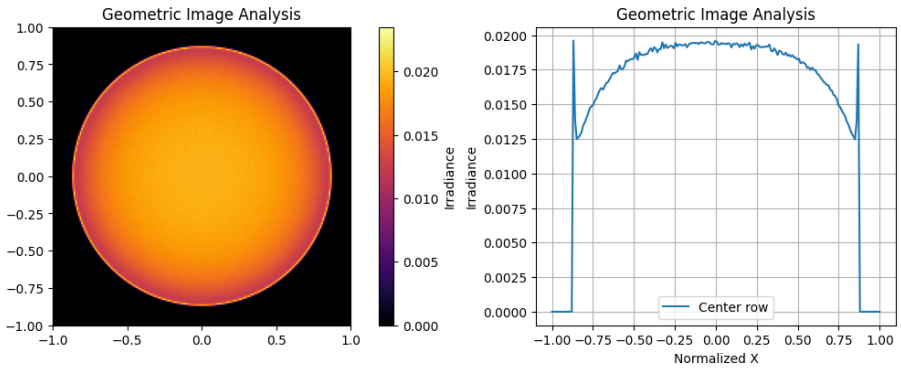

Figure 2: Initial beam profile at the output plane.

1.2 Optimized with only conic constant

The parameters given in *Laser Beam Shaping Techniques*:

TABLE 7.2
Design Data for Plano-Aspheric Lens Pair of Keplerian Beam Shaper with the Second-Order Aspheric Surfaces Whose Parameters Are Corrected by Optimization Method

No.	r_c	t_c	Glass	k	n_{532}
		Infinity			1
1	Infinity	3	Fused silica		1.46071
2	−20.182	150		−54.8	1
3	48.925	3	Fused silica	29.5	1.46071
4	Infinity				1

Figure 3: Optimized Keplerian type beam shaper system with only conic constant as variable.

In Zemax OpticStudio, the output profile given by this is:

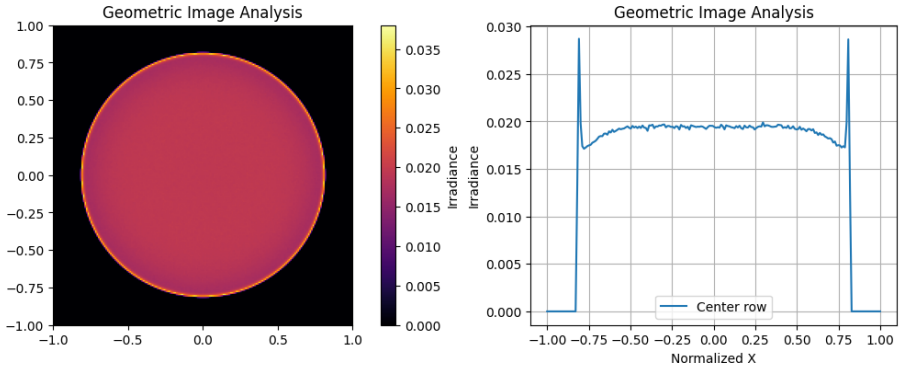

Figure 4: Output beam profile at the output plane after optimization with only conic constant as variable.

1.3 Optimized with up to 4th order

The parameters given in *Laser Beam Shaping Techniques*:

TABLE 7.3
Design Data for Plano-Aspheric Lens Pair of Keplerian Beam Shaper Where First Aspheric Has the Second-Order and the Second Aspheric Has the Fourth Order

No.	r_c	t_c	Glass	Asphere Coefficients	n_{532}
		Infinity			1
1	Infinity	3	Fused silica		1.46071
2	−20.1	150		$k = -55.62$	1
				$A_4 = -6.27 \times 10^{-5}$	
3	48.75	3	Fused silica	$K = 67.22$	1.46071
4	Infinity				1

Figure 5: Optimized Keplerian type beam shaper system with up to 4th order as variable.

In Zemax OpticStudio, the output profile given by this is:

2 Galilean Type Beam Shaper