SYSTEM DESIGN NOTE

NFM-AD-02-2202 Physical dimensions of warm optics layout

Prepared by	Date	Approved by	Date	Rev.	Rev. Date
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1. Introduction

This SDN lists the physical dimensions of NEWFIRM optical components, and intercomponent spacings, at fabrication temperature. These are derived from the cold optical design, see SDN NFM-AD-02-2201. These are the dimensions to be used for all mechanical design work on the optics mounts and optical support structure.

2. Optics dimensions

2.1 Design temperature

2.1.1 The reference temperature for these dimensions, and for all design effort based on them, shall be 293 K (= 20 deg C or 68 deg F).

2.2 Table of dimensions

2.2.1 All design work involving the optics shall be based on the data table below. All dimensions are given in millimeters.

Lens dimensions are as specified to the vendor. Finish dimensions will be measured and tabulated upon receipt. For some parts, finish machining to final dimensions will have to await these as-delivered dimensions.

Filter dimensions are nominal. The as-delivered measurements are being determined by the Optics Shop.

The Lyot stop diameters are specifications for the design. Recall this is a “doughnut” aperture in a metal plate, hence the OD and ID dimensions. The OD is slightly undersized, and the ID slightly oversized, with respect to the optical design. This allows some tolerance for alignment of the instrument to the telescope. This is not a tolerance for placement or centration of the stop within the instrument.

The detector size includes a 4 mm allowance for dead space between active areas of the arrays. This is presently a nominal dimension and it may change slightly. This would affect telescope and focal plane baffle dimensions but not the optics dimensions or spacings.

A side view of the optical layout is included for component identification. Note that only one filter is shown.

NEWFIRM Physical dimensions of the optical lenses and their spacing at 68 F = 20 C

	Diameter of lens	Edge Thickness	Center Thickness	Distance Cass Focus to 1st surface	Distance Cass Focus to 2nd surface	Distance Z axis to 1st surface	Distance Z axis to 2nd surface	Distance between lens surfaces
Cass Focus	-	-	-	0	0			20
Lens 1	407.00	20.16719	70	20	90	0		776.7701
Lens 2	200.00	9.28938	38.1205	866.77009	904.89059	0		39.80216
Lens 3	198.00	26.8005	15.00004	944.69276	959.6928	0		57.52359
1st Filter	124.xx	5.xx	5.xx	1017.21639	1022.21639	0		9.7536
2nd Filter	117.xx	5.xx	5.xx	1031.96999	1036.96999	0		14.0565
Lyot stop OD Lyot stop ID	**98.**0821 h 47.0318 h	1.016	1.016	1051.026504	1052.042504	0		1.90249
Lyot stop arms	7.32 j							
Lens 4	140.00	18.7	14.00004	1053.945	1067.94504	0		35.29597
Lens 5	173.00	12.43944	50.15857	1103.24101	1153.39958	0		11.75334
Lens 6	183.00	16.68435	18.02253	1165.15292	1183.17545	0		90.28169 c
Fold Mirror	245.00	50.8	50.8	1273.4571 a				
Horiz. Axis	--------							90.34497 d
Lens 7	200.00	18.095674	50.158574	1273.4571 a	-	90.34497	140.50354	115.5294 g
Lens 8	165.00	60.48456	16.000046	1273.4571 a	-	256.032914	272.03296	20.12637 e
Lens 8 seat	165.00	-	-	1273.4571 a	-	282.56778 b	-	
								9.59155 f
Detector plane	106.6 square	-	-	1273.4571 a	-	292.15933	-	

Distance between surfaces is from Ming's Prescription Data

All dimensions noted are in millimeters

a = Centerline of lenses 7 & 8 and Detector

b = Farthest lens seat from the Z axis

c = Distance from lens 6 surface to fold mirror surface

d = Distance from fold mirror surface to lens 7 first surface

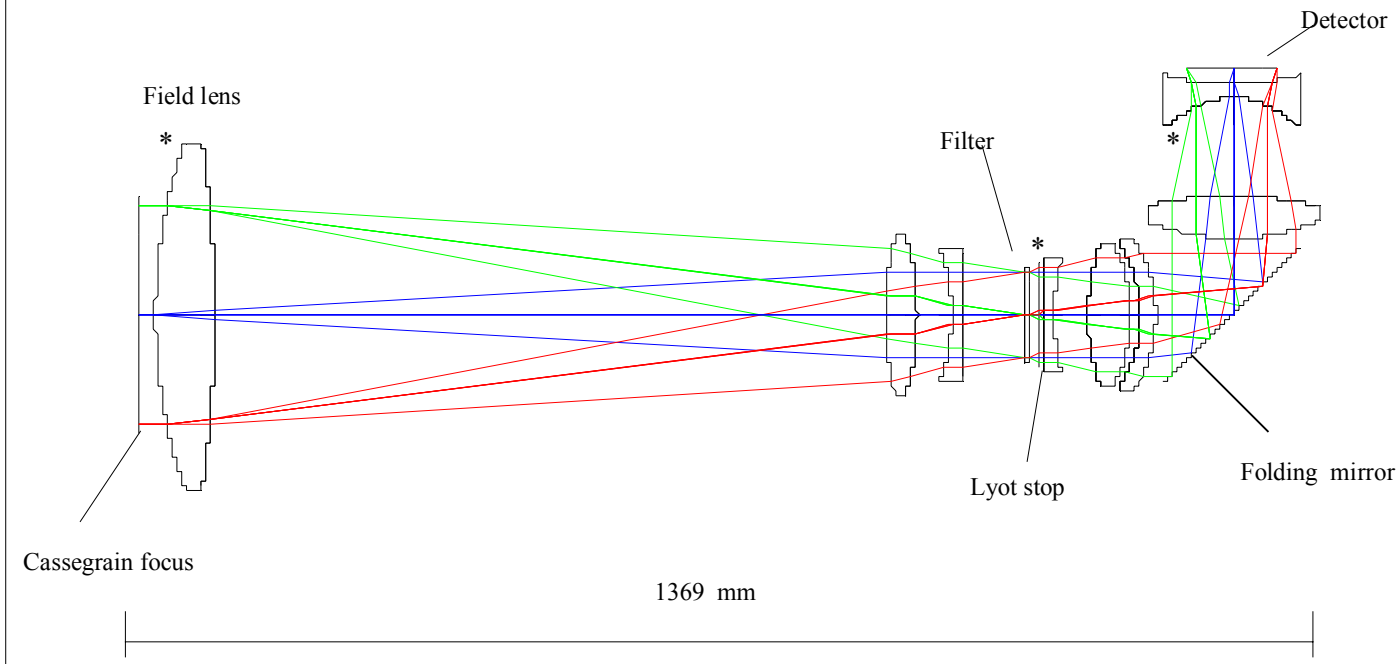
e = Distance from lens 8 second surface vertex to detector plane

f = Distance from lens 8 seat to detector plane

g= Distance between lens 7 and lens 8 surfaces

h= Lyot aperture is a doughnut with central obstruction. Dimensions include deliberate under/oversizing of 0.127 mm for alignment tolerance.

J= Lyot spider arm thickness, allowing for optical blurring and ±1 deg rotational misalignment. The arms are at 45 deg to the cardinal points.



3D LAYOUT

NBL3C65KFDL0
WED JAN 22 2003
SCALE: 0.1500

133.33 MILLIMETERS

D:\PT\NEWFRM\2003\TPL\COLDWRMDSCNWBL3GKFDLDRWNG.MX
CONFIGURATION 1 OF 3

Newfirm with Fused Silica field lens. Total warm length 1368.69 mm, largest distortion: 1.3 %, largest skew ray angle on filter: 13.52 deg