

Appendix 9. Optional corrector

The optical prescription is given in Table A- 7. The primary and secondary mirrors have the same prescription as in the baseline design.

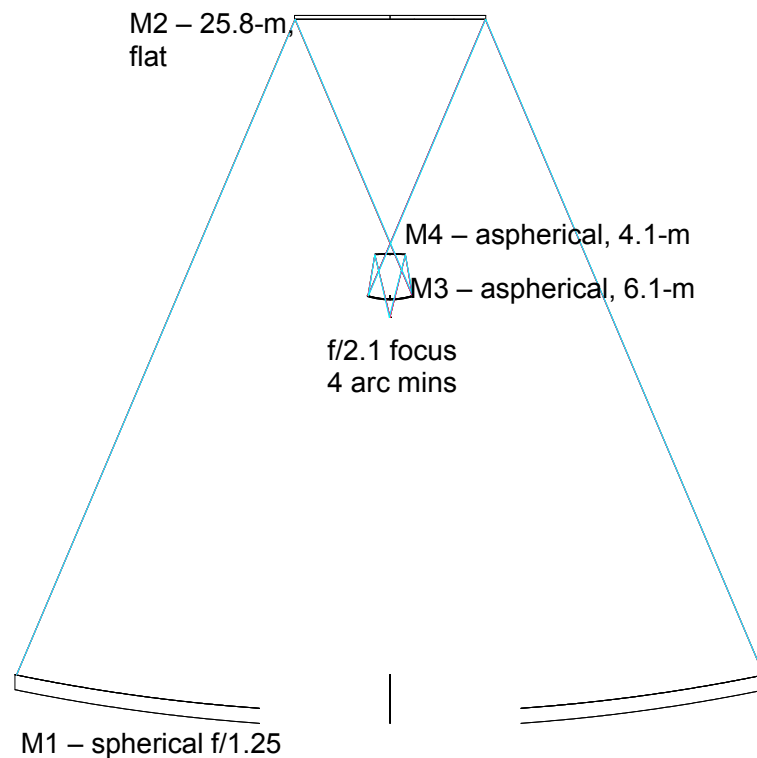


Figure A- 10. Optional two-mirror corrector (f/2.1 focus, 4 arc minutes total field of view).

Surface M4 can be used for tip-tilt correction albeit at a reduced frequency in view of its size. Fast (≥ 1 Hz) correction of image motion would have to be provided in the instrument and in the wavefront sensors.

Image quality at the f/2.1 focus is seeing-limited (0.15 arc seconds RMS) at the edge of the 4 arc minutes field. In principle, only the central one arc minute would be used for science, the field outside one arc minute being essentially for adaptive and active optics sensing. Figure A- 11 gives the Strehl Ratio at different wavelengths from 2.2 to 10 μm , and Figure A- 12 provides the optical quality over the entire field of view.

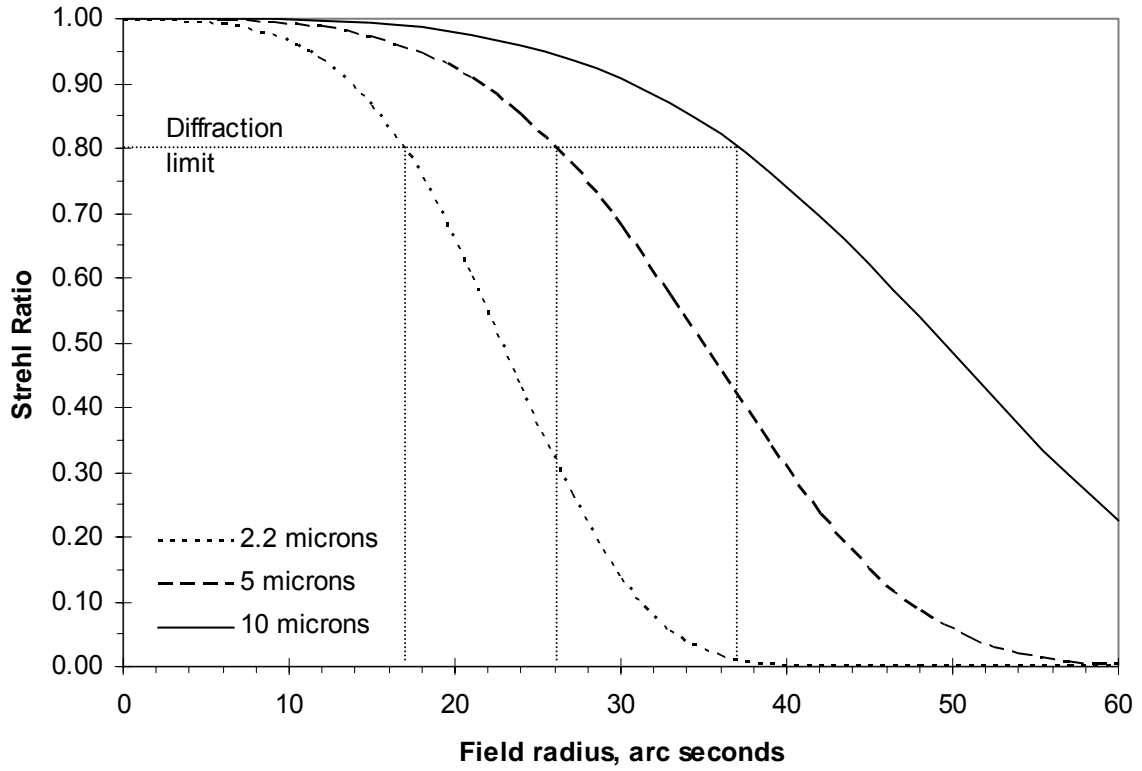


Figure A- 11. Optional corrector; Strehl Ratio vs field radius.

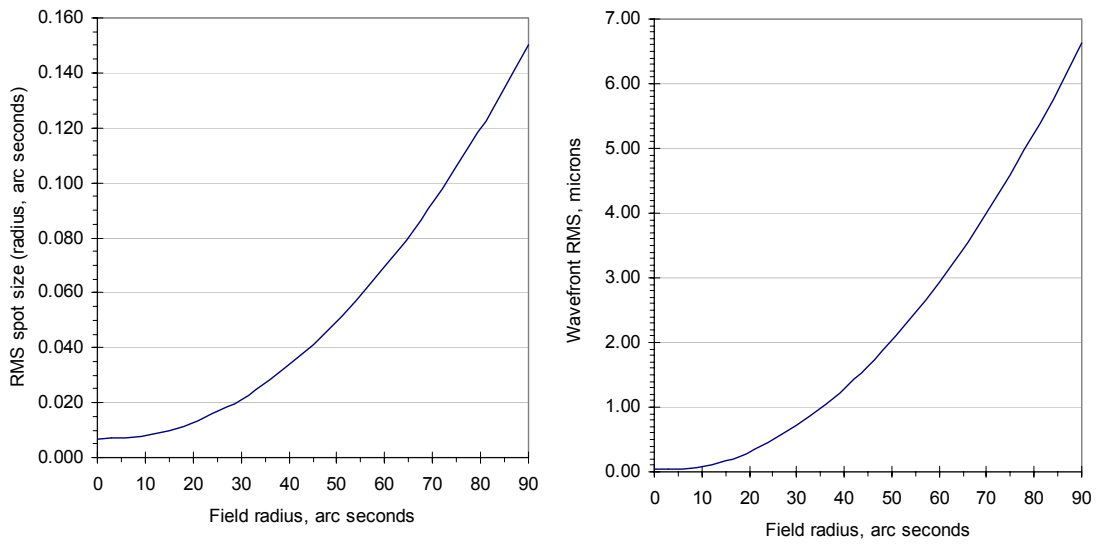


Figure A- 12. Optional corrector; RMS spot size, RMS wavefront error vs. field radius.

System/Prescription Data

File : OWL-1250-92518-100m-OPTIONAL_CORRECTOR_2.ZMX
 Surfaces : 8
 Stop : 2
 System Aperture : Entrance Pupil Diameter = 100000
 Effective Focal Length : -208928.6 (in image space)
 Back Focal Length : 236757.9
 Total Track : 92517.5
 Working F/# : 2.093617
 Stop Radius : 50000
 Entrance Pupil Diameter : 100000
 Entrance Pupil Position : 92517.5
 Exit Pupil Diameter : 4451.553
 Exit Pupil Position : -9301.553
 Field Type : Angle in degrees
 Maximum Radial Field : 0.03333
 Primary Wavelength : 5 μ m
 Lens Units : Millimeters

SURFACE DATA SUMMARY:

Surf	Type	Radius	Thickness	Glass	Diameter	Conic
OBJ	STANDARD	Infinity	Infinity		0	0
1	STANDARD	Infinity	92517.5		100101.8	0
STO	STANDARD	-250000	-92517.5	MIRROR	100000	0
3	STANDARD	Infinity	31312	MIRROR	25599.08	0
4	STANDARD	Infinity	5995.9		1362.146	0
5	EVENASPH	-10004	-5995.9	MIRROR	6090.72	0.9151138
6	EVENASPH	15900	5995.9	MIRROR	4101.446	-1.239024
7	STANDARD	Infinity	2424.224		1364.185	0
IMA	STANDARD	6050.087			244.9009	0

SURFACE DATA DETAIL:

Surface OBJ : STANDARD
 Surface 1 : STANDARD M2 OBSCURATION
 Aperture : Circular Aperture
 Minimum Radius : 15000
 Maximum Radius : 51000
 Surface STO : STANDARD M1
 Aperture : Circular Aperture
 Minimum Radius : 17500
 Maximum Radius : 50200
 Surface 3 : STANDARD M2
 Surface 4 : STANDARD HOLE M4
 Surface 5 : EVENASPH M3
 Coeff on r 2 : 0
 Coeff on r 4 : 6.7373593e-013
 Coeff on r 6 : -8.5515616e-020
 Coeff on r 8 : 1.1646497e-026
 Coeff on r 10 : -1.0944848e-033
 Coeff on r 12 : 6.5980757e-041
 Coeff on r 14 : -2.2477154e-048
 Coeff on r 16 : 3.2455245e-056
 Surface 6 : EVENASPH M4
 Coeff on r 2 : 0
 Coeff on r 4 : -2.6703784e-012
 Coeff on r 6 : 4.2436167e-021
 Coeff on r 8 : 2.7130365e-026
 Coeff on r 10 : -2.0785384e-032
 Coeff on r 12 : 6.4138293e-039
 Coeff on r 14 : -9.3103508e-046
 Coeff on r 16 : 5.2806034e-053
 Surface 7 : STANDARD HOLE M3
 Surface IMA : STANDARD IMAGE

Table A- 7. Optional corrector, optical prescription.