

Magellan II 6.5M Telescope

Tertiary Mirror

Final Polishing Results

00TE0001

S/N 2
Magellan



DATA SUMMARY SHEET FOR CARNEGIE MAGELLAN OPTIC

Surface Quality (Shear Data)

Shear (cm)	RMS(λ) for X Shear	RMS(λ) for Y Shear	Specification (λ rms)
2	0.01265	0.009874	0.0237
5	0.02459	0.01865	0.0427
10	0.03854	0.02809	0.0648
20	0.06209	0.04254	0.0901

Surface Roughness

Surface Roughness (A rms) Data	Avg. Surface Roughness(A rms)	Specification
6.8, 6.7, 4.9, 5.2, 5.0, 6.0, 4.4, 4.8	5.5	20 A

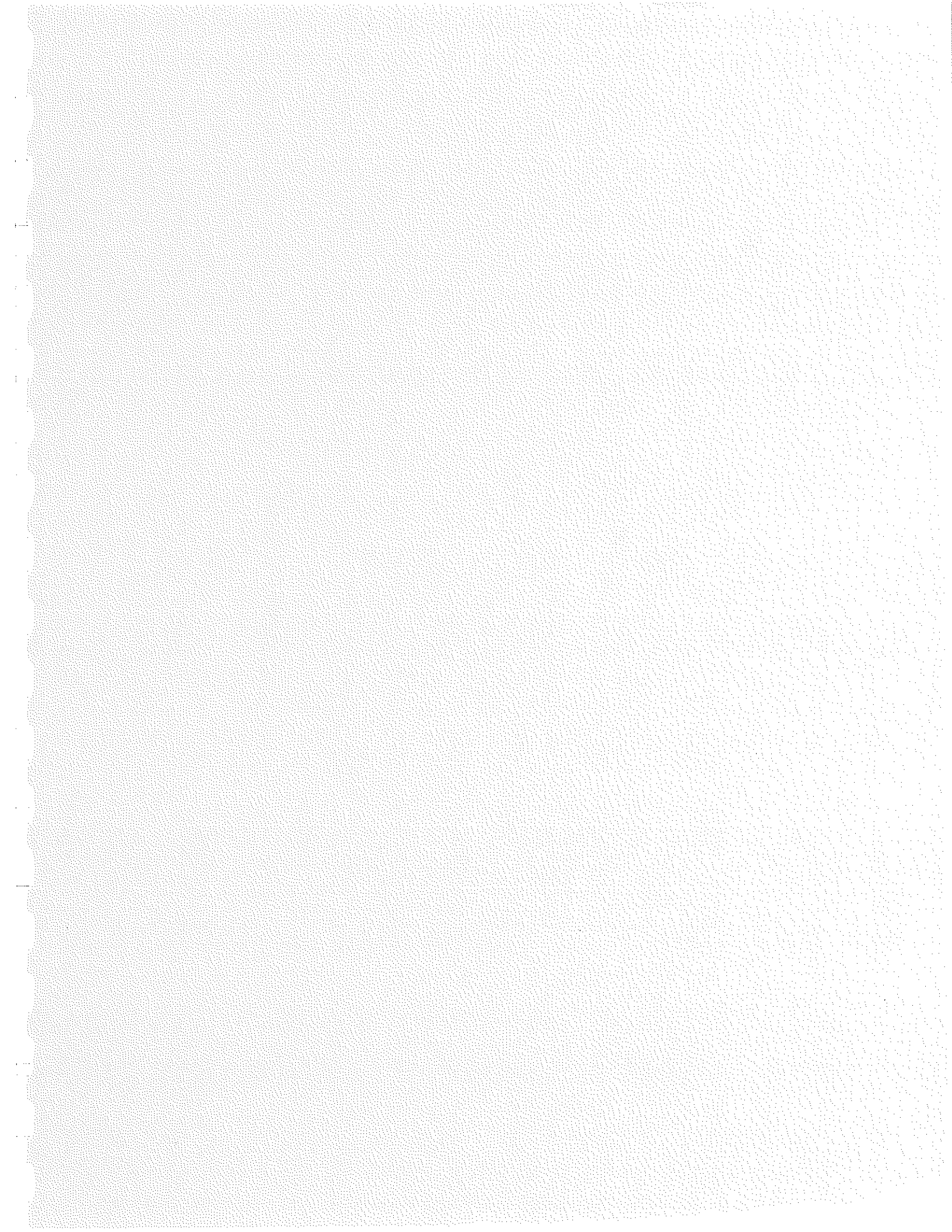
Scratch / Dig

Scratch / Dig Data	Specification
No scratches or digs outside of specification detected	60/40

The disc contains Array 991111 P103. This is an ASCII array of the surface of plano S/N 2 using data from the full four orientation test.

The array is 79 by 111 with increments of .3937 inches (1 cm) and starting points (in the lower left corner) of x start= -15.3543 and y start = -21.6535.

The header gives a title and the number of data values in the array. The first 8 data values give array parameters as follows: type (1), x size; y size, X increment. Y increment, X start, Y start, obstructed aperture (invalid data) value (10000.000000). The surface array data reads out in x; and increments up in y.



**MAGELLAN
SERIAL NUMBER 2
CHAPMAN 2000**

Location 1		Location 2		Location 3		Location 4	
North Outer		North Inner		South Outer		South Inner	
RMS (A)	P-V (A)	RMS (A)	P-V (A)	RMS (A)	P-V (A)	RMS (A)	P-V (A)
6.88	63.91	6.56	67.33	4.91	41.05	5.18	70.57
6.87	63.86	6.64	70.65	4.92	40.83	5.24	58.48
6.87	64.25	6.74	72.95	4.87	38.64	5.17	56.75
6.56	53.80	6.78	76.20	4.96	41.88	5.14	59.72
6.62	56.79	6.76	74.34	4.98	41.01	5.07	56.28
AVRG 6.76		AVRG 6.70		AVRG 4.93		AVRG 5.16	

Location 5		Location 6		Location 7		Location 8	
West Outer		West Inner		East Outer		East Inner	
RMS (A)	P-V (A)	RMS (A)	P-V (A)	RMS (A)	P-V (A)	RMS (A)	P-V (A)
4.98	48.51	5.99	66.78	4.22	39.42	4.74	46.62
4.91	45.87	6.00	66.84	4.46	68.62	4.77	44.13
4.91	45.69	5.94	67.28	4.47	59.49	4.77	45.76
4.93	42.88	6.00	66.42	4.49	52.41	4.80	45.27
5.02	41.96	5.96	65.72	4.43	47.98	4.76	46.54
AVRG 4.95		AVRG 5.98		AVRG 4.41		AVRG 4.77	

OFFSET 1.0MM
 FILTER CUT OFF .08MM
 SCAN LENGTH 5.0MM

CATHY SILVIO
 11/23/99

Cutoff Filter Length = 80 μm

Side 1

PV (Rt) = 64.25 \AA

RMS (Rq) = 6.87 \AA

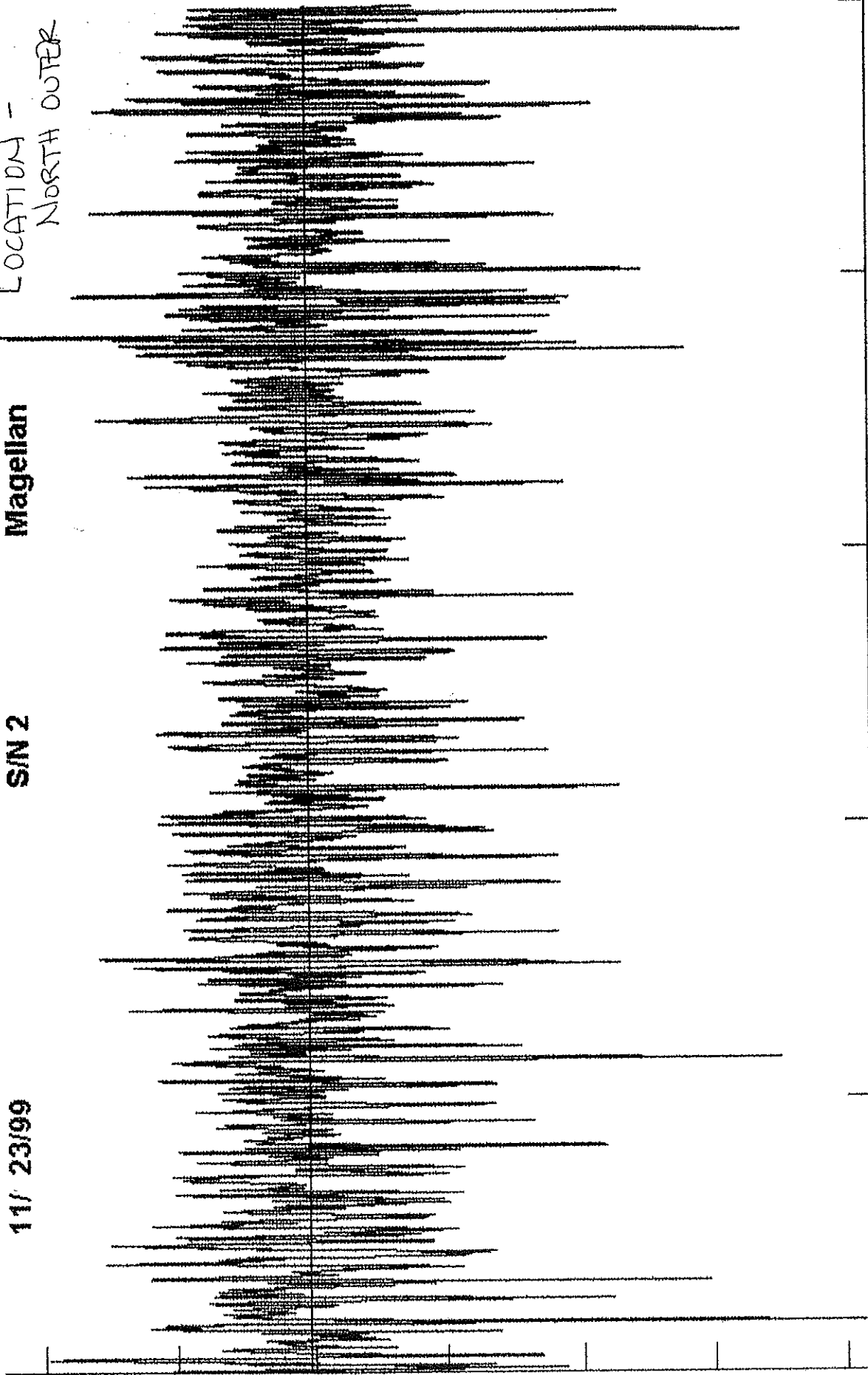
Ra = 5.20 \AA

11/ 23/99

S/N 2

Magellan

LOCATION -
NORTH OUTER



23

(A)

-42

Length (μm)

0

500

Cutoff Filter Length = 80µm

Side 1 10x Objective

Ra = 4.88 Å

RMS (Rq) = 6.78 Å

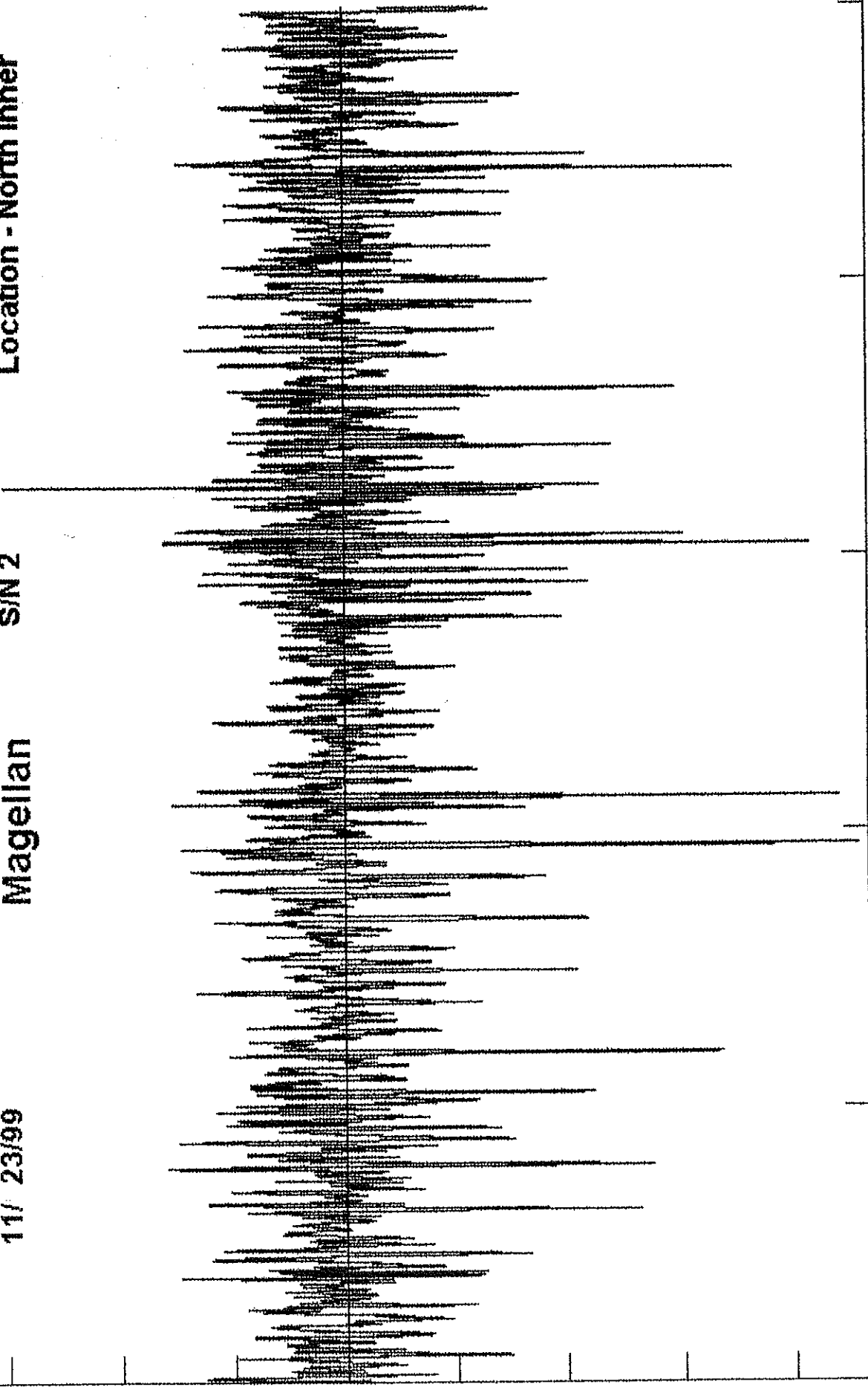
PV (Rt) = 76.20 Å

11/ 23/99

Magellan

S/N 2

Location - North Inner



31

(A)

-47

0

Length (µm)

500

Cutoff Filter Length = 80µm

Side 1 10x Objective

PV (Rt) = 41.88 Å

RMS (Rq) = 4.96 Å

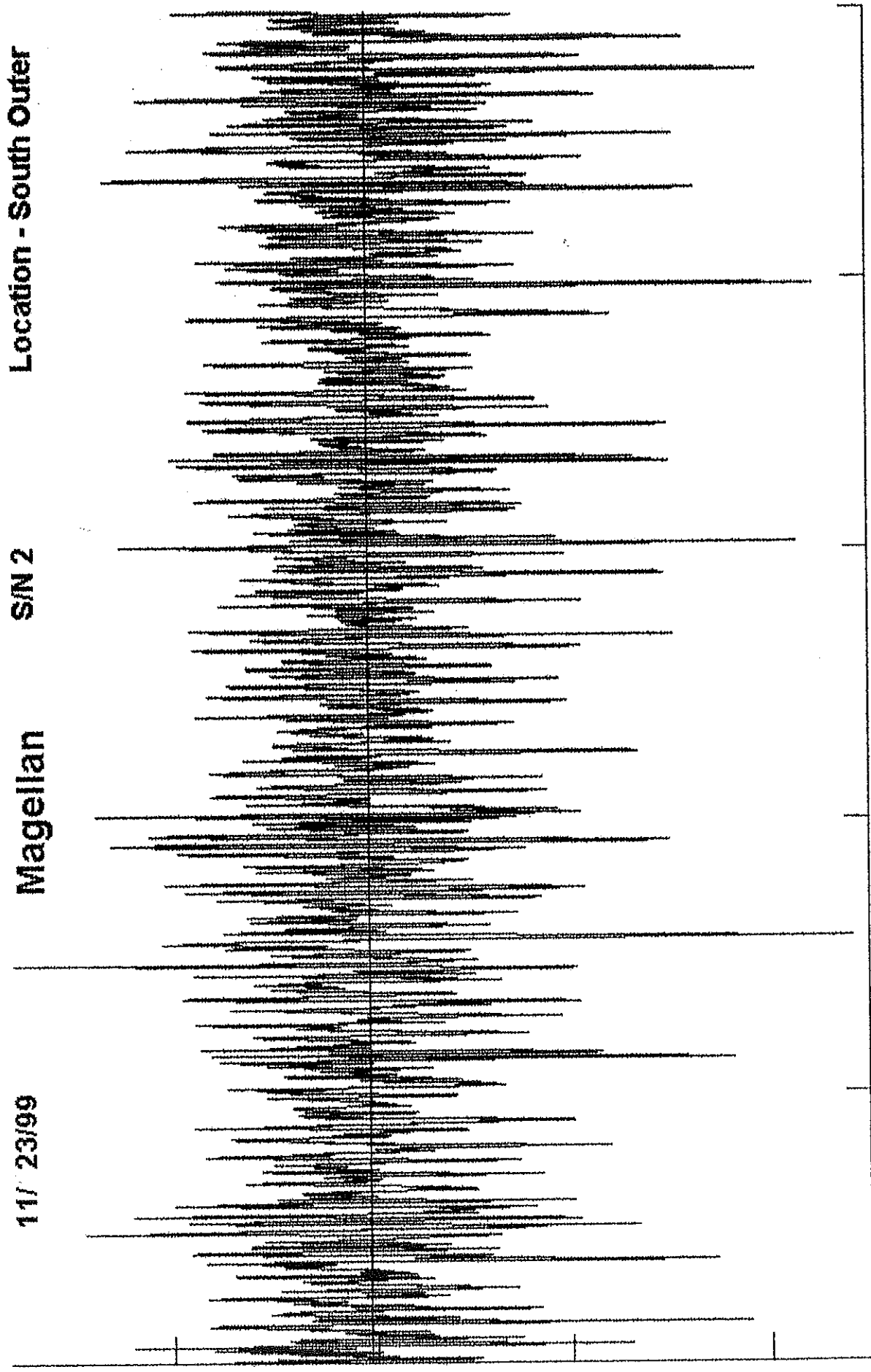
Ra = 3.82 Å

S/N 2

Magellan

11/ 23/99

Location - South Outer



18

(Å)

-25

0

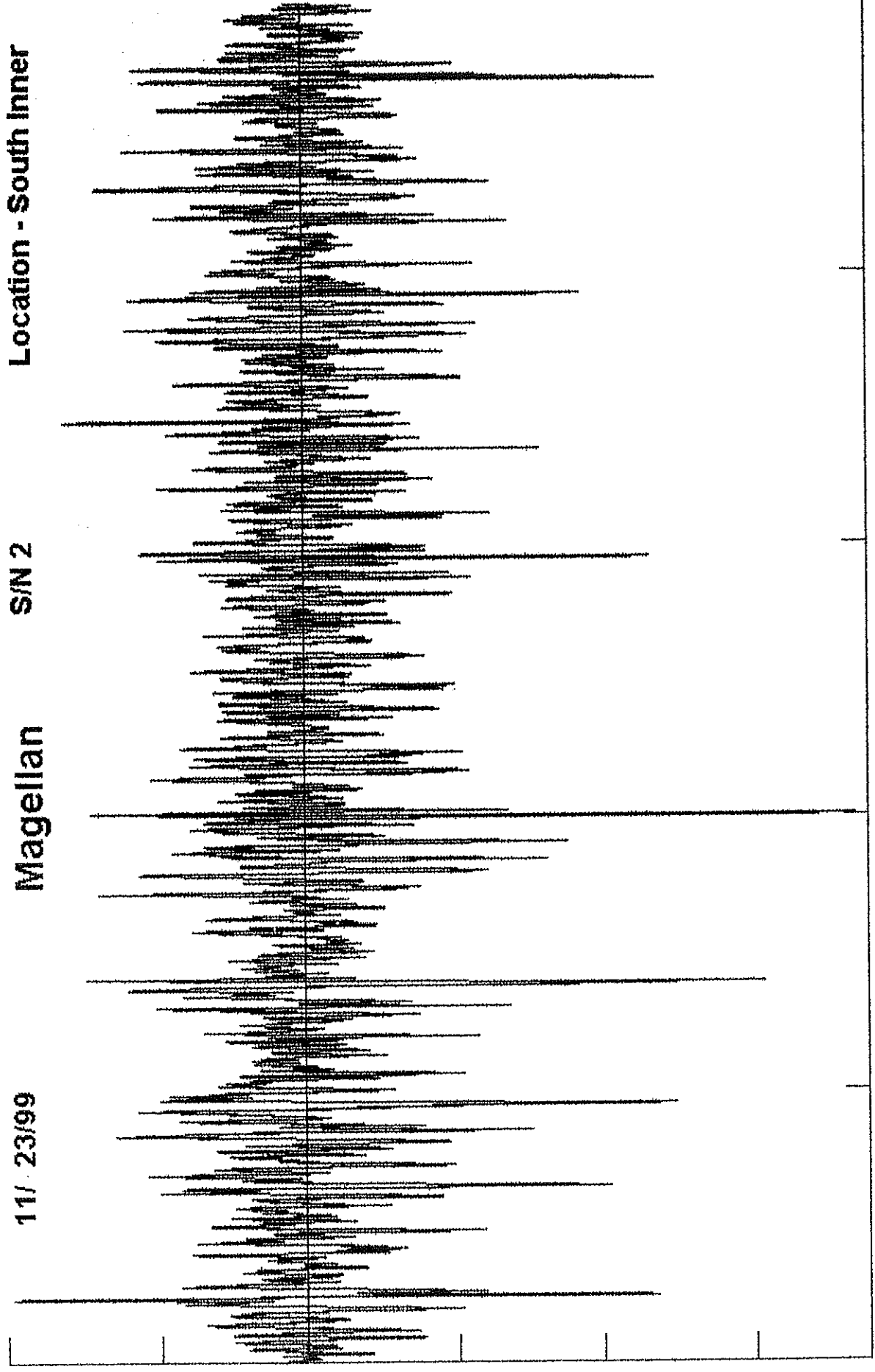
Length (µm)

500

Cutoff Filter Length = 80 μm

Side 1 10x objective

Ra = 3.79 \AA RMS (Rq) = 5.17 \AA PV (Rt) = 56.75 \AA



20

(A)

-38

11/ 23/99

Magellan

S/N 2

Location - South Inner

0

Length (μm)

500

-38

Cutoff Filter Length = 80µm

Side 1 10x Objective

Ra = 3.61 Å RMS (Rq) = 4.91 Å PV (Rt) = 45.69 Å

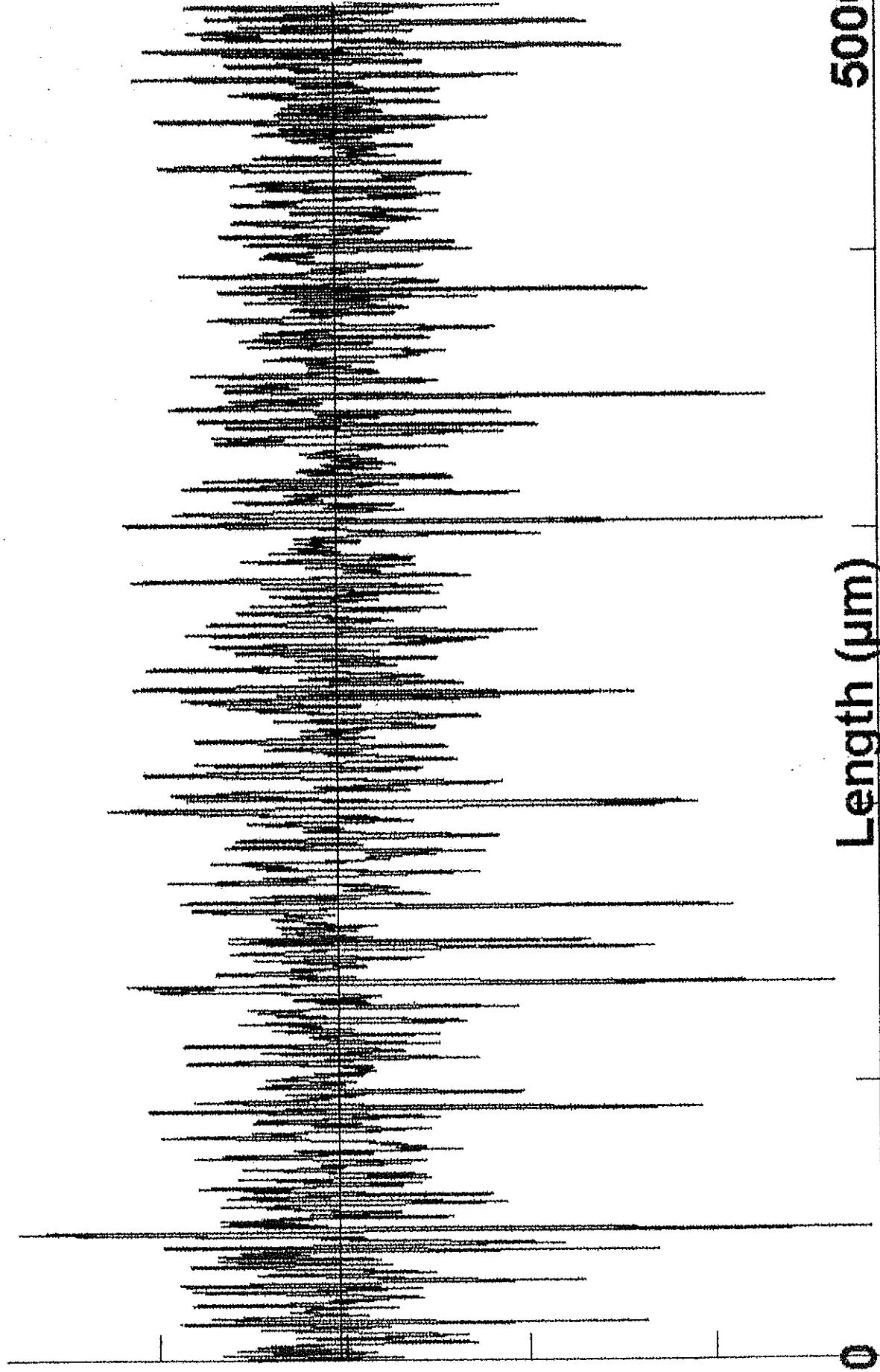
Magellan

S/N 2

Location - West Outer

11/ 23/99

18



(Å)

-29

Length (µm)

500

Cutoff Filter Length = 80µm

Side 1 10x Objective

Ra = 4.15 Å RMS (Rq) = 5.94 Å PV (Rt) = 67.28 Å

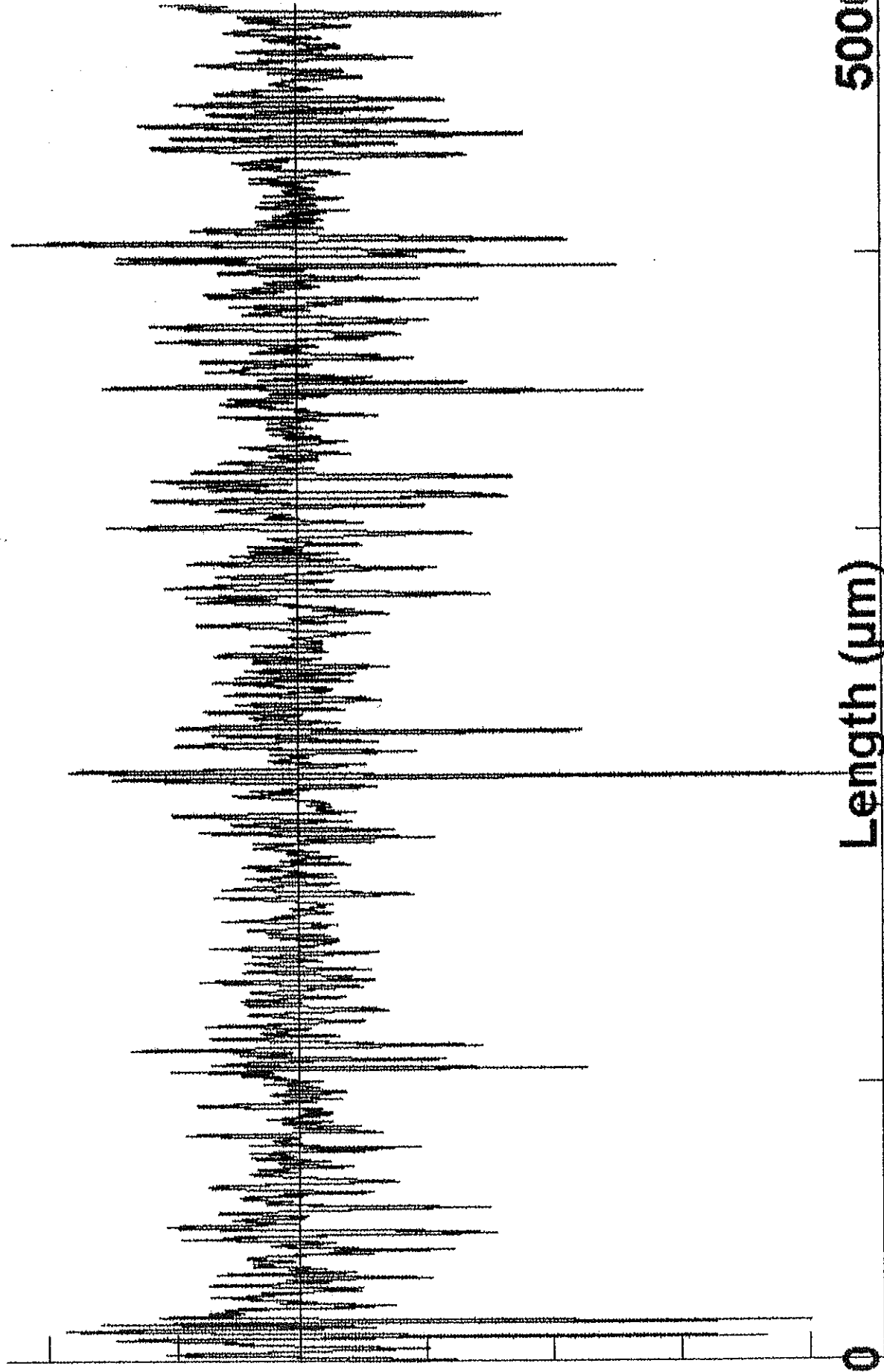
11/ 23/99

Magellan

S/N 2

Location - West Inner

23



(A)

-46

Length (µm)

0

500

Cutoff Filter Length = 80 μm

Side 1 10x Objective

Ra = 3.21 \AA RMS (Rq) = 4.47 \AA PV (Rt) = 59.49 \AA

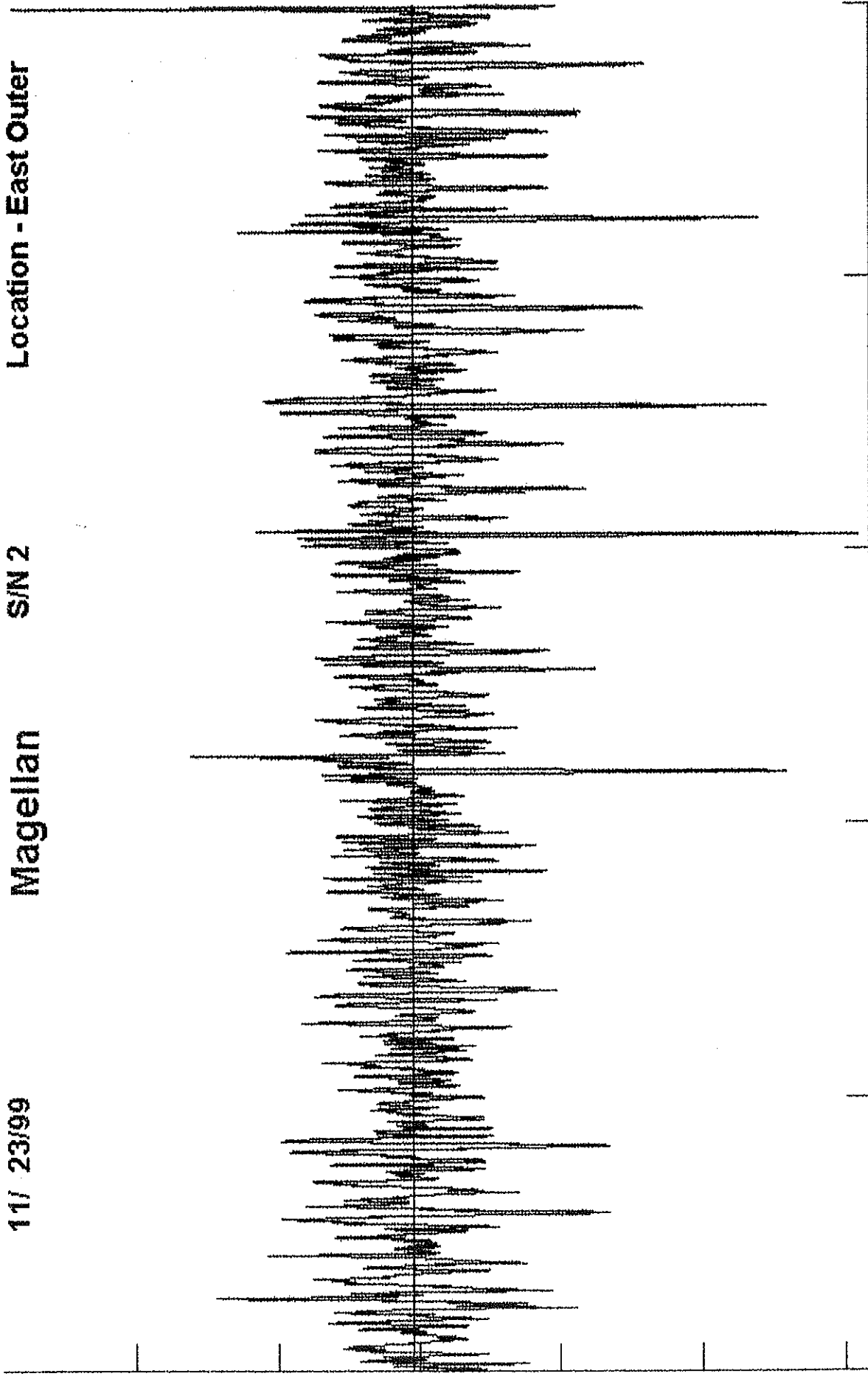
29

11/ 23/99

Magellan

S/N 2

Location - East Outer



-32

0

Length (μm)

500

Cutoff Filter Length = 80 μm

Side 1 10x objective

Ra = 3.52 \AA RMS (Rq) = 4.77 \AA PV (Rt) = 45.76 \AA

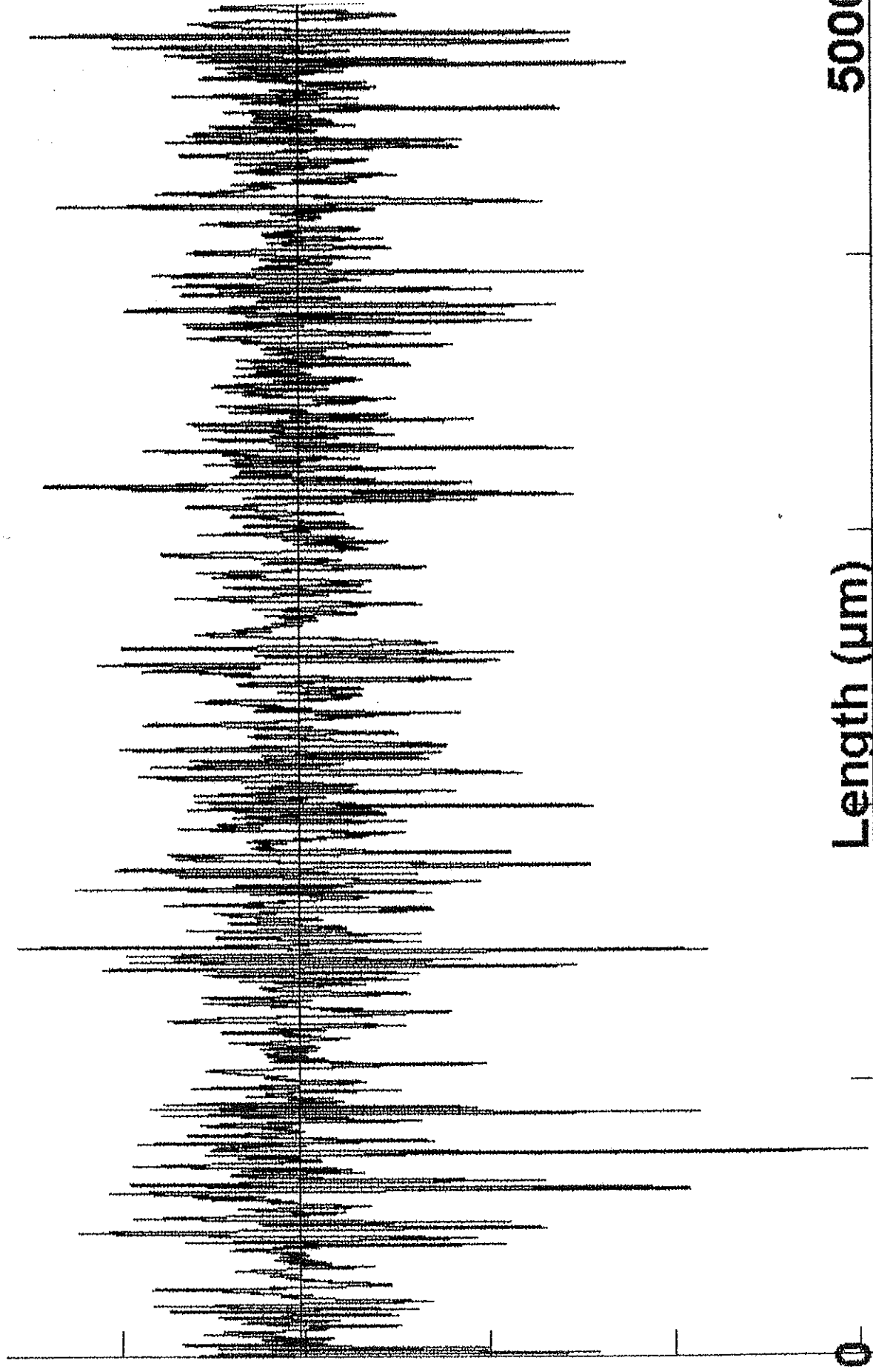
16

11/ 23/99

Magellan

S/N 2

Location - East Inner



(A)

-31



INSPECTION REPORT

PART NO. & REV. 95TE0501 Rev. E	QA JOB NO. 187491	DATE RECD 11/29/99	QUAN. RECD 1	NMDR SUMMARY	
	P. O. NO.	Q. C. LOT NO. C23426	DATE INSPD. 11/29/99	QUAN. INSPD 1	NMDR SERIAL NO.
RT NAME Tertiary Mirror	P. O. LINE ITEM	INSP. PROC. NO. Z-4856	INSP DEPT. 331	QUAN. OK 1	DISPOSITION
PART SERIAL NO.'S 002	NMDR			QUAN. VARYING 0	QTY.
VENDOR/MFG. DEPT. Dept. 177	CERTIFICATION			WO NO.	SERIAL NO.'S
PUR. FAB. <input type="checkbox"/> <input checked="" type="checkbox"/>	REC'D <input type="checkbox"/> <input type="checkbox"/>	YES NO YES NO REC'D <input type="checkbox"/> <input type="checkbox"/>	INSP. TIME	WO SEQ. NO.	ACCEPT
					SCRAP
					REWORK IN HOUSE
					REPAIR
					RETURN TO VENDOR
					SHIPPING ORDER NO.

<input type="checkbox"/>	ADDED OPERATIONS
<input type="checkbox"/>	JOB COMPLETE

CHARACTERISTIC CHECKED	DIMENSION OR SPECIFICATION	TOL	ACTUAL MEASUREMENT						REMARKS	
			S/N	S/N	S/N	S/N	S/N	S/N		
Post Wavefront & MicroRoughness Evaluation										
MicroRoughness									5.5 Å RMS	OK
	8 sites, see map on page 2 for measurement sites									
Structural Inspection									OK	OK
Cosmetic Inspection									OK	OK
MATERIAL										*N-NUMBER
VISUAL AND APPEARANCE										

NATURE 	DATE 11/29/99	INSP STAMP QA 164	PAGE OF 1 / 3	C23426
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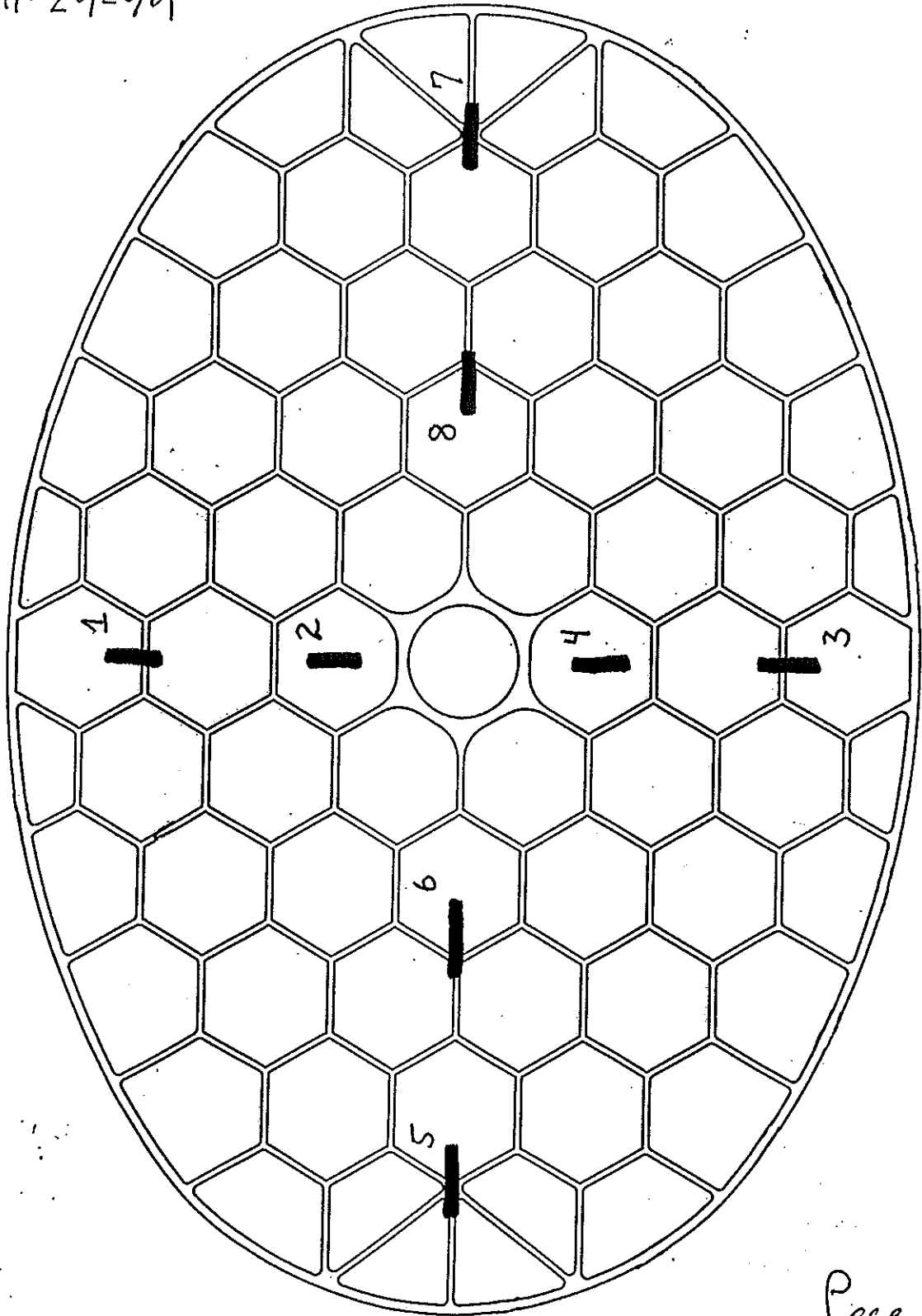
Front Plate View

S/N 02

11-29-99

East

Micro Roughness
Test Sites



North

South

West

W. Bin

QA
164

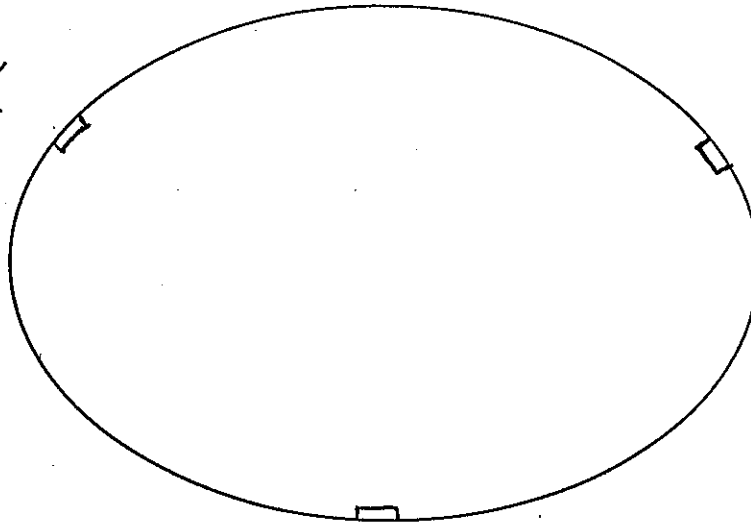
Page 2 of 3

C23426

Optic: Carnegie Institute

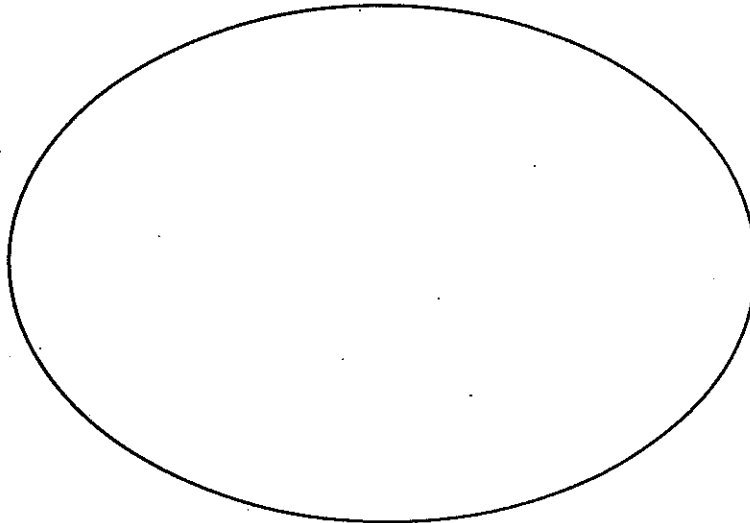
Record defects or conditions which would affect the processing of the optic .


Faceplate: OK



*Ion Support Sites
(3) places*

 Backplate:



 Inspector: W. O'Brien QA 164
Date: 11-29-99

3.4 Supports

The mirror will be supported in the telescope on an air bag. The mirror piston and tilt will be defined by three flexures that clamp to the back plate. A single flexure at the center of the mirror will carry lateral loads and define the mirror position parallel to the plane of the front surface. Figure 1 shows a preliminary design of the center support.

4. Polishing

4.1 Polish Area

The entire front face inside of the edge bevel shall be polished. Surface quality shall be measured in the area defined by the clear aperture.

4.2 Surface Quality

Surface maps shall be prepared from the interferometric tests that show surface deviation from the target conic shape. Height differences shall be calculated for pairs of measurement points as a function of separation. The RMS of such measurements shall not exceed the following:

<u>s (cm)</u>	<u>σ_{rms} (nm)</u>	RMS @ .6328 μm
2	15	0.0237
5	27	0.0427
10	41	0.0648
20	57	0.0901
greater than 20	57	0.0901

where s is the separation of point pairs measured in the plane perpendicular to the optical axis and σ_{rms} is the root mean square deviation between points.

σ_{rms} shall be calculated by shearing the surface map a distance s and subtracting the result from a copy of the original. Overlapping point-pairs that fall outside of the clear aperture on either map are discarded. The rms shall then be calculated from the residuals for shears in two orthogonal directions.

4.3 Print-through

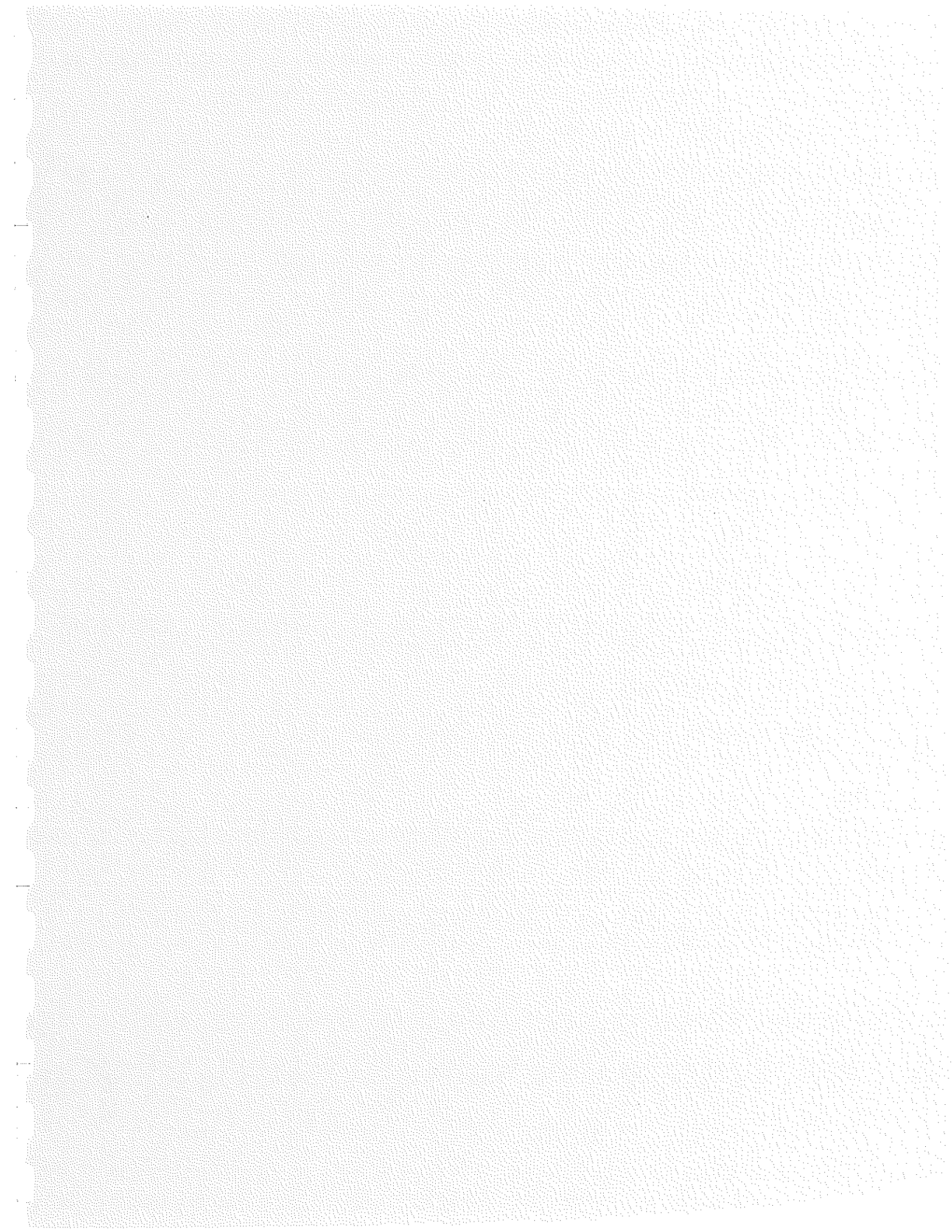
Tool pressure shall be selected to limit print through of the internal rib structure on the polished surface. Figure 2 shows the surface deflection of a 1/4 model of the face plate over a single cell with a uniform applied pressure of 1 PSI.

4.4 Microroughness

The polished surface shall be smooth at spatial frequencies $\ll 1$ cm such that microroughness shall not exceed 20 A rms.

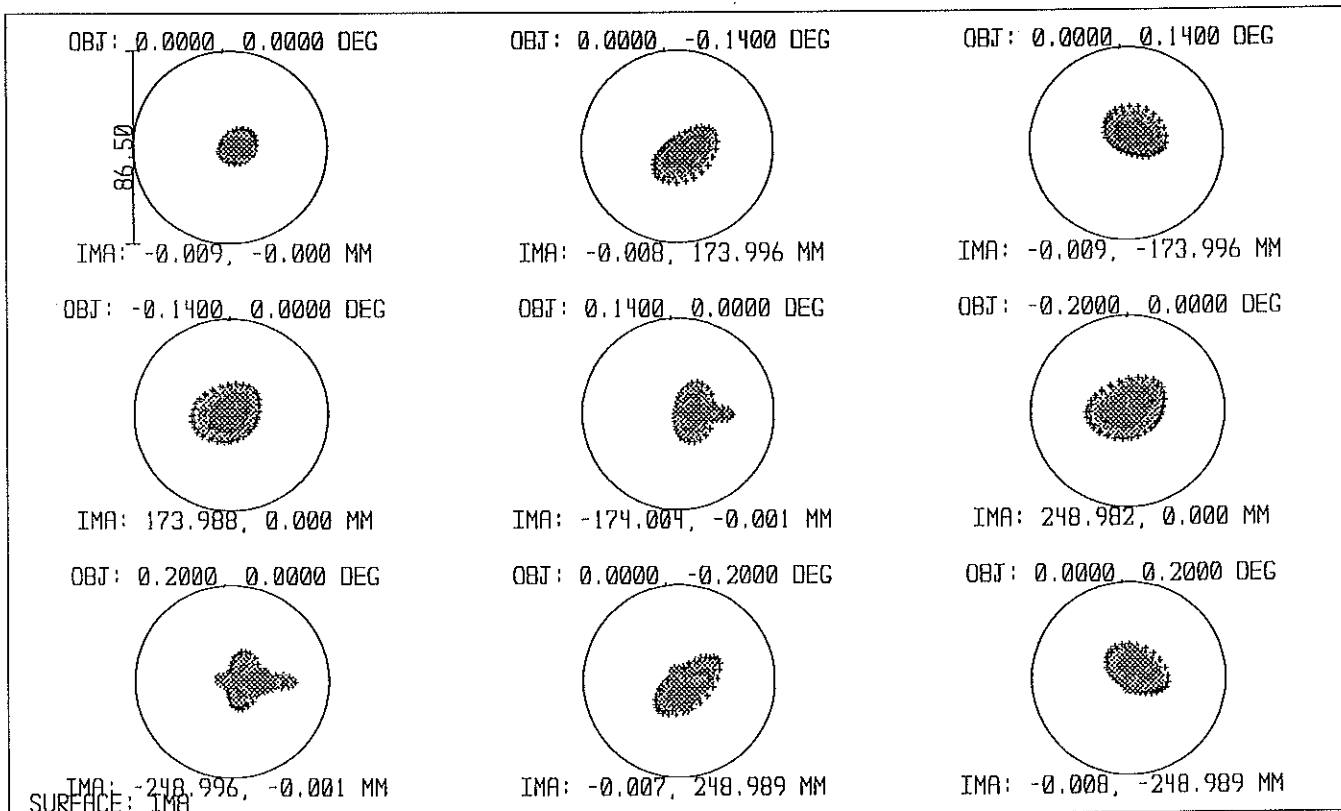
4.5 Scratch/dig

Max. scratch/dig: 60/40.



MAGELLAN 2 TERTIARY MIRROR IN MAGELLAN 1
 "AS-BUILT" OPTICS. TERTIARY MIRROR HAS BEEN
 FIT WITH A 25-TERM ZERNIKE POLYNOMIAL
 TO THE FINAL KODAK SURFACE PROFILE. CIRCLE
 DIAMETER IS 0.25".

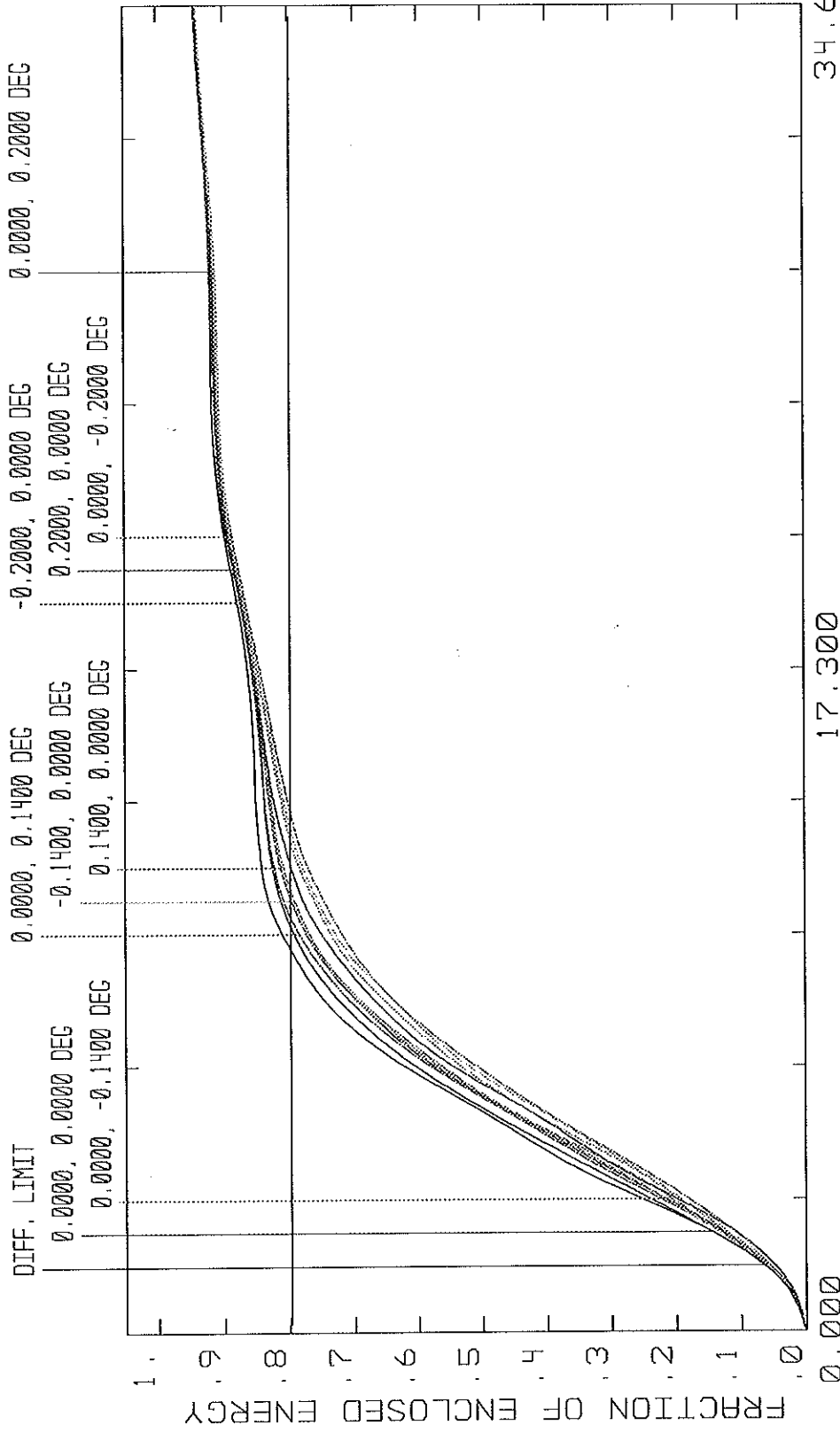
MWJ 2-28-80



SPOT DIAGRAM

MAGELLAN 1 F/11 AS-BUILT W/MAG 2 M3
 MON FEB 28 2000 UNITS ARE MICRONS.

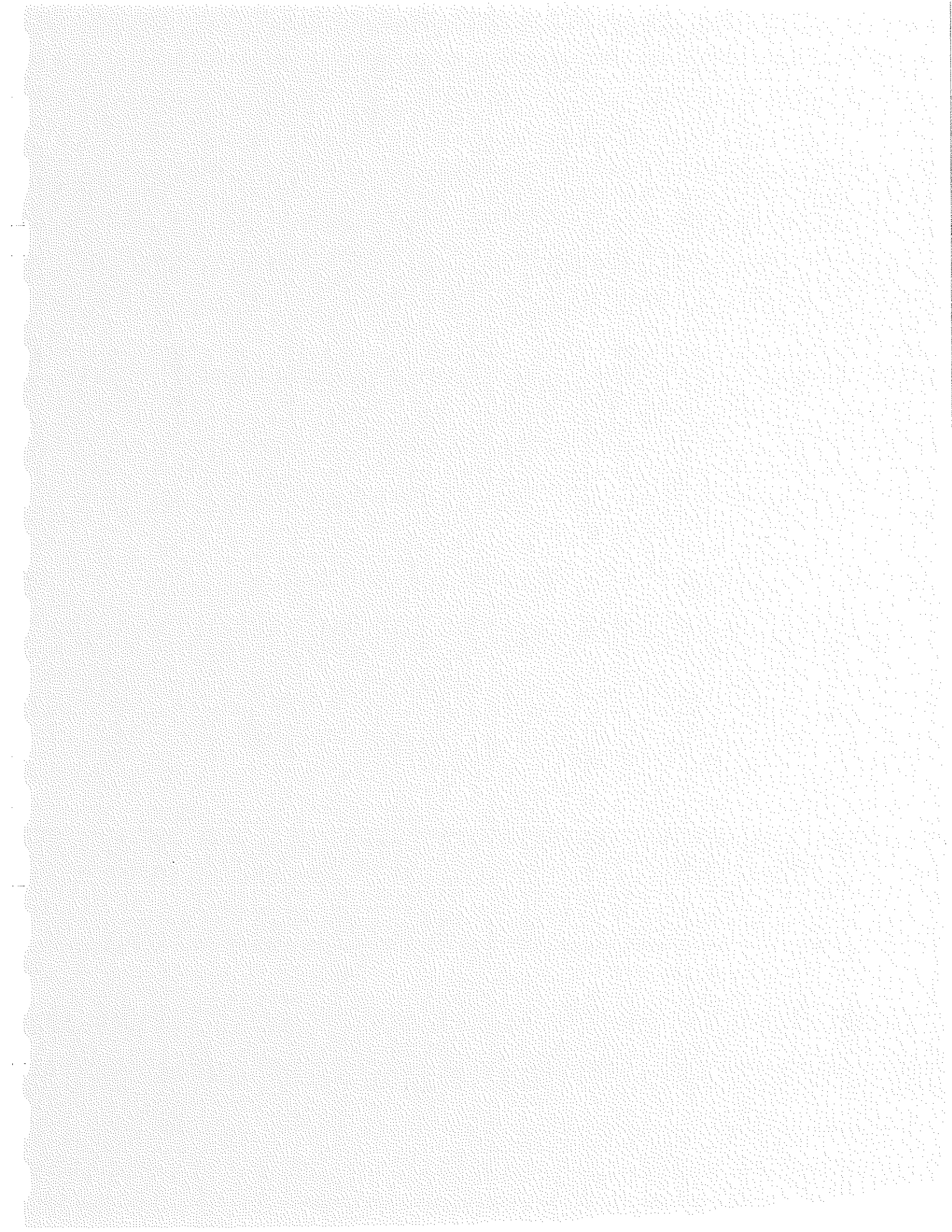
FIELD :	1	2	3	4	5	6	7	8	9
RMS RADIUS :	4.921	7.911	7.433	7.242	9.023	8.535	10.261	8.897	8.152
GEO RADIUS :	12.144	18.219	17.844	17.321	24.580	18.389	27.994	20.085	17.492
CIRCLE DIAM:	86.5		REFERENCE : CHIEF RAY						



FFT DIFFRACTION ENCIRCLED ENERGY

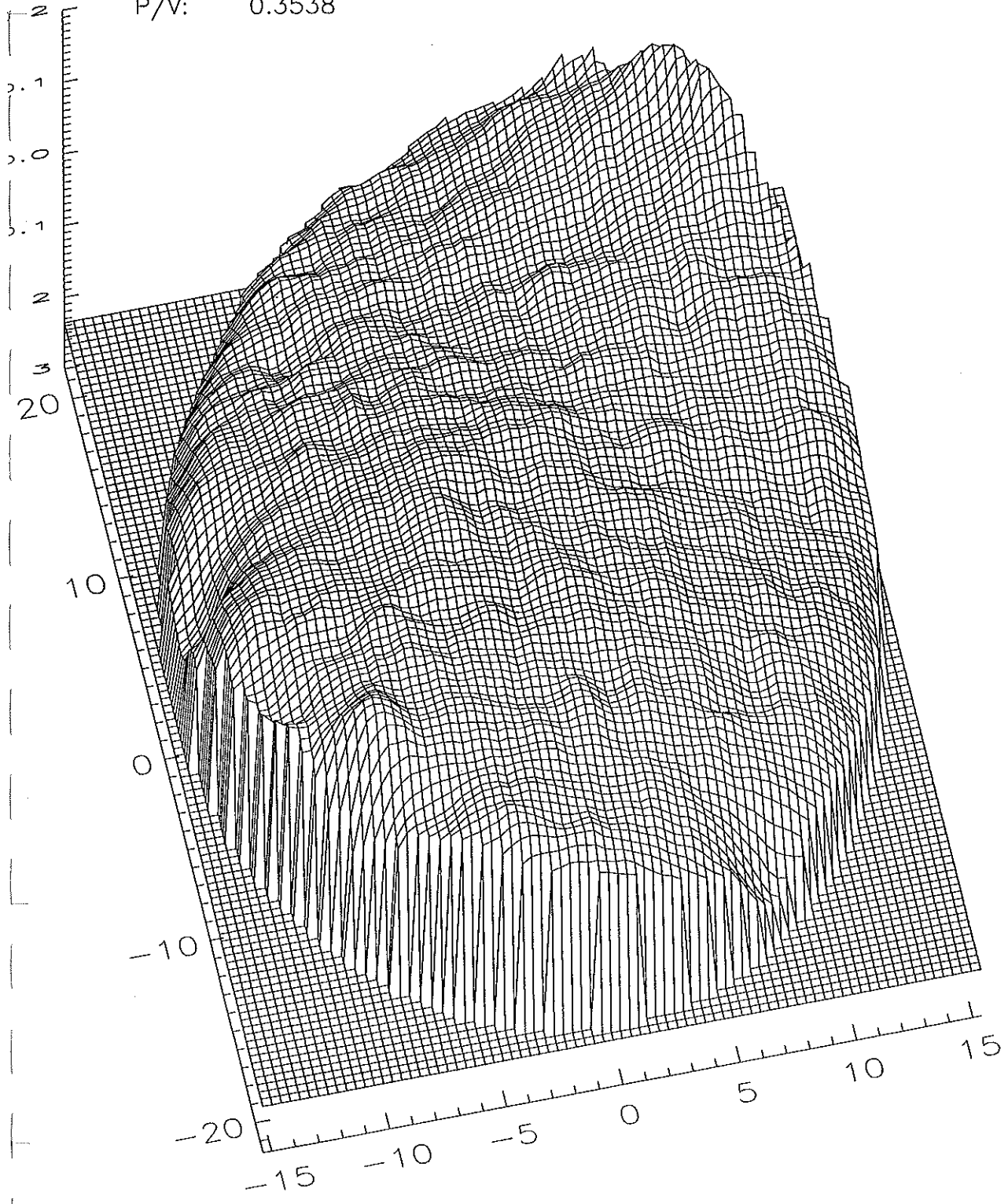
MAGELLAN 1 F/11 AS-BUILT W/MAG 2 M3
 MON FEB 28 2000
 WAVELENGTH: POLYCHROMATIC

C:\MAGELLAN\OPTICS\ZEMAX\F11DIR\000121.ZMX
 CONFIGURATION 1 OF 1



4 Orientation Avg,
Surface
Clear aperture

TA 991111 P103 OPD array
RMS: 0.04725
P/V: 0.3538



TA 991111 P103

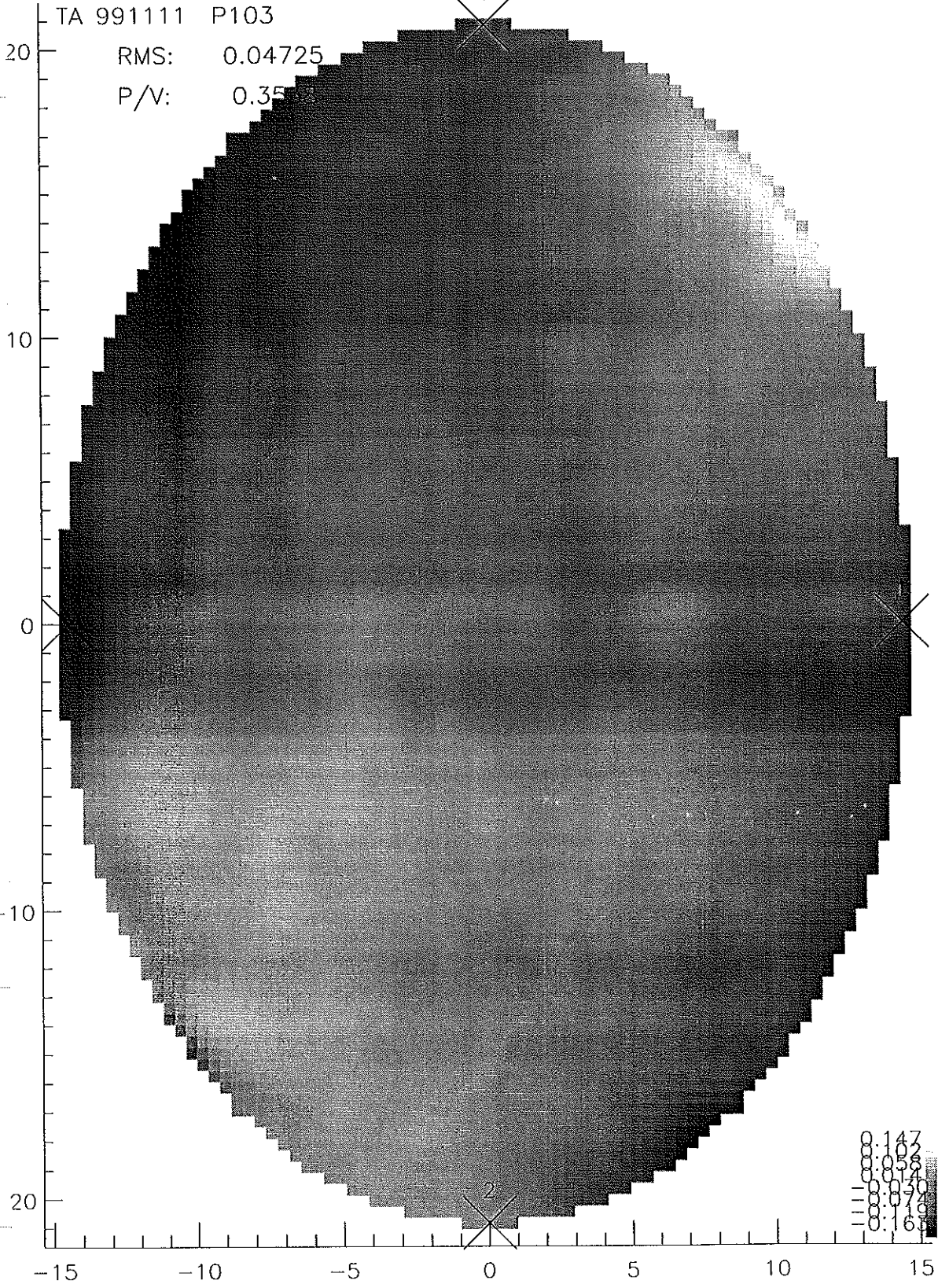
RMS: 0.04725

P/V: 0.35

4

2

0.147
0.082
0.058
0.038
0.020
0.019
0.165



***** WAVEFRONT COMBINATION PROCESS started at 9911121422 *****

WAVEFRONT COMBINATION PARAMETERS
 combination type: average area: common aggregate focus: wedge

TA	Pic	Flip	Rot	Mult	Focus
991111	101	--	--	1.0000	none
991111	102	--	--	1.0000	none

OPD SUMMARY *****

TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid pts	pts	Peak Valley	RMS	
991111101	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.163	-0.201	0.048
991111102	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.185	-0.175	0.048
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2 1S 2S 3S	Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
991111101	0.009	0.984	36 73 94 99	0.048	0.026	0.021	0.021	0.017	0.016
991111102	0.009	0.984	40 71 94 98	0.054	0.034	0.021	0.021	0.018	0.015
999999999			38 72 94 99	0.051	0.029	0.020	0.020	0.016	0.014

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	ang	ang	ang	
991111101	-0.125	0.277	58.9	0.113	32.4	0.004	0.096	23.5	0.051	-39.1
991111102	-0.116	0.309	63.6	0.173	22.0	-0.006	0.075	25.5	0.102	-43.5
999999999	-0.120	0.292	61.4	0.142	26.1	-0.001	0.085	24.4	0.076	-42.0



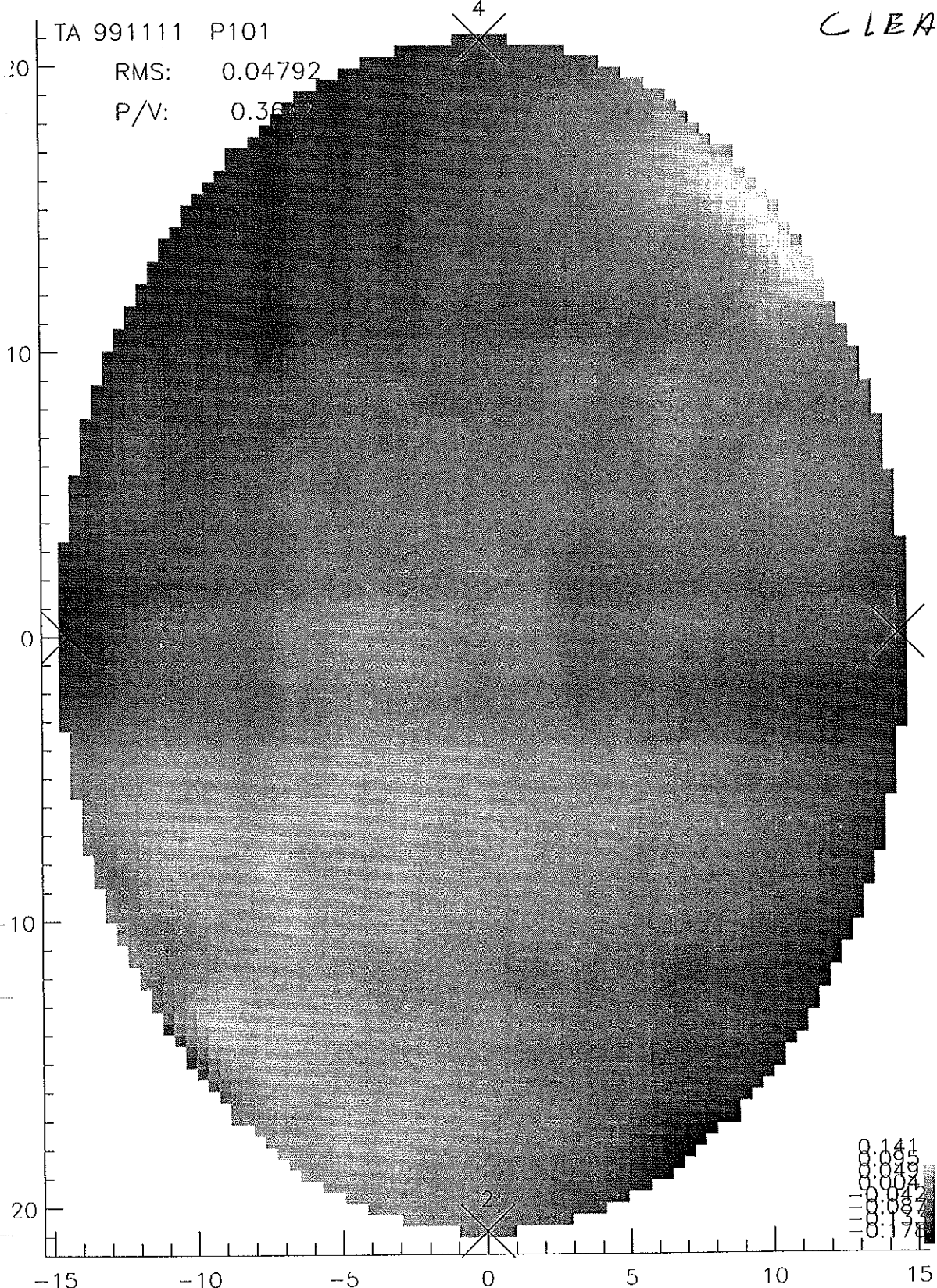
0°/90° COMBO

CLEAR AP

TA 991111 P101

RMS: 0.04792

P/V: 0.36



0:141
0:095
0:049
0:004
0:042
0:087
0:178

Starting Combine orientations task combine_orientations

result ta, picture: 999999 999
orientation #1 ta, picture: 991111 1
orientation #2 ta, picture: 991111 2
test setup #1 ta, picture: 991106 100
test setup #2 ta, picture: 991106 200

surface ta, picture: 991106 200

SURFACE INFORMATION TA991111 P001 12-Nov-1999 14:20:46
TITLE: Magellan Tertiary Mirror S/N 2 - Full Optical Aperture

Fiducial marks (4) -----
Number X Y Number X Y
01 14.4375 0.0000 03 -14.4375 0.0000
02 0.0000 -20.8375 04 0.0000 20.8375

Reference wavelength: 6328

Grid points: X: 79 Y: 111 Grid increments: X: 0.393700 Y: 0.393700
Grid start: X:-15.354300 Y:-21.653500

Windows (1) -----
No. Shape Center X Center Y Length Width Angle
1 Ellipse 0.000 0.000 30.497 43.289 0.000
Obstructions (0) -----

SURFACE INFORMATION TA991111 P002 12-Nov-1999 14:20:46
TITLE: Magellan Tertiary Mirror S/N 2 - Full Optical Aperture

Fiducial marks (4) -----
Number X Y Number X Y
01 14.4375 0.0000 03 -14.4375 0.0000
02 0.0000 -20.8375 04 0.0000 20.8375

Reference wavelength: 6328

Grid points: X: 79 Y: 111 Grid increments: X: 0.393700 Y: 0.393700
Grid start: X:-15.354300 Y:-21.653500

Windows (1) -----
No. Shape Center X Center Y Length Width Angle
1 Ellipse 0.000 0.000 30.497 43.289 0.000
Obstructions (0) -----

TEST SETUP INFORMATION TA991106 P100 12-Nov-1999 14:20:46

Base length: 343.0640
Central displacement X: 0.0000 Y: 0.0000
Angle of incidence: 45.0000
Surface rotation: 0.0000

TEST SETUP INFORMATION TA991106 P200 12-Nov-1999 14:20:46

Base length: 343.0640
Central displacement X: 0.0000 Y: 0.0000
Angle of incidence: 45.0000
Surface rotation: -90.0000

Difference array between input, unfocused arrays -----
peak: 0.2532 valley: -0.1346 rms: 0.0678

Special surface 1 coefficients:
0.092798, -0.000351, 0.000112, -0.002050
Special surface 2 coefficients:
-0.092696, -0.000015, -0.000519, -0.000977
(models: c1 + c2*x + c3*y + c4*(x^2+y^2)
[in the two pupil planes, aperture not normalized]

Difference array between refocused arrays -----
peak: 0.0815 valley: -0.1053 rms: 0.0207

Coefficients of final wedge model removed
*** Bias: -0.06816
*** Wedge: 0.00497 Angle: -49.38718

OPD SUMMARY *****

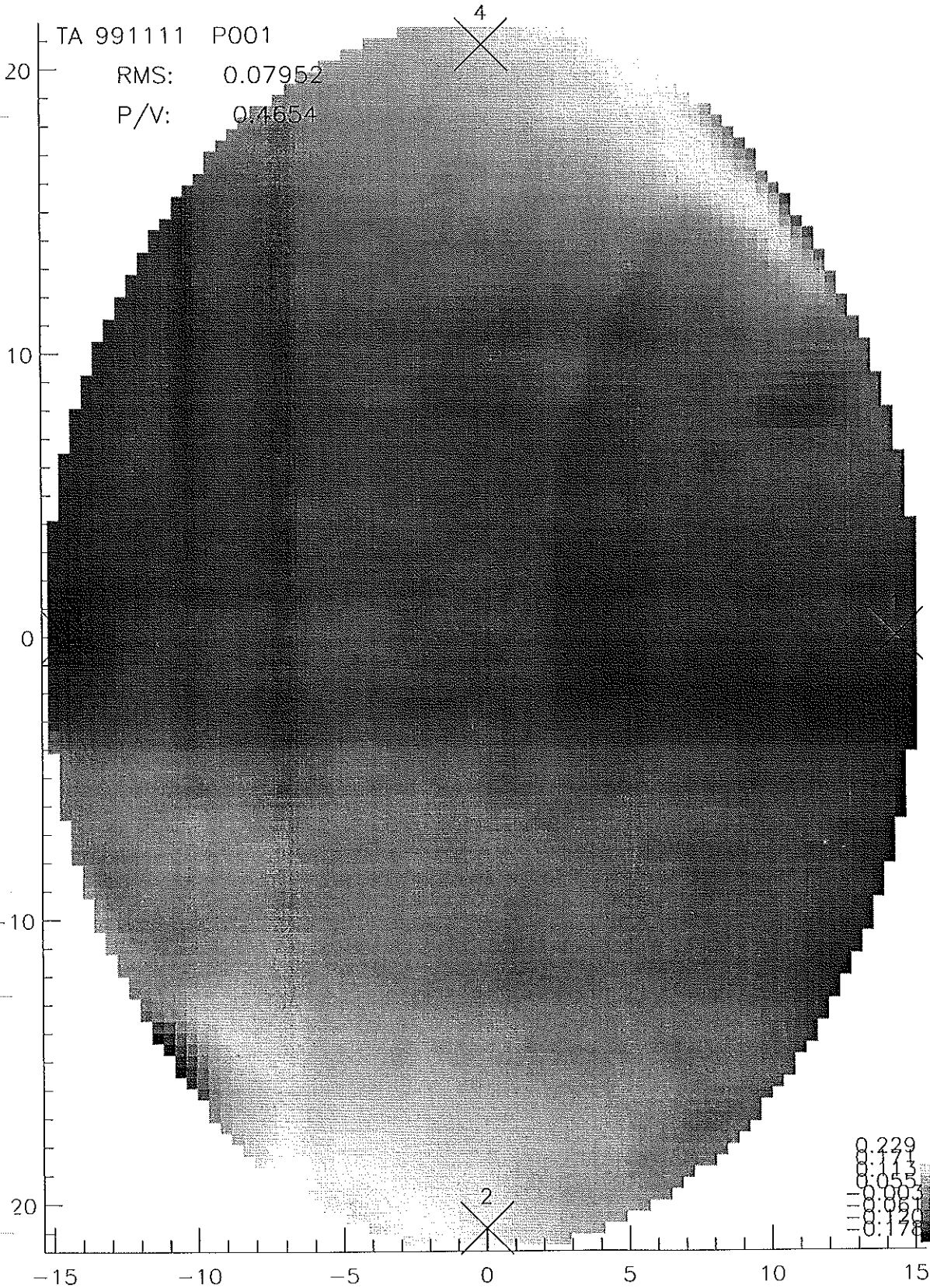
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid pts	Peak	Valley	RMS
991111001	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6681 6681	0.258	-0.207	0.080
991111002	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6681 6681	0.209	-0.198	0.048
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6253 6253	0.163	-0.201	0.048

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2 1S 2S 3S	Power rms	Astig rms	Coma rms	Spher rms	Tref: rms	Tetra rms
991111001			35 73 93 99	0.067	0.027	0.024	0.024	0.022	0.022
991111002			43 72 94 98	0.053	0.035	0.029	0.029	0.022	0.022
999999999			36 73 94 99	0.048	0.026	0.021	0.021	0.017	0.016

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	Power ang	Astig ang	Coma ang	Spher ang	Trefoil ang	Tetra ang
991111001	0.089	0.387	70.3	0.092	57.9	-0.008	0.069	30.9	0.001	-41.7		
991111002	-0.045	0.267	52.8	0.134	20.1	-0.017	0.138	20.4	0.013	-41.7		
999999999	-0.125	0.277	58.9	0.113	32.4	0.004	0.096	23.5	0.051	-39.1		



0° Full AP



***** INTERFEROGRAM EVALUATION PROCESS started at 12-Nov-1999 14:17:50 *****

Result TA, Picture: 999999 999 Surface TA, Picture: 991106 100
Test setup TA, Picture: 991106 100 Backout TA, Picture: 991106 600
Transform TA, Picture: 991111 001

SURFACE INFORMATION TA991106 P100 12-Nov-1999 14:17:50
TITLE: Magellan Tertiary Mirror S/N 2 - Full Optical Aperture

Fiducial marks (4) -----

Number	X	Y	Number	X	Y
01	14.4375	0.0000	03	-14.4375	0.0000
02	0.0000	-20.8375	04	0.0000	20.8375

Reference wavelength: 6328

Grid points: X: 79 Y: 111 Grid increments: X: 0.393700 Y: 0.393700
Grid start: X:-15.354300 Y:-21.653500

Windows (1) -----

No.	Shape	Center X	Center Y	Length	Width	Angle
1	Ellipse	0.000	0.000	30.497	43.289	0.000

Obstructions (0) -----

TEST SETUP INFORMATION TA991106 P100 12-Nov-1999 14:17:50

Base length: 343.0640 Y: 0.0000
Central displacement X: 0.0000
Angle of incidence: 45.0000
Surface rotation: 0.0000

INTERFEROGRAM PROCESSING PARAMETERS
Wavefront passes: 4 Averaging type: unweighted Area: total
Design residual: 0 Mapping error: 0
Focus model: wedge

INTERFEROGRAM PROCESSED
TA 991111 Picture 001
TA 991111 Picture 002

TA 991111 Picture 003
TA 991111 Picture 004

INTERFEROGRAM INFORMATION TA991106 P600
TITLE: 82" sphere robot middle fids (10.625"radius)

12-Nov-1999 14:17:50

Test Fiducial marks (4) -----
Number X Y Number X Y
01 325.1415 474.8585 03 474.8585 325.1415
02 474.8585 474.8585 04 325.1415 325.1415

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 151 Wedge: Plus (+)

Windows (1) -----
No. Shape Center X Center Y Length Width Angle
1 Ellipse 400.000 400.000 800.000 800.000 0.000

Obstructions (0) -----

Transform coefficients (interferogram->pupil) for transform interferogram
-0.051162 0.0023152 32.335
-0.0024039 -0.051184 26.759
Transformation error: 0.0049754

Transform coefficients (pupil->interferogram) for backout interferogram
11.101 0.04346 393.21
-0.20611 11.031 396.78
Transformation error: 0.0037682

Transformed backout pupil fiducial marks (4) -----
Number X Y Number X Y
01 324.967 474.325 03 474.686 324.613
02 475.031 475.385 04 325.317 325.678

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -0.01095
*** Wedge: 0.06817 Angle: 19.34998
*** Power: -0.21956
*** Coma: 0.57817 Angle: 21.89841

Points interpolated 6681, extrapolated 0; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 5.26269.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 462.7836 502.7795 03 861.2032 483.9140
02 670.8509 896.7407 04 634.1157 84.2755

Reference Fiducial marks (4) -----
Number X Y Number X Y
01 768.6003 351.6163 03 516.2714 623.6754
02 504.6513 357.2012 04 778.8433 614.3692

Test wavelength: 6328 Fringes: 28 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-19.501 -0.88147 654.27
0.91862 -19.495 492.07
Transformation error: 0.0050307

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 460.940 501.174 03 859.466 482.401
02 672.641 898.300 04 635.906 85.835

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -15.22226
*** Wedge: 28.04601 Angle: -89.79376
*** Power: 0.36811
*** Coma: 0.40894 Angle: -169.56563

Points interpolated 6512, extrapolated 121; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 21.8901.

Test Fiducial marks (4)

Number	X	Y	Number	X	Y
01	396.1901	534.0195	03	787.5218	541.6370
02	589.4238	936.2776	04	583.1292	121.1179

Reference Fiducial marks (0)

Test wavelength: 6328 Fringes: 18 Wedge: Plus (+)

Windows (0)

Obstructions (0)

Transform coefficients (pupil->interferogram) for test interferogram
-19.149 -0.15104 586.16
-0.38587 -19.56 533.2
Transformation error: 0.0057017

Transformed pupil fiducial marks (4)

Number	X	Y	Number	X	Y
01	396.315	529.379	03	787.640	537.265
02	589.302	940.784	04	583.008	125.625

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -9.25420
*** Wedge: 35.25039 Angle: -3.41918
*** Power: 0.06069
*** Coma: 0.14693 Angle: -161.03092

Points interpolated 6588, extrapolated 93; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 34.5232.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 391.7994 535.9001 03 788.1441 539.0144
02 598.6694 932.6490 04 572.6419 119.3874

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 36 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-19.392 -0.62454 584.87
-0.16897 -19.514 531.71
Transformation error: 0.007496

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 392.613 530.037 03 788.911 533.490
02 597.879 938.343 04 571.852 125.081

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -18.90334
*** Wedge: 35.63202 Angle: 77.84970
*** Power: 0.42679
*** Coma: 0.57708 Angle: -165.10197

Points interpolated 6584, extrapolated 97; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 18.5448.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 831.5764 478.0197 03 432.6758 503.0393
02 626.6462 94.8138 04 643.6591 907.2719

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 18 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
19.515 0.40822 636.61
-1.2085 19.495 495.6
Transformation error: 0.0078504

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 830.080 483.622 03 431.265 508.318
02 628.100 89.374 04 645.113 901.832

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -8.41200
*** Wedge: 35.75979 Angle: -3.14424
*** Power: 0.77366
*** Coma: 0.45022 Angle: -1.25063

Points interpolated 6480, extrapolated 165; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 34.461.

INTERFEROGRAM SUMMARY *****

TA/PIC	W	NF	g	Data	Cx	Cy	Tran	Rot-f	Int/surf	Data	Area	
				pts			Err	angle	ratio	WO	radius	radius
991106600	151	+	17556	393.2	396.8	0.38	R	0	1.0000	1	56.767	21.438
991111001	28	+	1971	654.3	492.1	0.50	R	-177	1.0000	0	21.465	21.438
991111002	18	+	2479	586.2	533.2	0.57	R	-179	1.0000	0	21.426	21.438
991111003	36	+	2493	584.9	531.7	0.75	R	-178	1.0000	0	21.590	21.438
991111004	18	+	2531	636.6	495.6	0.79	R	1	1.0000	0	21.567	21.438

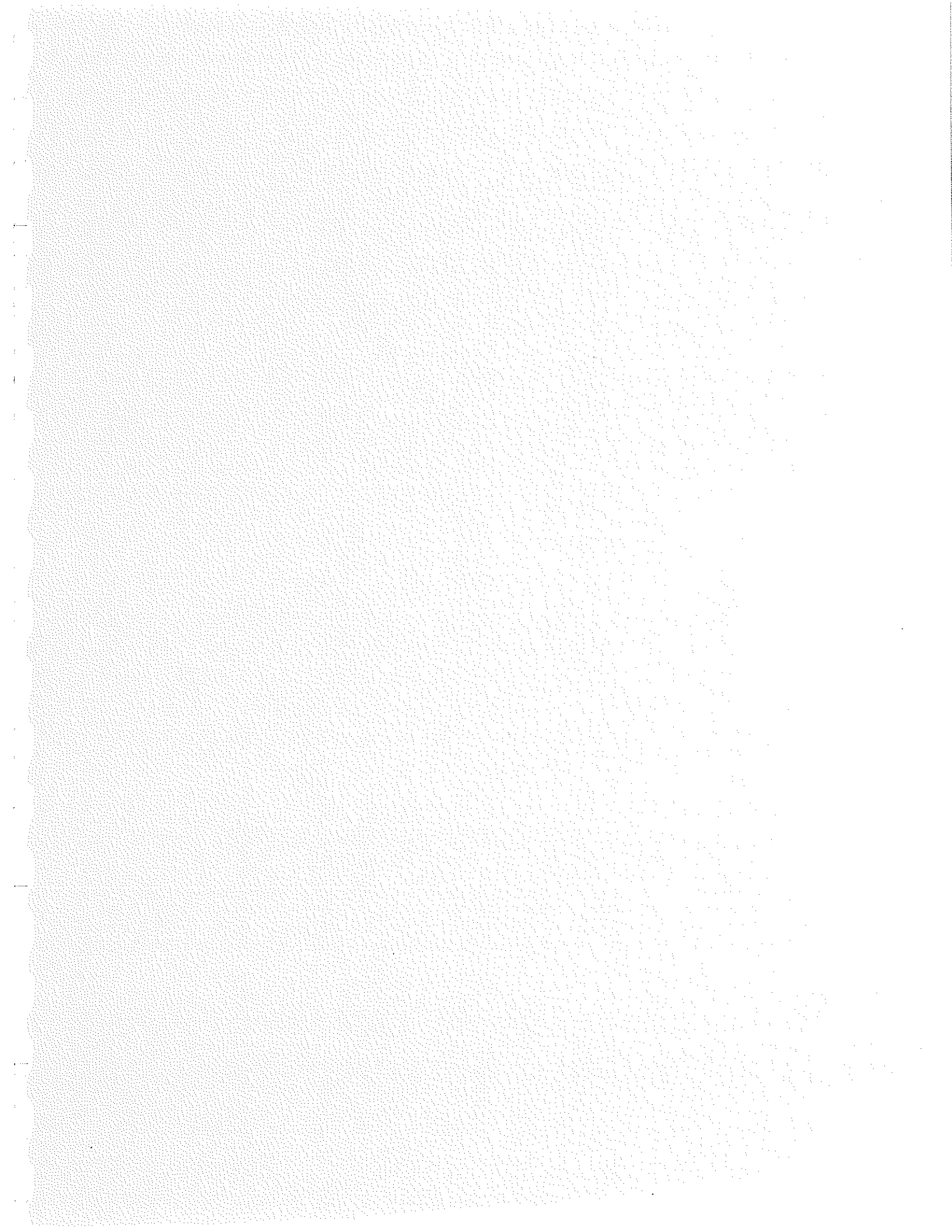
TA/PIC	resid	high	low	resid	wedge	power	coma	coma	coma	coma	coma
				high	rms	rms	rms	power	coma	coma	coma
991106600	0.778	-0.518	0.242	0.237	0.216	-0.220	0.578				
991111001	0.523	-1.193	0.220	0.201	0.191	0.368	0.409				
991111002	0.468	-0.794	0.168	0.167	0.166	0.061	0.147				
991111003	0.444	-1.290	0.218	0.194	0.171	0.427	0.577				
991111004	0.465	-0.860	0.255	0.181	0.167	0.774	0.450				

OPD SUMMARY *****

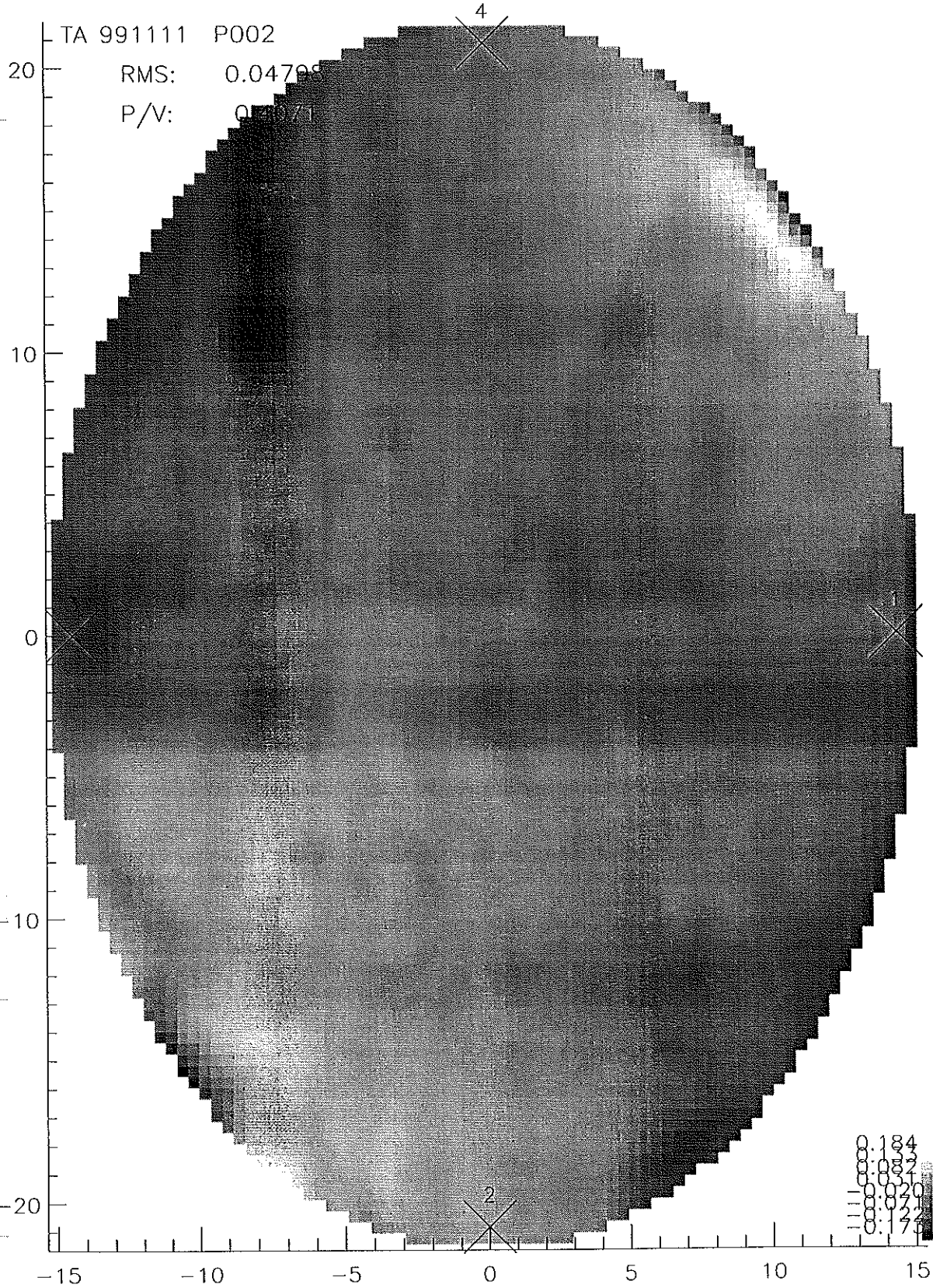
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid pts pts	Peak Valley	RMS
991106600	82" sphere robot mid	079	111	-15.354	-21.653	0.39370	0.39370	6681 6681	0.181 -0.237	0.096
991111001		079	111	-15.354	-21.653	0.39370	0.39370	6681 6633	0.350 -0.424	0.082
991111002		079	111	-15.354	-21.653	0.39370	0.39370	6681 6681	0.216 -0.215	0.060
991111003		079	111	-15.354	-21.653	0.39370	0.39370	6681 6681	0.302 -0.452	0.082
991111004		079	111	-15.354	-21.653	0.39370	0.39370	6681 6645	0.303 -0.286	0.105
991106100	**AVERAGE**	079	111	-15.354	-21.653	0.39370	0.39370	6681 6681	0.258 -0.207	0.080

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2 1S 2S 3S	Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
991106600	0.019	0.973	29 60 98100	0.053	0.047	0.041	0.041	0.041	0.038
991111001	0.034	0.921	41 74 93 99	0.074	0.033	0.031	0.031	0.031	0.030
991111002	0.018	0.975	40 72 93 99	0.057	0.027	0.026	0.026	0.025	0.025
991111003	0.034	0.968	38 71 94 99	0.070	0.038	0.033	0.033	0.030	0.030
991111004			28 73 94100	0.080	0.031	0.028	0.027	0.024	0.024
991106100			35 73 93 99	0.067	0.027	0.024	0.024	0.022	0.022

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	ang	ang	ang	ang
991106600	-0.351	0.189	0.143	-8.2	-0.033	0.056	-0.8	0.149	3.4	
991111001	0.066	0.406	0.075	63.0	-0.002	0.044	43.2	0.021	2.8	
991111002	0.034	0.318	0.065	67.3	-0.002	0.054	31.6	0.019	-26.6	
991111003	0.100	0.358	0.136	59.7	-0.009	0.096	34.1	0.031	4.4	
991111004	0.156	0.482	0.096	44.8	-0.020	0.101	22.2	0.052	44.2	
991106100	0.089	0.387	0.092	57.9	-0.008	0.069	30.9	0.001	-41.7	



-90° Fall Ap



***** INTERFEROGRAM EVALUATION PROCESS started at 12-Nov-1999 14:17:03 *****

Result TA, Picture: 999999 999 Surface TA, Picture: 991106 100
Test setup TA, Picture: 991106 200 Backout TA, Picture: 991106 600
Transform TA, Picture: 991111 005

SURFACE INFORMATION TA991106 P100 12-Nov-1999 14:17:03
TITLE: Magellan Tertiary Mirror S/N 2 - Full Optical Aperture

Fiducial marks (4)

Number	X	Y	Number	X	Y
01	14.4375	0.0000	03	-14.4375	0.0000
02	0.0000	-20.8375	04	0.0000	20.8375

Reference wavelength: 6328

Grid points: X: 79 Y: 111 Grid increments: X: 0.393700 Y: 0.393700
Grid start: X:-15.354300 Y:-21.653500

Windows (1)

No.	Shape	Center X	Center Y	Length	Width	Angle
1	Ellipse	0.000	0.000	30.497	43.289	0.000

Obstructions (0)

TEST SETUP INFORMATION TA991106 P200 12-Nov-1999 14:17:03

Base length: 343.0640 Y: 0.0000
Central displacement X: 0.0000
Angle of incidence: 45.0000
Surface rotation: -90.0000

INTERFEROGRAM PROCESSING PARAMETERS
Wavefront passes: 4 Averaging type: unweighted Area: total
Design residual: 0 Mapping error: 0
Focus model: wedge

INTERFEROGRAM PROCESSED
TA 991111 Picture 005
TA 991111 Picture 006

TA 991111 Picture 007
TA 991111 Picture 008

Test Fiducial marks (4)

Number	X	Y	Number	X	Y
01	325.1415	474.8585	03	474.8585	325.1415
02	474.8585	474.8585	04	325.1415	325.1415

Reference Fiducial marks (0)

Test wavelength: 6328 Fringes: 151 Wedge: Plus (+)

Windows (1)

No.	Shape	Center X	Center Y	Length	Width	Angle
1	Ellipse	400.000	400.000	800.000	800.000	0.000

Obstructions (0)

Transform coefficients (interferogram->pupil) for transform interferogram
 -0.002945 -0.035242 18.393
 0.035399 -0.0029648 -24.672
 Transformation error: 0.0016024

Transform coefficients (pupil->interferogram) for backout interferogram
 10.926 0.054926 395.03
 -0.15638 10.927 404.04
 Transformation error: 0.0040711

Transformed backout pupil fiducial marks (4)

Number	X	Y	Number	X	Y
01	324.948	474.285	03	474.666	324.573
02	475.051	475.425	04	325.337	325.719

Coefficients of interferogram COMA MODEL removed during interpolation
 *** Bias: -0.00670
 *** Wedge: 0.04996 Angle: 3.99737
 *** Power: -0.19825
 *** Coma: 0.51095 Angle: 19.95307

Points interpolated 6681, extrapolated 0; interior points estimated with surface fit 0;
 triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 5.26269.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 330.6231 493.0268 03 1140.6497 425.3408
02 771.7356 895.4736 04 702.0520 63.6963

Reference Fiducial marks (4) -----
Number X Y Number X Y
01 928.4686 627.2422 03 517.1492 270.8611
02 904.4920 239.4626 04 546.8575 656.1807

Test wavelength: 6328 Fringes: 27 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-2.36 28.053 735.52
-28.177 -2.3441 460.45
Transformation error: 0.0015976

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 330.504 494.296 03 1140.530 426.609
02 771.850 894.260 04 702.177 62.374

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -13.63616
*** Wedge: 28.69416 Angle: 178.23577
*** Power: -0.26257
*** Coma: 0.24486 Angle: -128.78214

Points interpolated 6614, extrapolated 59; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 31.7201.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 360.1372 475.6769 03 1174.4254 462.4297
02 774.8101 904.3462 04 762.5109 66.9167

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 27 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-0.41821 28.2 767.84
-28.363 -0.45879 468.35
Transformation error: 0.0011285

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 360.695 474.975 03 1174.982 461.727
02 774.277 905.018 04 761.930 67.649

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -14.06235
*** Wedge: 28.20861 Angle: 88.03151
*** Power: -0.48888
*** Coma: 0.24629 Angle: -128.02948

Points interpolated 6540, extrapolated 124; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 31.4376.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 337.5102 502.1922 03 1152.0278 464.4380
02 765.7188 911.2543 04 715.9164 78.2995

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 27 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-1.6796 28.208 742.26
-28.204 -1.3075 480.11
Transformation error: 0.0051448

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 335.002 498.983 03 1149.520 461.228
02 768.119 914.326 04 718.532 81.647

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -14.42004
*** Wedge: 28.44141 Angle: 1.66915
*** Power: -0.10253
*** Coma: 0.14304 Angle: ~103.52536

Points interpolated 6580, extrapolated 80; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 32.7605.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 358.2513 472.9176 03 1173.4937 434.8235
02 785.3816 891.7188 04 748.1665 61.1961

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 26 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-1.2607 28.233 765.92
-28.138 -1.3193 456.24
Transformation error: 0.0029814

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 358.303 475.292 03 1173.545 437.197
02 785.333 889.447 04 748.113 58.721

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -12.49498
*** Wedge: 27.24520 Angle: -89.20047
*** Power: -0.57944
*** Coma: 0.19909 Angle: -123.29418

Points interpolated 6588, extrapolated 75; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 32.6568.

INTERFEROGRAM SUMMARY *****

TA/PIC	W	Data	Cx	Cy	Tran	Rot-f	Int/surf	Data	Area	
	g	pts			Err	angle	ratio	radius	radius	
991106600	151	+	17556	395.0	404.0	0.41	R 90	1.0000	1 46.400	21.438
991111005	27	+	3261	735.5	460.5	0.16	R 184	1.0000	0 21.791	21.438
991111006	27	+	2988	767.8	468.4	0.11	R 180	1.0000	0 20.959	21.438
991111007	27	+	3156	742.3	480.1	0.51	R 183	1.0000	0 21.141	21.438
991111008	26	+	2993	765.9	456.2	0.30	R 182	1.0000	0 20.972	21.438

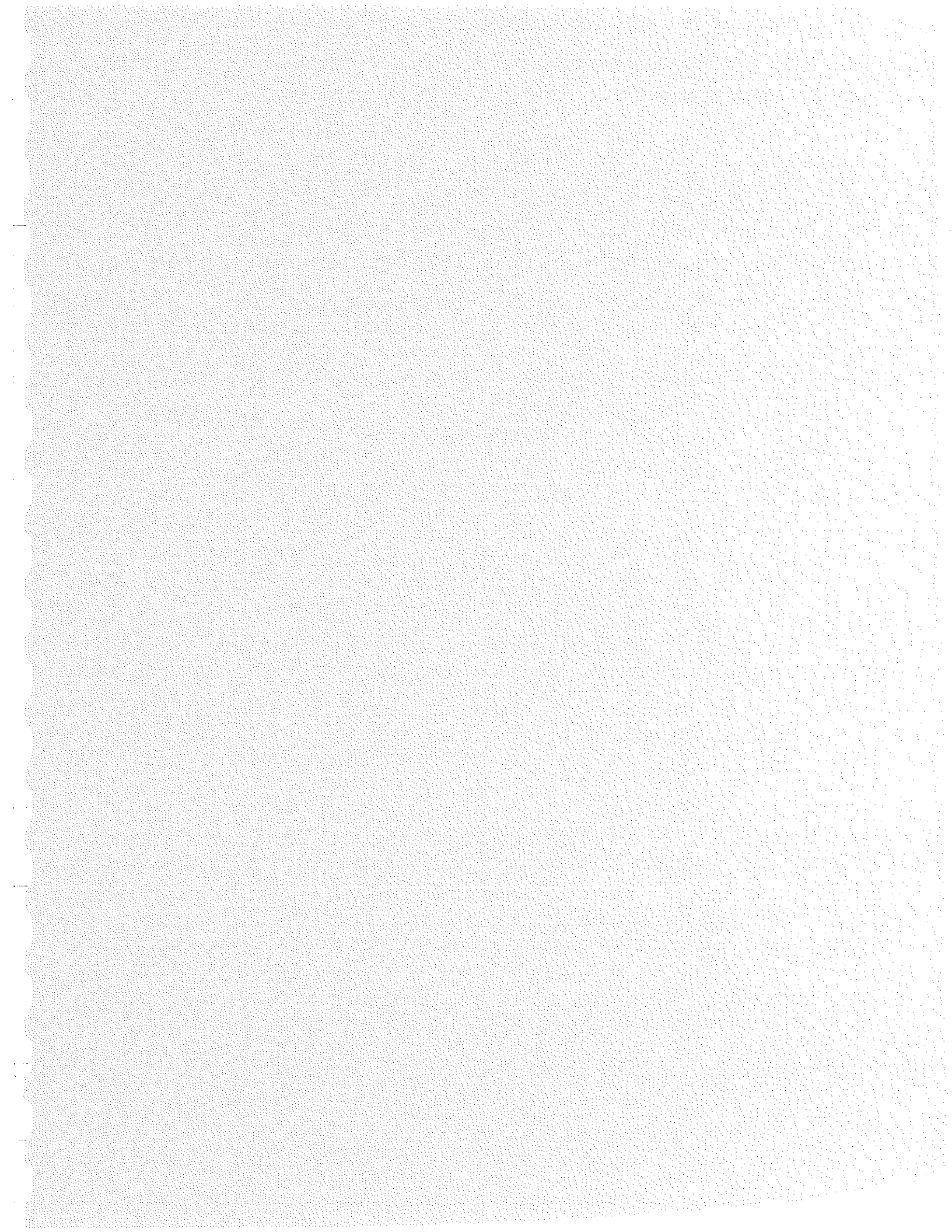
TA/PIC	resid	resid	wedge	power	coma
	high	low	rms	rms	coma
991106600	0.762	-0.531	0.242	0.237	0.221
991111005	0.544	-1.165	0.154	0.135	0.129
991111006	0.574	-0.469	0.185	0.129	0.122
991111007	0.490	-0.627	0.129	0.125	0.123
991111008	0.432	-0.847	0.205	0.126	0.122

OPD SUMMARY *****

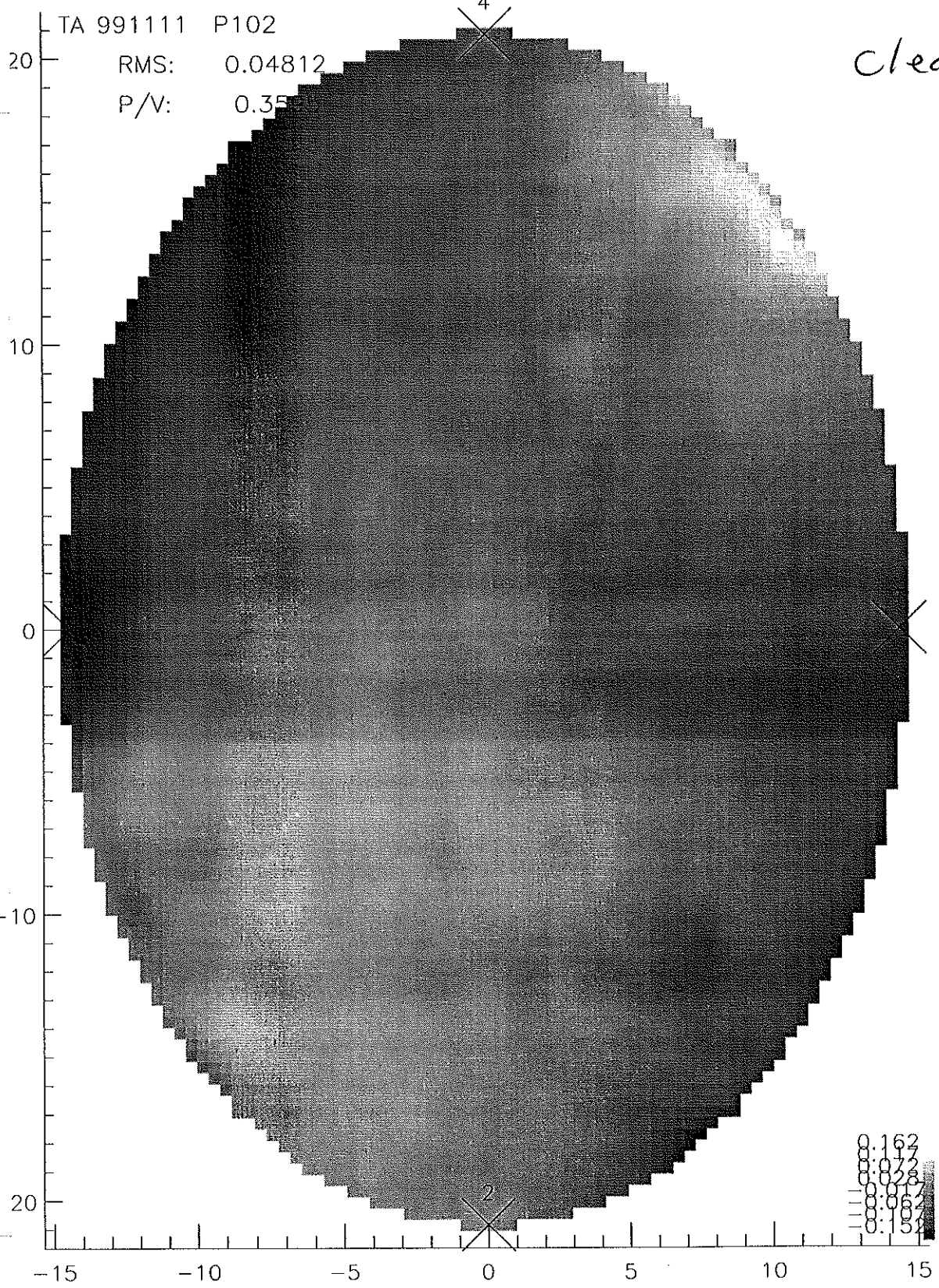
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid pts	Peak	Valley	RMS
991106600	82" sphere robot mid	079	111	-15.354	-21.653	0.39370	0.39370	6681 6681	0.189	-0.353	0.111
991111005		079	111	-15.354	-21.653	0.39370	0.39370	6681 6673	0.251	-0.191	0.050
991111006		079	111	-15.354	-21.653	0.39370	0.39370	6681 6664	0.253	-0.193	0.053
991111007		079	111	-15.354	-21.653	0.39370	0.39370	6681 6660	0.257	-0.242	0.054
991111008		079	111	-15.354	-21.653	0.39370	0.39370	6681 6663	0.173	-0.330	0.057
991106100	**AVERAGE**	079	111	-15.354	-21.653	0.39370	0.39370	6681 6681	0.209	-0.198	0.048

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2 1S 2S 3S	Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
991106600			36 65 95 99	0.058	0.049	0.044	0.036	0.036	0.035
991111005	0.018	0.936	40 73 94 99	0.057	0.041	0.035	0.034	0.026	0.026
991111006	0.021	0.920	43 73 94 98	0.058	0.042	0.035	0.034	0.026	0.025
991111007	0.028	0.850	40 72 94 99	0.053	0.034	0.033	0.033	0.029	0.029
991111008	0.026	0.889	38 71 94 99	0.060	0.036	0.029	0.029	0.026	0.026
991106100			43 72 94 98	0.053	0.035	0.029	0.029	0.022	0.022

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	ang
991106600	-0.469	0.192	0.107	-0.104	0.023	0.089	5.8
991111005	0.008	0.256	0.157	-0.023	0.173	0.014	-34.2
991111006	-0.101	0.283	0.170	-0.014	0.171	0.074	39.3
991111007	0.067	0.263	0.073	-0.017	0.116	0.035	-1.6
991111008	-0.155	0.306	0.138	-0.013	0.101	0.029	-27.0
991106100	-0.045	0.267	0.134	-0.017	0.138	0.013	-41.7



90°/180°
COMBO
clear Ap



Starting Combine orientations task combine_orientations
 result ta, picture: 999999 999
 orientation #1 ta, picture: 991111 3
 orientation #2 ta, picture: 991111 4
 test setup #1 ta, picture: 991106 300
 test setup #2 ta, picture: 991106 400

surface ta, picture: 991106 200

SURFACE INFORMATION TA991111 P003 12-Nov-1999 14:21:32
 TITLE: Magellan Tertiary Mirror S/N 2 - Full Optical Aperture

Fiducial marks (4) -----

Number	X	Y	Number	X	Y
01	14.4375	0.0000	03	-14.4375	0.0000
02	0.0000	-20.8375	04	0.0000	20.8375

Reference wavelength: 6328

Grid points: X: 79 Y: 111 Grid increments: X: 0.393700 Y: 0.393700
 Grid start: X:-15.354300 Y:-21.653500

Windows (1) -----

No.	Shape	Center X	Center Y	Length	Width	Angle
1	Ellipse	0.000	0.000	30.497	43.289	0.000

Obstructions (0) -----

SURFACE INFORMATION TA991111 P004 12-Nov-1999 14:21:32
 TITLE: Magellan Tertiary Mirror S/N 2 - Full Optical Aperture

Fiducial marks (4) -----

Number	X	Y	Number	X	Y
01	14.4375	0.0000	03	-14.4375	0.0000
02	0.0000	-20.8375	04	0.0000	20.8375

Reference wavelength: 6328

Grid points: X: 79 Y: 111 Grid increments: X: 0.393700 Y: 0.393700
 Grid start: X:-15.354300 Y:-21.653500

Windows (1) -----

No.	Shape	Center X	Center Y	Length	Width	Angle
1	Ellipse	0.000	0.000	30.497	43.289	0.000

Obstructions (0) -----

TEST SETUP INFORMATION TA991106 P300 12-Nov-1999 14:21:32

Base length: 343.0640
Central displacement X: 0.0000 Y: 0.0000
Angle of incidence: 45.0000
Surface rotation: 180.0000

TEST SETUP INFORMATION TA991106 P400 12-Nov-1999 14:21:32

Base length: 343.0640
Central displacement X: 0.0000 Y: 0.0000
Angle of incidence: 45.0000
Surface rotation: 90.0000

Difference array between input, unfocused arrays -----
peak: 0.2051 valley: -0.1770 rms: 0.0431

Special surface 1 coefficients:
-0.065980, -0.000072, 0.000609, -0.001010
Special surface 2 coefficients:
0.065980, -0.000420, -0.000097, -0.002397
(models: c1 + c2*x + c3*y + c4*(x^2+y^2)
[in the two pupil planes, aperture not normalized]

Difference array between refocused arrays -----
peak: 0.1057 valley: -0.1146 rms: 0.0198

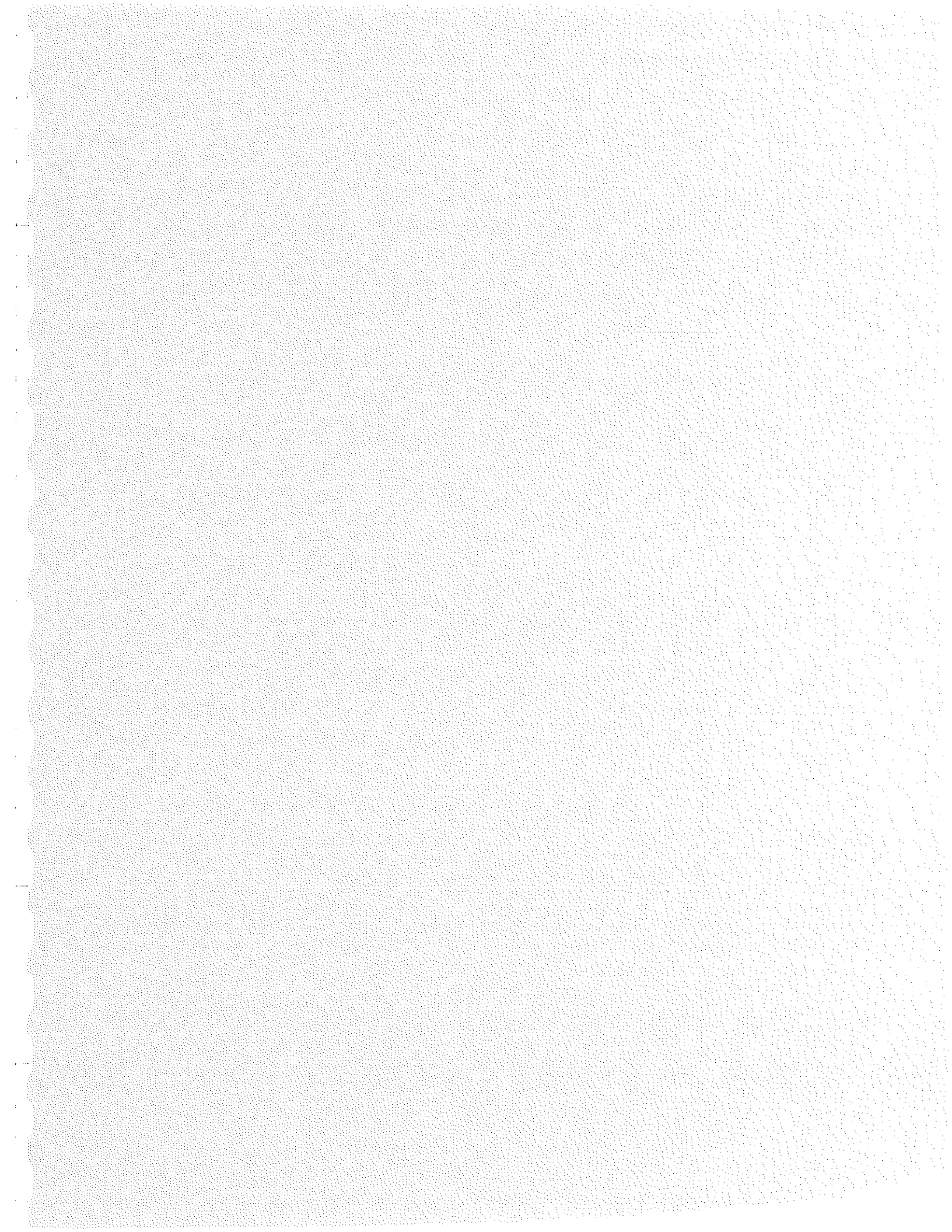
Coefficients of final wedge model removed
*** Bias: -0.07098
*** Wedge: 0.01589 Angle: -131.34682

OPD SUMMARY *****

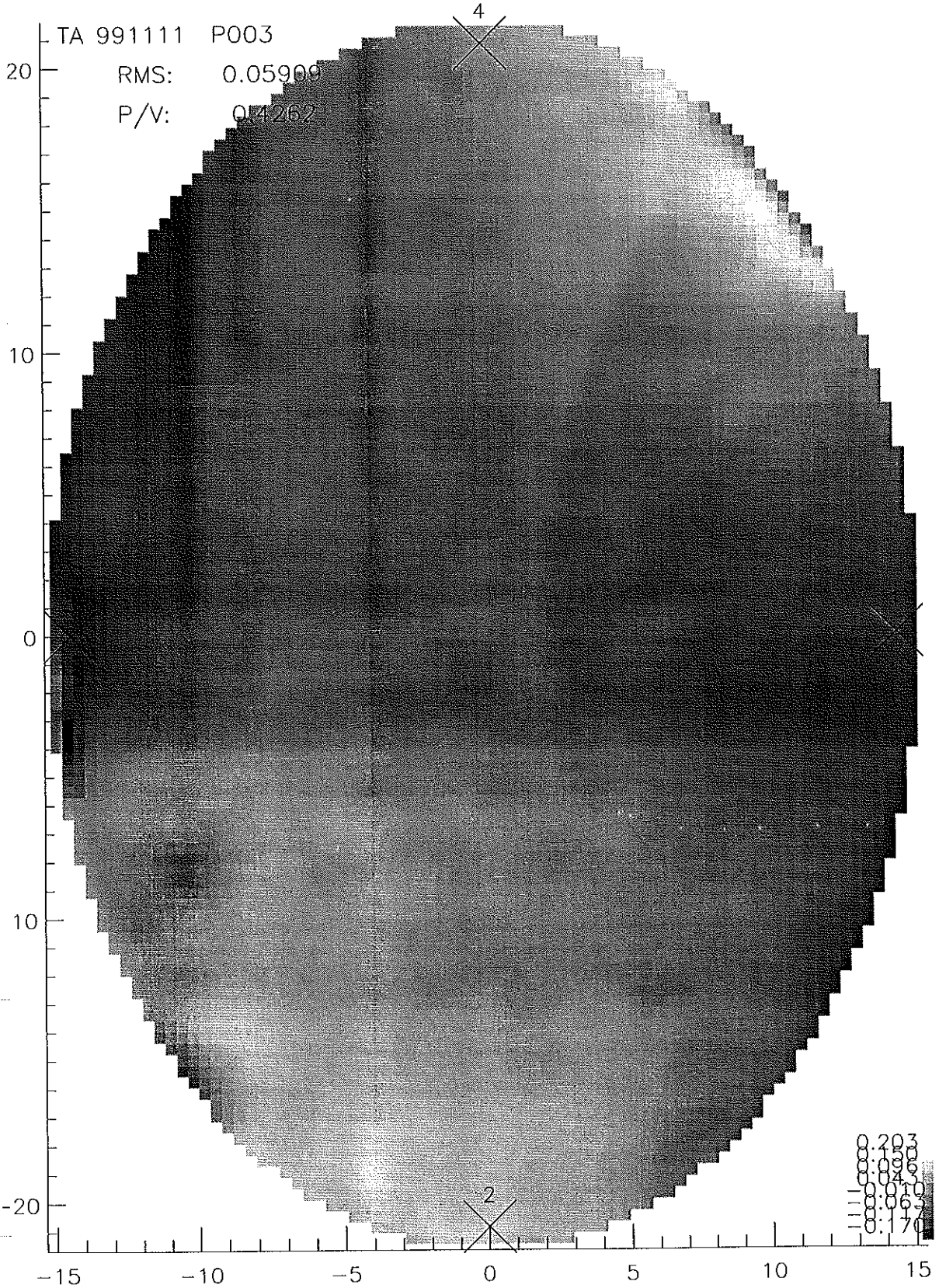
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid pts	Peak	Valley	RMS
991111003	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6681	0.230	-0.197	0.059
991111004	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6681	0.282	-0.168	0.061
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6253	0.185	-0.175	0.048

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2	1S	2S	3S	Power rms	Astig rms	Coma rms	Spher rms	Trefl rms	Tetra rms
991111003			42	72	94	99	0.066	0.034	0.025	0.023	0.021	0.019
991111004			40	68	95	98	0.055	0.041	0.028	0.028	0.026	0.025
999999999			40	71	94	98	0.054	0.034	0.021	0.021	0.018	0.015

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	ang	ang	ang	ang	ang
991111003	-0.036	0.379	70.2	0.153	19.1	-0.027	0.079	24.3	0.063	-41.3	
991111004	0.141	0.262	45.9	0.191	23.8	-0.016	0.069	23.1	0.070	38.9	
999999999	-0.116	0.309	63.6	0.173	22.0	-0.006	0.075	25.5	0.102	-43.5	



180° full Ap



***** INTERFEROGRAM EVALUATION PROCESS started at 12-Nov-1999 13:02:20 *****

Result TA, Picture: 999999 999 Surface TA, Picture: 991106 100
Test setup TA, Picture: 991106 300 Backout TA, Picture: 991106 600
Transform TA, Picture: 991111 009

SURFACE INFORMATION TA991106 P100 12-Nov-1999 13:02:20
TITLE: Magellian Tertiary Mirror S/N 2 - Full Optical Aperture

Fiducial marks (4)			
Number	X	Y	Number
01	14.4375	0.0000	03
02	0.0000	-20.8375	04

Reference wavelength: 6328
Grid points: X: 79 Y: 111 Grid increments: X: 0.393700 Y: 0.393700
Grid start: X:-15.354300 Y:-21.653500

Windows (1)			
No.	Shape	Center X	Center Y
1	Ellipse	0.000	0.000

Length: 30.497
Width: 43.289
Angle: 0.000

Obstructions (0)

TEST SETUP INFORMATION TA991106 P300 12-Nov-1999 13:02:20

Base length: 343.0640
Central displacement X: 0.0000 Y: 0.0000
Angle of incidence: 45.0000
Surface rotation: 180.0000

INTERFEROGRAM PROCESSING PARAMETERS
Wavefront passes: 4 Averaging type: unweighted Area: total
Design residual: 0 Mapping error: 0
Focus model: wedge

INTERFEROGRAM PROCESSED
TA 991111 Picture 009
TA 991111 Picture 010

TA 991111 Picture 011
TA 991111 Picture 012

TITLE: 82" sphere robot middle fids (10.625"radius)

Test Fiducial marks (4)

Number	X	Y	Number	X	Y
01	325.1415	474.8585	03	474.8585	325.1415
02	474.8585	474.8585	04	325.1415	325.1415

Reference Fiducial marks (0)

Test wavelength: 6328 Fringes: 151 Wedge: Plus (+)

Windows (1)

No.	Shape	Center X	Center Y	Length	Width	Angle
1	Ellipse	400.000	400.000	800.000	800.000	0.000

Obstructions (0)

Transform coefficients (interferogram->pupil) for transform interferogram

-0.051573 0.0037694 28.771
 -0.0041847 -0.051111 28.828
 Transformation error: 0.0017764

Transform coefficients (pupil->interferogram) for backout interferogram

10.91 0.25923 401.66
 -0.26979 11.113 402.26
 Transformation error: 0.0026787

Transformed backout pupil fiducial marks (4)

Number	X	Y	Number	X	Y
01	325.411	475.150	03	475.128	325.433
02	474.586	474.564	04	324.874	324.852

Coefficients of interferogram COMA MODEL removed during interpolation

*** Bias: -0.00152
 *** Wedge: 0.02378 Angle: -0.22437
 *** Power: -0.17515
 *** Coma: 0.52292 Angle: 13.87061

Points interpolated 6681, extrapolated 0; interior points estimated with surface fit 0; triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 5.26269.

Test Fiducial marks (4) -----

Number	X	Y	Number	X	Y
01	797.7410	497.8974	03	403.8175	530.1078
02	566.5226	110.7997	04	625.7562	921.3194

Reference Fiducial marks (4) -----

Number	X	Y	Number	X	Y
01	724.0875	379.8141	03	472.2283	657.3450
02	460.2654	395.9546	04	738.0618	643.1401

Test wavelength: 6328 Fringes: 19 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram

-19.274 -1.4213 595.53
1.5785 -19.449 515.27
Transformation error: 0.001884

Transformed pupil fiducial marks (4) -----

Number	X	Y	Number	X	Y
01	798.333	498.663	03	404.446	530.920
02	565.912	110.011	04	625.146	920.531

Coefficients of interferogram COMA MODEL removed during interpolation

*** Bias: -9.84137
*** Wedge: 38.72533 Angle: -4.34855
*** Power: -0.13278
*** Coma: 0.55685 Angle: 5.67762

Points interpolated 6573, extrapolated 98; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 32.8918.

Test Fiducial marks (4)

Number	X	Y	Number	X	Y
01	855.2323	531.3330	03	463.9188	563.0215
02	645.1771	135.2559	04	663.6306	948.2402

Reference Fiducial marks (0)

Test wavelength: 6328 Fringes: 35 Wedge: Plus (+)

Windows (0)

Obstructions (0)

Transform coefficients (pupil->interferogram) for test interferogram

-19.147 -0.44279 654.08
1.542 -19.508 544.7

Transformation error: 0.0038321

Transformed pupil fiducial marks (4)

Number	X	Y	Number	X	Y
01	855.548	528.472	03	464.254	559.985
02	644.852	138.205	04	663.305	951.189

Coefficients of interferogram COMA MODEL removed during interpolation

*** Bias: -17.98712
*** Wedge: 35.10336 Angle: -81.50006
*** Power: -0.35013
*** Coma: 0.44220 Angle: -1.76482

Points interpolated 6483, extrapolated 185; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 18.6727.
WARNING: 2 points received non-identical, multiple estimates

Test Fiducial marks (4)

Number	X	Y	Number	X	Y
01	847.1426	506.0850	03	453.8029	538.1113
02	619.3110	119.7087	04	669.0371	931.6593

Reference Fiducial marks (0)

Test wavelength: 6328 Fringes: 23 Wedge: Plus (+)

Windows (0)

Obstructions (0)

Transform coefficients (pupil->interferogram) for test interferogram
-19.248 -1.1932 644.4
1.5717 -19.483 524.13
Transformation error: 0.0020554

Transformed pupil fiducial marks (4)

Number	X	Y	Number	X	Y
01	846.926	507.593	03	453.573	539.711
02	619.534	118.155	04	669.260	930.105

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -10.99947
*** Wedge: 47.68712 Angle: 175.79589
*** Power: 0.35092
*** Coma: 0.43040 Angle: 8.60842

Points interpolated 6492, extrapolated 125; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 27.0195.
WARNING: 1 points received non-identical, multiple estimates

Test Fiducial marks (4) -----
Number X Y Number X Y
01 794.1226 512.1628 03 403.3334 543.0472
02 566.0839 127.2011 04 620.9150 935.4574

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 40 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-19.122 -1.3157 593.21
1.516 -19.394 529.7
Transformation error: 0.0022174

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 794.407 513.746 03 403.635 544.727
02 565.791 125.570 04 620.622 933.826

Coefficients of interferogram COMA MODEL removed during interpolation

*** Bias: -20.49027
*** Wedge: 39.63707 Angle: 84.53498
*** Power: 0.24441
*** Coma: 0.42977 Angle: -3.29096

Points interpolated 6555, extrapolated 126; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 16.8326.

INTERFEROGRAM SUMMARY *****

TA/PIC	NF	g	Data	Cx	Cy	Tran	Rot-f	Int/surf	Data	Area	
			pts			Err	angle	ratio	WO	radius	
991106600	151	+	17556	401.7	402.3	0.27	R-178	1.0000	1	39.834	21.438
991111009	19	+	2615	595.5	515.3	0.19	R-355	1.0000	0	21.954	21.438
991111010	35	+	2366	654.1	544.7	0.38	R-358	1.0000	0	21.271	21.438
991111011	23	+	3588	644.4	524.1	0.21	R-356	1.0000	0	21.555	21.438
991111012	40	+	2902	593.2	529.7	0.22	R-356	1.0000	0	21.618	21.438

TA/PIC	resid	resid	wedge	power	coma
	high	low	rms	rms	coma
991106600	0.749	-0.560	0.242	0.237	0.219
991111009	0.546	-1.055	0.191	0.188	0.167
991111010	0.528	-0.761	0.194	0.174	0.161
991111011	0.538	-0.652	0.194	0.175	0.162
991111012	0.546	-0.606	0.190	0.181	0.169

OPD SUMMARY *****

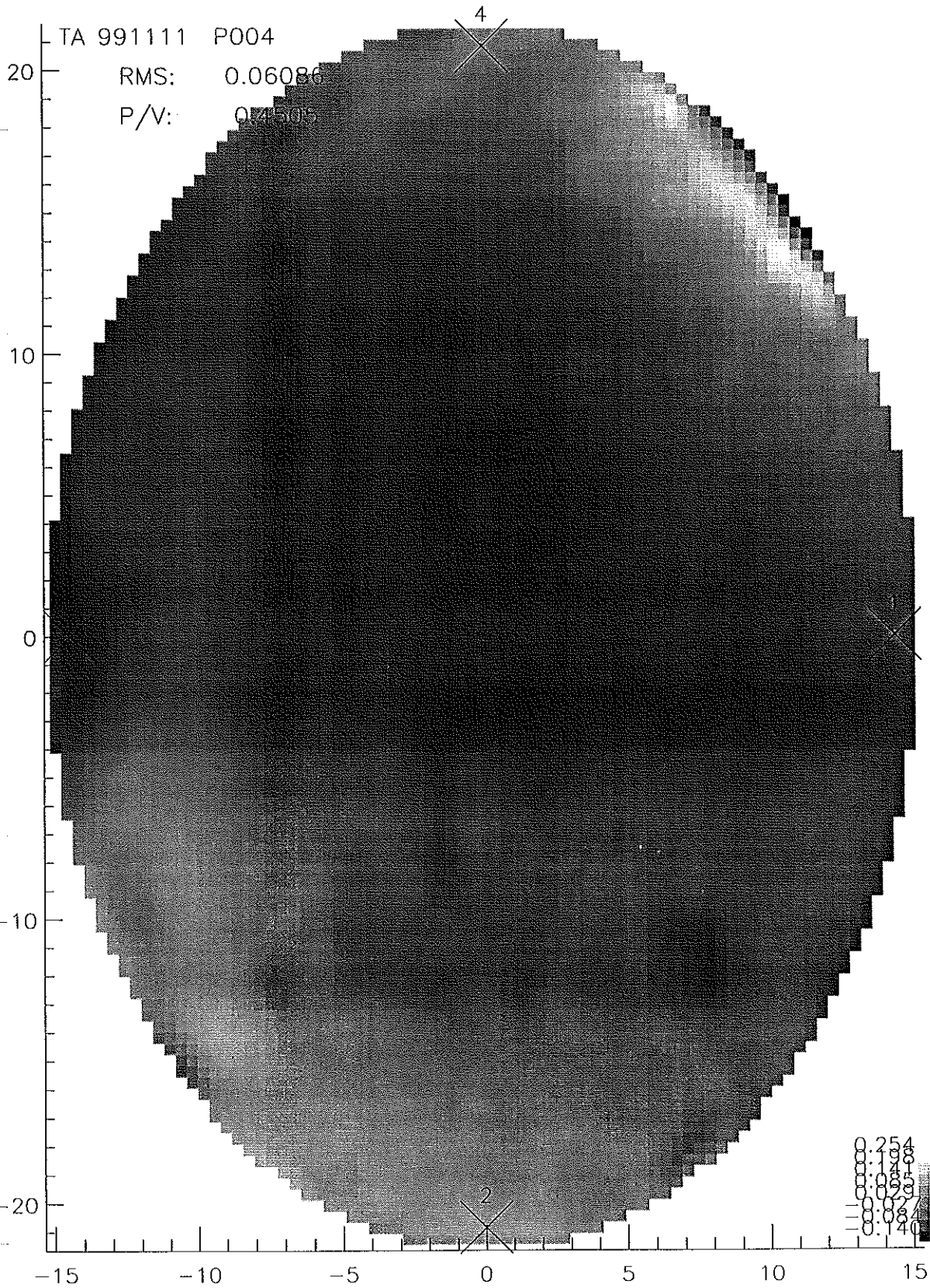
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist pts	Valid pts	Peak	Valley	RMS
991106600	82" sphere robot mid	079	111	-15.354	-21.653	0.39370	0.39370	6681	6681	0.169	-0.222	0.094
991111009		079	111	-15.354	-21.653	0.39370	0.39370	6681	6671	0.286	-0.450	0.057
991111010		079	111	-15.354	-21.653	0.39370	0.39370	6681	6668	0.230	-0.240	0.053
991111011		079	111	-15.354	-21.653	0.39370	0.39370	6681	6617	0.299	-0.231	0.077
991111012		079	111	-15.354	-21.653	0.39370	0.39370	6681	6681	0.272	-0.197	0.072
991106100	**AVERAGE**	079	111	-15.354	-21.653	0.39370	0.39370	6681	6681	0.230	-0.197	0.059

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2 1S 2S 3S	Power rms	Astig rms	Coma rms	Spher rms	Trefoil mag	Tetra mag	Trefoil ang	Tetra ang
991106600	0.023	0.923	28 59 98100	0.048	0.043	0.041	0.041	0.041	0.041	0.041	0.038
991111009	0.036	0.793	41 74 95 98	0.071	0.045	0.032	0.030	0.030	0.029	0.029	0.028
991111010	0.031	0.928	43 74 94 98	0.058	0.032	0.028	0.027	0.027	0.024	0.024	0.023
991111011	0.024	0.953	34 73 94 99	0.072	0.036	0.028	0.027	0.027	0.024	0.024	0.023
991111012			38 72 94 99	0.072	0.036	0.030	0.028	0.028	0.026	0.026	0.024
991106100			42 72 94 99	0.066	0.034	0.025	0.023	0.023	0.021	0.021	0.019

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag
991106600	-0.334	0.178	32.3	0.073	0.016	0.160
991111009	-0.102	0.377	71.0	0.199	0.078	0.064
991111010	-0.115	0.332	63.6	0.107	0.088	0.069
991111011	0.058	0.387	72.0	0.160	0.102	0.047
991111012	0.017	0.419	72.4	0.132	0.068	0.087
991106100	-0.036	0.379	70.2	0.153	0.079	0.063



+90 Full Ap



***** INTERFEROGRAM EVALUATION PROCESS started at 12-Nov-1999 14:15:49 *****

Result TA, Picture: 999999 999 Surface TA, Picture: 991106 100
Test setup TA, Picture: 991106 400 Backout TA, Picture: 991106 600
Transform TA, Picture: 991111 013

SURFACE INFORMATION TA991106 P100 12-Nov-1999 14:15:49
TITLE: Magellan Tertiary Mirror S/N 2 - Full Optical Aperture

Fiducial marks (4) -----
Number X Y Number X Y
01 14.4375 0.0000 03 -14.4375 0.0000
02 0.0000 -20.8375 04 0.0000 20.8375

Reference wavelength: 6328

Grid points: X: 79 Y: 111 Grid increments: X: 0.393700 Y: 0.393700
Grid start: X:-15.354300 Y:-21.653500

Windows (1) -----
No. Shape Center X Center Y Length Width Angle
1 Ellipse 0.000 0.000 30.497 43.289 0.000

Obstructions (0) -----

TEST SETUP INFORMATION TA991106 P400 12-Nov-1999 14:15:49

Base length: 343.0640 Y: 0.0000
Central displacement X: 0.0000
Angle of incidence: 45.0000
Surface rotation: 90.0000

INTERFEROGRAM PROCESSING PARAMETERS

Wavefront passes: 4 Averaging type: unweighted Area: total
Design residual: 0 Mapping error: 0
Focus model: wedge

INTERFEROGRAM PROCESSED
TA 991111 Picture 013
TA 991111 Picture 014

TA 991111 Picture 015
TA 991111 Picture 016

Test Fiducial marks (4) -----
Number X Y Number X Y
01 325.1415 474.8585 03 474.8585 325.1415
02 474.8585 474.8585 04 325.1415 325.1415

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 151 Wedge: Plus (+)

Windows (1) -----
No. Shape Center X Center Y Length Width Angle
1 Ellipse 400.000 400.000 800.000 800.000 0.000

Obstructions (0) -----

Transform coefficients (interferogram->pupil) for transform interferogram
-0.00020125 0.035224 -17.601
-0.035444 -0.0013524 25.571
Transformation error: 0.00058676

Transform coefficients (pupil->interferogram) for backout interferogram
11.113 -0.20966 397.9
0.69417 11.022 394.1
Transformation error: 0.0033341

Transformed backout pupil fiducial marks (4) -----
Number X Y Number X Y
01 325.608 475.031 03 475.321 325.312
02 474.390 474.686 04 324.681 324.972

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -0.00776
*** Wedge: 0.05712 Angle: 24.08649
*** Power: -0.20429
*** Coma: 0.60137 Angle: 18.06780

Points interpolated 6681, extrapolated 0; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 5.26269.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 294.9262 500.9114 03 1109.4176 505.5652
02 687.0001 905.1780 04 718.9708 67.1738

Reference Fiducial marks (4) -----
Number X Y Number X Y
01 490.7192 321.9728 03 883.0144 698.9627
02 500.8738 701.6533 04 874.4977 314.5170

Test wavelength: 6328 Fringes: 22 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-1.0831 -28.207 702.24
28.383 -0.16115 503.7
Transformation error: 0.00058607

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 294.990 501.378 03 1109.481 506.031
02 686.934 904.692 04 718.910 66.727

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -11.54480
*** Wedge: 23.25772 Angle: -90.93072
*** Power: -0.04283
*** Coma: 0.40321 Angle: -167.41593

Points interpolated 6552, extrapolated 94; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 38.7921.

Test Fiducial marks (4)

Number	X	Y	Number	X	Y
01	266.1185	552.5494	03	1084.1129	527.3943
02	673.9249	937.6700	04	676.6583	102.3701

Reference Fiducial marks (0)

Test wavelength: 6328 Fringes: 24 Wedge: Plus (+)

Windows (0)

Obstructions (0)

Transform coefficients (pupil->interferogram) for test interferogram
-0.092746 -28.329 675.17
28.296 0.87119 538.97
Transformation error: 0.0012584

Transformed pupil fiducial marks (4)

Number	X	Y	Number	X	Y
01	266.177	551.544	03	1084.171	526.388
02	673.864	938.719	04	676.602	103.333

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -12.49291
*** Wedge: 24.63758 Angle: 177.04029
*** Power: 0.21334
*** Coma: 0.30077 Angle: -178.11295

Points interpolated 6583, extrapolated 97; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 37.3173.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 341.5563 476.5859 03 1155.9506 504.0269
02 725.5171 883.2902 04 766.2780 58.3623

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 19 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-1.3752 -28.204 746.89
27.944 -0.95032 489.42
Transformation error: 0.0026345

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 339.693 475.704 03 1154.086 503.145
02 727.461 884.210 04 768.062 59.206

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -9.36397
*** Wedge: 19.05550 Angle: 85.86868
*** Power: -0.38858
*** Coma: 0.33546 Angle: -177.90057

Points interpolated 6583, extrapolated 97; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 44.7351.

Test Fiducial marks (4) -----
Number X Y Number X Y
01 304.8493 492.6794 03 1120.5129 471.4389
02 707.3707 881.4122 04 714.5001 46.1824

Reference Fiducial marks (0) -----

Test wavelength: 6328 Fringes: 24 Wedge: Plus (+)

Windows (0) -----

Obstructions (0) -----

Transform coefficients (pupil->interferogram) for test interferogram
-0.23872 -28.248 711.73
28.291 0.73561 481.9
Transformation error: 0.0012298

Transformed pupil fiducial marks (4) -----
Number X Y Number X Y
01 303.901 492.517 03 1119.564 471.276
02 708.360 881.582 04 715.408 46.338

Coefficients of interferogram COMA MODEL removed during interpolation
*** Bias: -12.19903
*** Wedge: 26.01064 Angle: 3.28255
*** Power: 0.30085
*** Coma: 0.24652 Angle: 173.91500

Points interpolated 6506, extrapolated 121; interior points estimated with surface fit 0;
triangle eccentricity threshold 1e+10, area threshold 1e+10; average fringe spacing 35.1864.

INTERFEROGRAM SUMMARY *****

TA/PIC	NF	g	W	Data	Cx	Cy	Tran	Rot-f	Int/surf	WO	Data	Area
				pts			Err	angle	ratio		radius	radius
991106600	151	+		17556	397.9	394.1	0.33	R -91	1.0000	1	39.217	21.438
991111013	22	+		2280	702.2	503.7	0.06	R-182	1.0000	0	20.288	21.438
991111014	24	+		2768	675.2	539.0	0.13	R-180	1.0000	0	20.895	21.438
991111015	19	+		1665	746.9	489.4	0.26	R-182	1.0000	0	20.153	21.438
991111016	24	+		2895	711.7	481.9	0.12	R-180	1.0000	0	20.447	21.438

TA/PIC	resid	high	low	resid	wedge	power	coma	resid	high	low	resid	wedge	power	coma
					rms	rms	rms					rms	rms	rms
991106600	0.771	-0.538	0.242	0.237	0.214	-0.204	0.601							
991111013	0.597	-0.839	0.147	0.147	0.132	-0.043	0.403							
991111014	0.559	-1.202	0.155	0.144	0.136	0.213	0.301							
991111015	0.512	-0.887	0.182	0.145	0.134	-0.389	0.335							
991111016	0.499	-0.775	0.152	0.130	0.124	0.301	0.247							

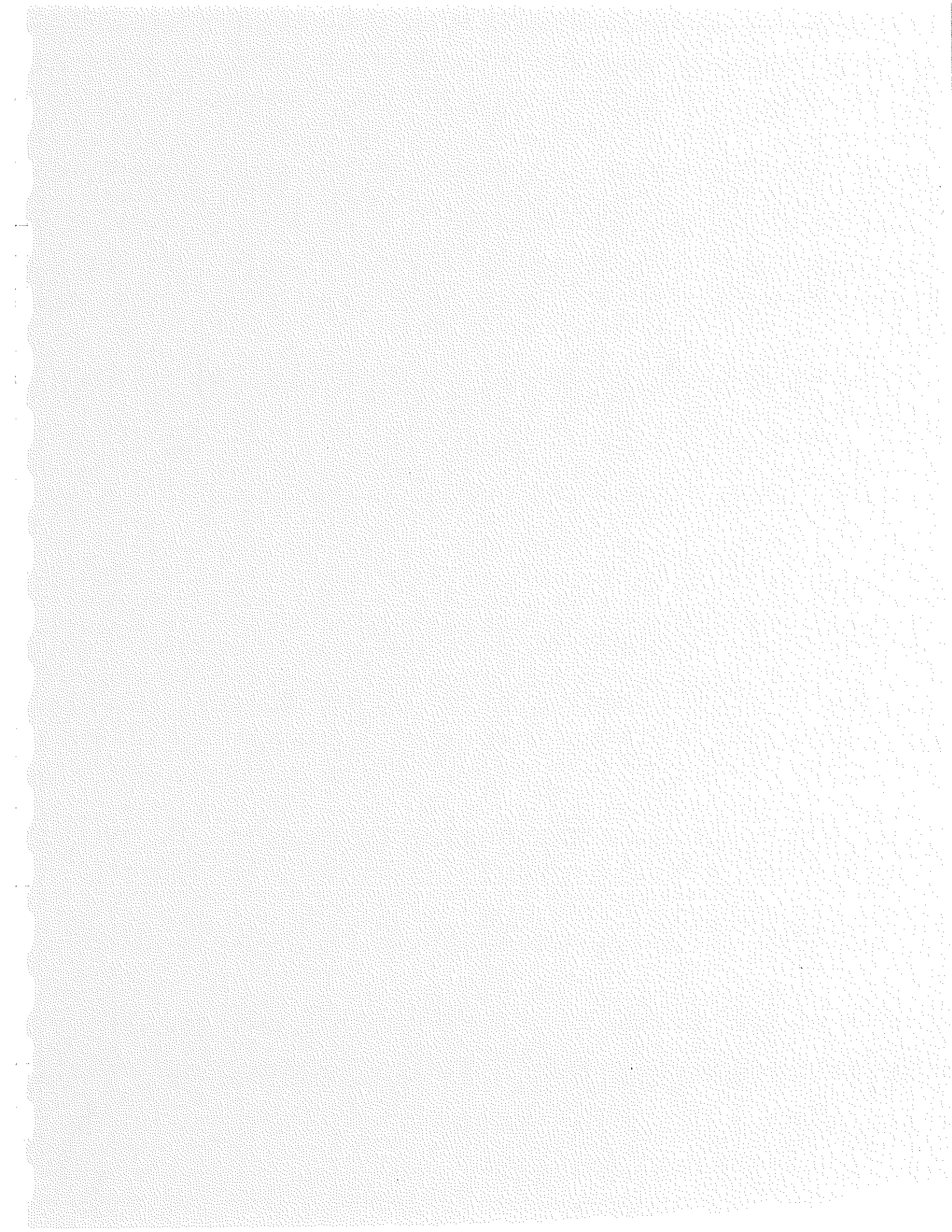
OPD SUMMARY *****

TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid pts	pts	Peak	Valley	RMS
991106600	82" sphere robot mid	079	111	-15.354	-21.653	0.39370	0.39370	6681	6681	0.198	-0.346	0.110
991111013		079	111	-15.354	-21.653	0.39370	0.39370	6681	6646	0.355	-0.148	0.064
991111014		079	111	-15.354	-21.653	0.39370	0.39370	6681	6680	0.349	-0.177	0.072
991111015		079	111	-15.354	-21.653	0.39370	0.39370	6681	6680	0.316	-0.366	0.055
991111016		079	111	-15.354	-21.653	0.39370	0.39370	6681	6627	0.357	-0.168	0.077
991106100	**AVERAGE**	079	111	-15.354	-21.653	0.39370	0.39370	6681	6681	0.282	-0.168	0.061

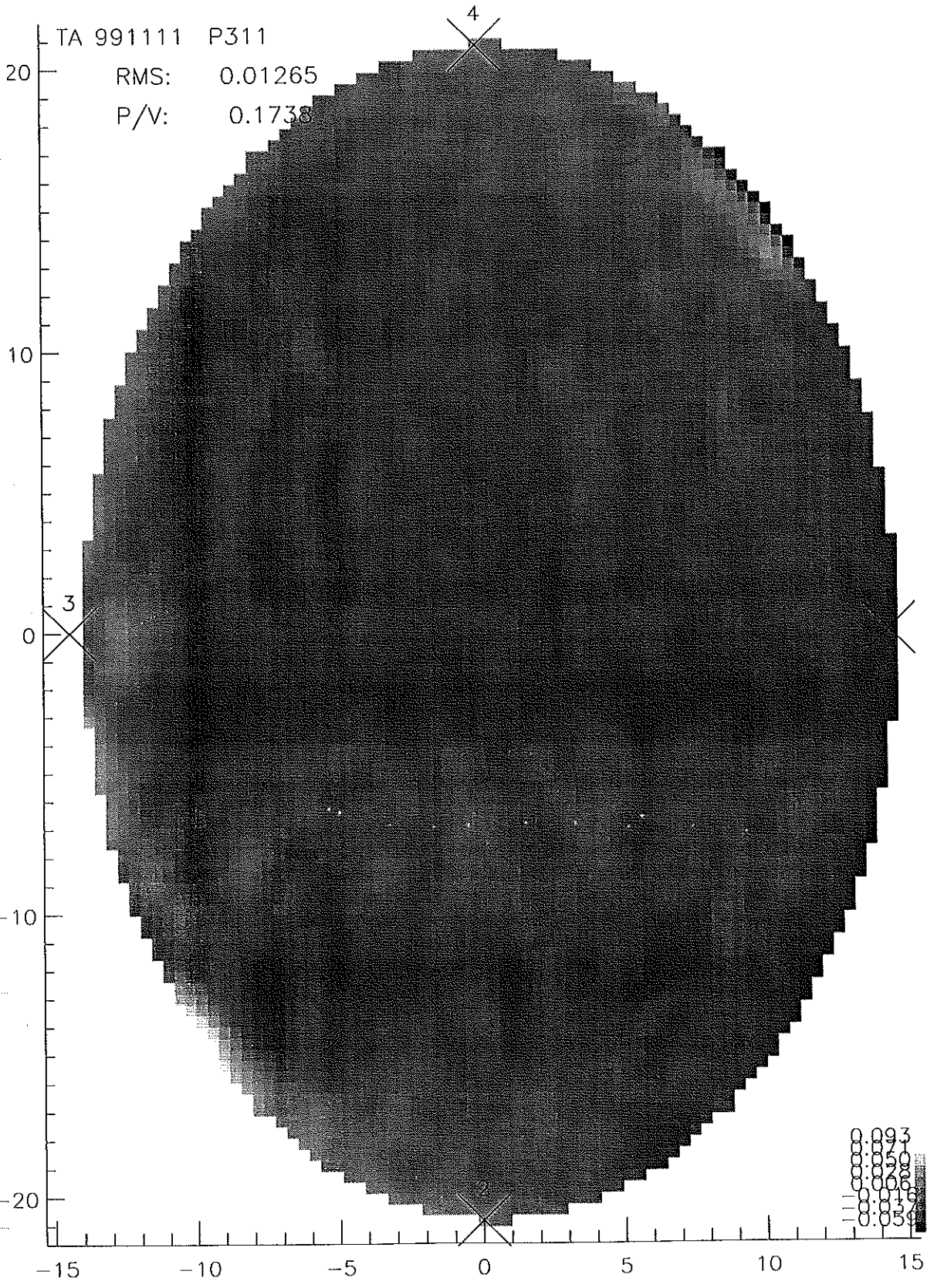
TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2 1S 2S 3S	Power rms	Astig rms	Coma rms	Spher rms	Trefoil rms	Tetra rms
991106600			34 66 95 99	0.056	0.048	0.044	0.036	0.036	0.035
991111013	0.020	0.948	37 69 95 98	0.062	0.045	0.028	0.028	0.028	0.027
991111014	0.024	0.946	39 69 95 98	0.059	0.044	0.035	0.034	0.032	0.032
991111015	0.040	0.770	42 73 94 98	0.062	0.045	0.035	0.033	0.032	0.031
991111016	0.029	0.935	37 66 96 99	0.058	0.039	0.032	0.032	0.030	0.029
991106100			40 68 95 98	0.055	0.041	0.028	0.028	0.026	0.025

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag
991106600	-0.475	0.171	0.106	-81.2	0.020	22.5
991111013	0.113	0.293	0.221	16.7	0.044	18.2
991111014	0.235	0.261	0.175	33.2	0.084	29.4
991111015	-0.053	0.312	0.189	24.6	0.066	25.4
991111016	0.283	0.274	0.149	29.2	0.076	26.6
991106100	0.141	0.262	0.191	23.8	0.069	23.1

Tetra ang	Tetra ang	Tetra ang
6.2	35.7	41.4
32.1	42.8	38.9



2cmAX None model



***** WAVEFRONT COMBINATION PROCESS started at 9911121518 *****

WAVEFRONT COMBINATION PARAMETERS -----
 combination type: add area: common aggregate focus: none

TA	Pic	Flip	Rot	Mult	Focus
991111	103	--	--	1.0000	none
991111	202	--	--	-1.0000	none

OPD SUMMARY *****

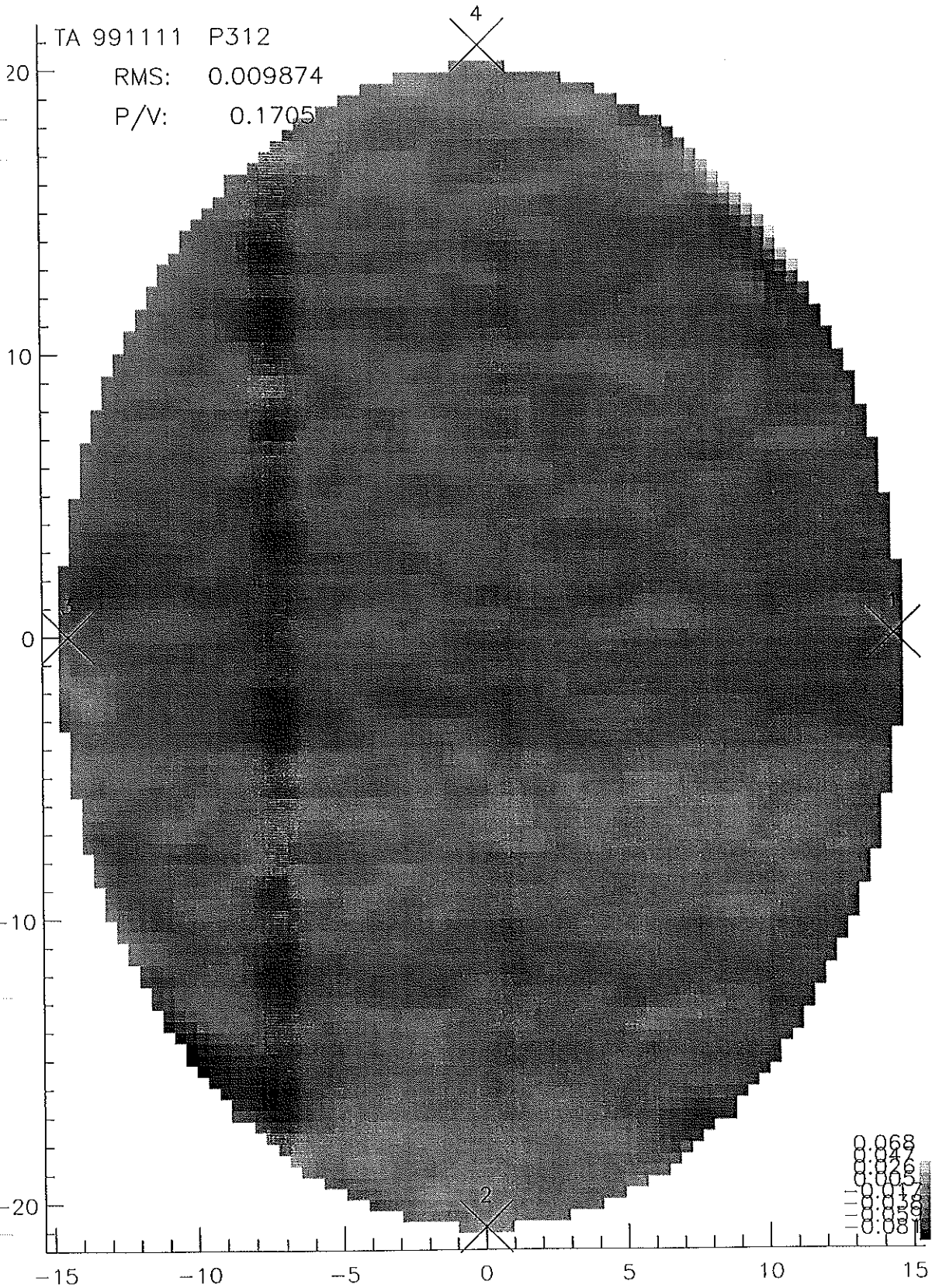
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid		Peak	Valley	RMS
								pts	pts			
99111103	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047
991111202	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6681	6039	0.104	-0.070	0.013

TA/PIC	Diff. RMS	Corr. ind.	--Barchart--			Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
			S/2	1S	2S						
99111103	0.044	0.357	38	72	94	99	0.051	0.029	0.020	0.020	0.016
991111202	0.045	0.323	38	72	94	99	0.052	0.030	0.020	0.020	0.016
999999999			46	78	94	98	0.013	0.012	0.009	0.009	0.008

TA/PIC	Power mag	Astig mag	Coma mag	Spher		Trefoil		Tetra		
				ang	mag	ang	mag	ang	mag	
99111103	-0.120	0.292	61.4	0.142	26.1	-0.001	0.085	24.4	0.076	-42.0
991111202	-0.135	0.290	63.8	0.144	26.0	-0.001	0.092	22.3	0.076	-42.0
999999999	0.019	0.026	15.9	0.049	174.8	0.000	0.035	55.6	0.015	-28.7

2 cm Δγ

NONE



***** WAVEFRONT COMBINATION PROCESS started at 9911121518 *****

WAVEFRONT COMBINATION PARAMETERS
 combination type: add area: common aggregate focus: none

TA	Pic	Flip	Rot	Mult	Focus
991111	103	--	--	1.0000	none
991111	203	--	--	-1.0000	none

OPD SUMMARY *****

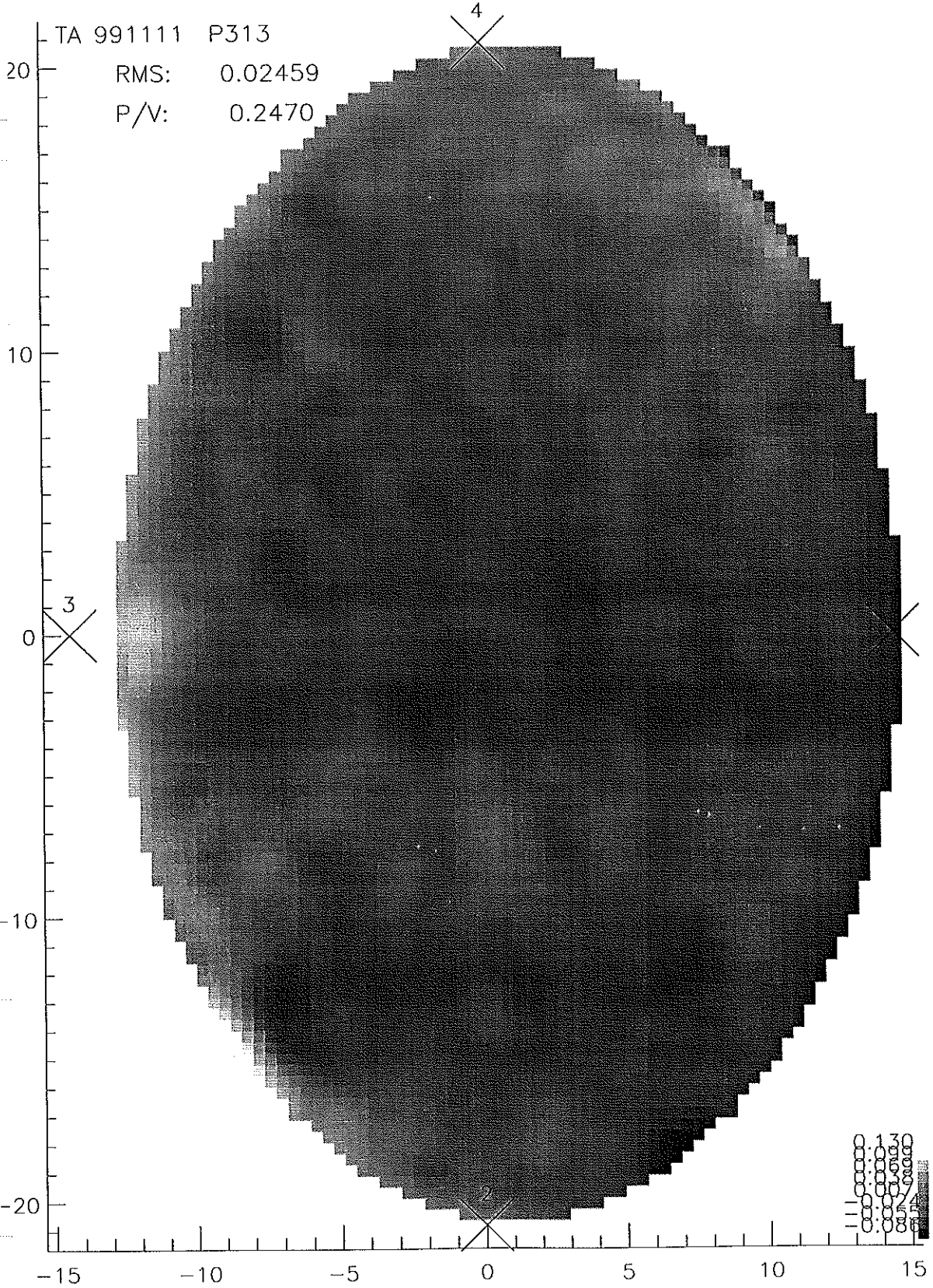
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist pts	Valid pts	Peak	Valley	RMS
99111103	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047
991111203	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6681	6103	0.079	-0.091	0.010

TA/PIC	Diff. RMS	Corr. ind.	--Barchart--			Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms	
			S/2	1S	2S 3S							
99111103	0.046	0.230	38	72	94	99	0.051	0.029	0.020	0.020	0.016	0.014
991111203	0.046	0.273	38	72	94	99	0.054	0.032	0.019	0.019	0.016	0.014
999999999			47	78	96	98	0.009	0.009	0.008	0.008	0.008	0.008

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	Spher ang	Trefoil ang	Tetra ang	
										99111103
991111203	-0.123	0.324	60.6	0.159	25.9	-0.002	0.107	25.5	0.088	-42.0
999999999	-0.008	0.014	-42.5	0.013	115.2	-0.001	0.002	24.9	0.019	-5.8

5 cm DX

NOISE



***** WAVEFRONT COMBINATION PROCESS started at 9911121517 *****

WAVEFRONT COMBINATION PARAMETERS -----
 combination type: add area: common aggregate focus: none

TA	Pic	Flip	Rot	Mult	Focus
991111	103	--	--	1.0000	none
991111	205	--	--	-1.0000	none

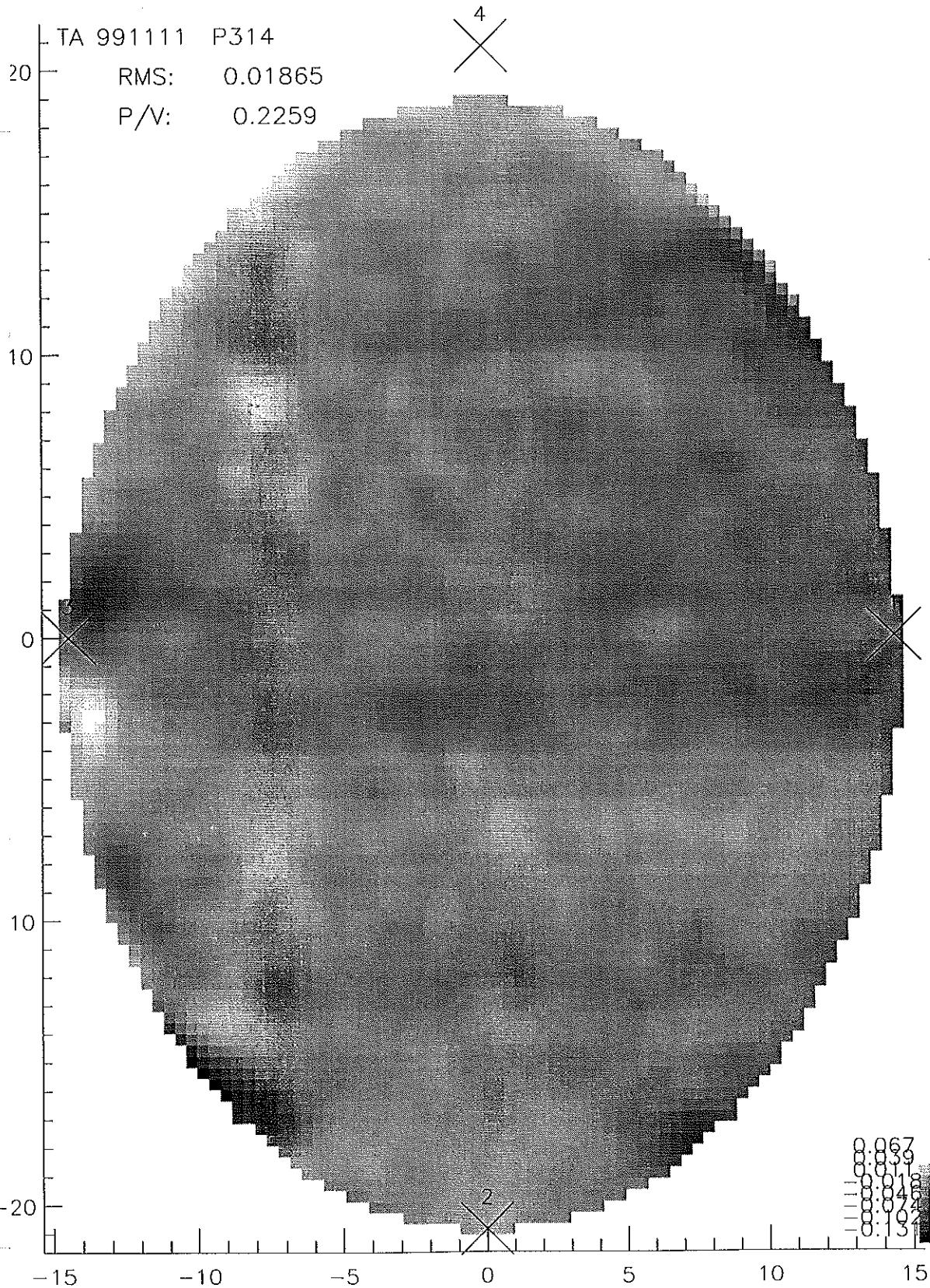
OPD SUMMARY *****

TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid	Peak	Valley	RMS	
								pts	pts			
99111103	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047
99111205	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6168	6168	0.169	-0.185	0.047
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6681	5718	0.146	-0.101	0.025

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2 1S 2S 3S	Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
99111103	0.041	0.482	38 72 94 99	0.051	0.029	0.020	0.020	0.016	0.014
99111205	0.043	0.404	38 72 94 99	0.054	0.031	0.020	0.020	0.016	0.014
999999999			41 75 95 98	0.024	0.021	0.015	0.015	0.013	0.012

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	ang	ang		
99111103	-0.120	0.292	61.4	0.142	26.1	-0.001	0.085	24.4	0.076	-42.0
99111205	-0.156	0.287	66.9	0.153	24.4	-0.001	0.106	19.4	0.068	-41.5
999999999	0.048	0.070	11.8	0.087	172.8	-0.001	0.075	54.8	0.033	-26.5

~~10 CM Δ~~
5 CM Δ NONE



***** WAVEFRONT COMBINATION PROCESS started at 9911121516 *****

WAVEFRONT COMBINATION PARAMETERS
 combination type: add area: common aggregate focus: none

TA	Pic	Flip	Rot	Mult	Focus
991111	103	--	--	1.0000	none
991111	206	--	--	-1.0000	none

OPD SUMMARY *****

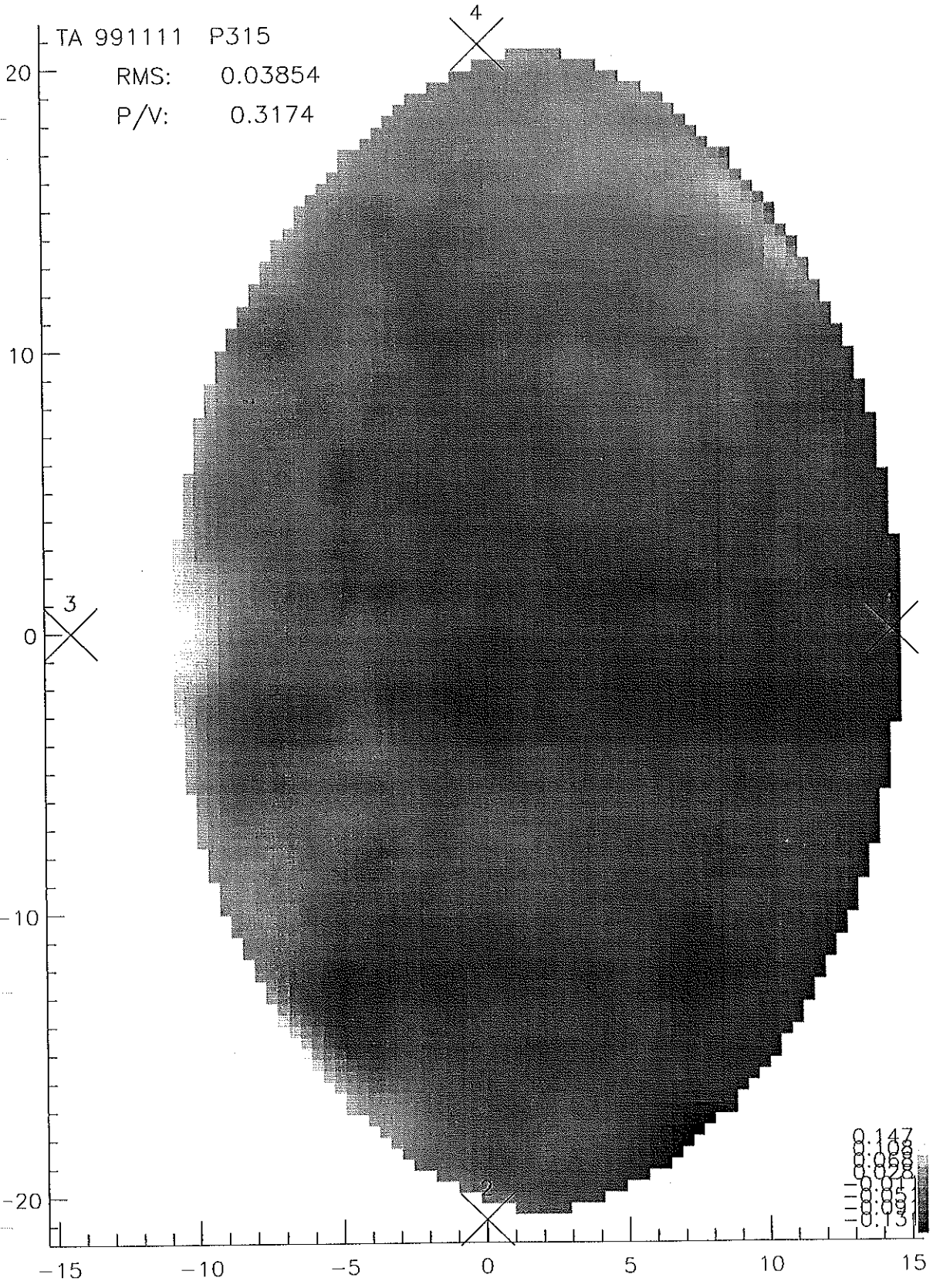
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid	Peak	Valley	RMS
								pts	pts		
991111103	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	-0.185	0.047
991111206	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6212	6212	-0.185	0.047
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6681	5878	-0.145	0.019

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2 1S 2S 3S	Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
991111103	0.045	0.321	38 72 94 99	0.051	0.029	0.020	0.020	0.016	0.014
991111206	0.043	0.409	38 72 94 99	0.059	0.034	0.019	0.019	0.017	0.014
999999999			46 76 95 98	0.015	0.015	0.014	0.014	0.014	0.013

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	ang
991111103	-0.120	0.292	61.4	0.142	0.085	24.4	0.076
991111206	-0.112	0.351	59.4	0.169	0.135	26.9	0.112
999999999	-0.023	0.038	-44.3	0.021	0.014	-21.3	0.051

100m ΔX
NONE

TA 991111 P315
RMS: 0.03854
P/V: 0.3174



***** WAVEFRONT COMBINATION PROCESS started at 9911121516 *****

WAVEFRONT COMBINATION PARAMETERS
 combination type: add area: common aggregate focus: none

TA	Pic	Flip	Rot	Mult	Focus
991111	103	--	--	1.0000	none
991111	210	--	--	-1.0000	none

OPD SUMMARY *****

TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid		Peak	Valley	RMS
								pts	pts			
99111103	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047
991111210	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	5895	5895	0.169	-0.185	0.046
9999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6681	5193	0.167	-0.150	0.039

TA/PIC	Diff. RMS	Corr. ind.	--Barchart--			Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
			S/2	1S	2S 3S						
99111103	0.040	0.590	38	72	94 99	0.051	0.029	0.020	0.020	0.016	0.014
991111210	0.043	0.500	38	73	94 98	0.064	0.038	0.023	0.023	0.016	0.014
9999999999			35	69	95 98	0.036	0.028	0.021	0.021	0.016	0.014

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	ang	ang		
									99111103	-0.120
991111210	-0.213	0.332	74.5	0.196	20.9	-0.001	0.155	13.8	0.069	-42.8
9999999999	0.091	0.152	6.9	0.113	168.7	-0.007	0.142	52.4	0.063	-22.2

***** WAVEFRONT COMBINATION PROCESS started at 9911121515 *****

WAVEFRONT COMBINATION PARAMETERS
 combination type: add area: common aggregate focus: none

TA	Pic	Flip	Rot	Mult	Focus
991111	103	--	--	1.0000	none
991111	211	--	--	-1.0000	none

OPD SUMMARY *****

TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid	Peak	Valley	RMS	
								pts	pts			
991111103	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047
991111211	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6053	6053	0.169	-0.185	0.047
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6681	5503	0.110	-0.130	0.028

TA/PIC	Diff. RMS	Corr. ind.	--Barchart-- S/2	1S	2S	3S	Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
991111103	0.044	0.412	38	72	94	99	0.051	0.029	0.020	0.020	0.016	0.014
991111211	0.041	0.505	37	72	94	99	0.069	0.037	0.019	0.019	0.017	0.013
999999999			41	72	95	98	0.020	0.018	0.018	0.018	0.018	0.017

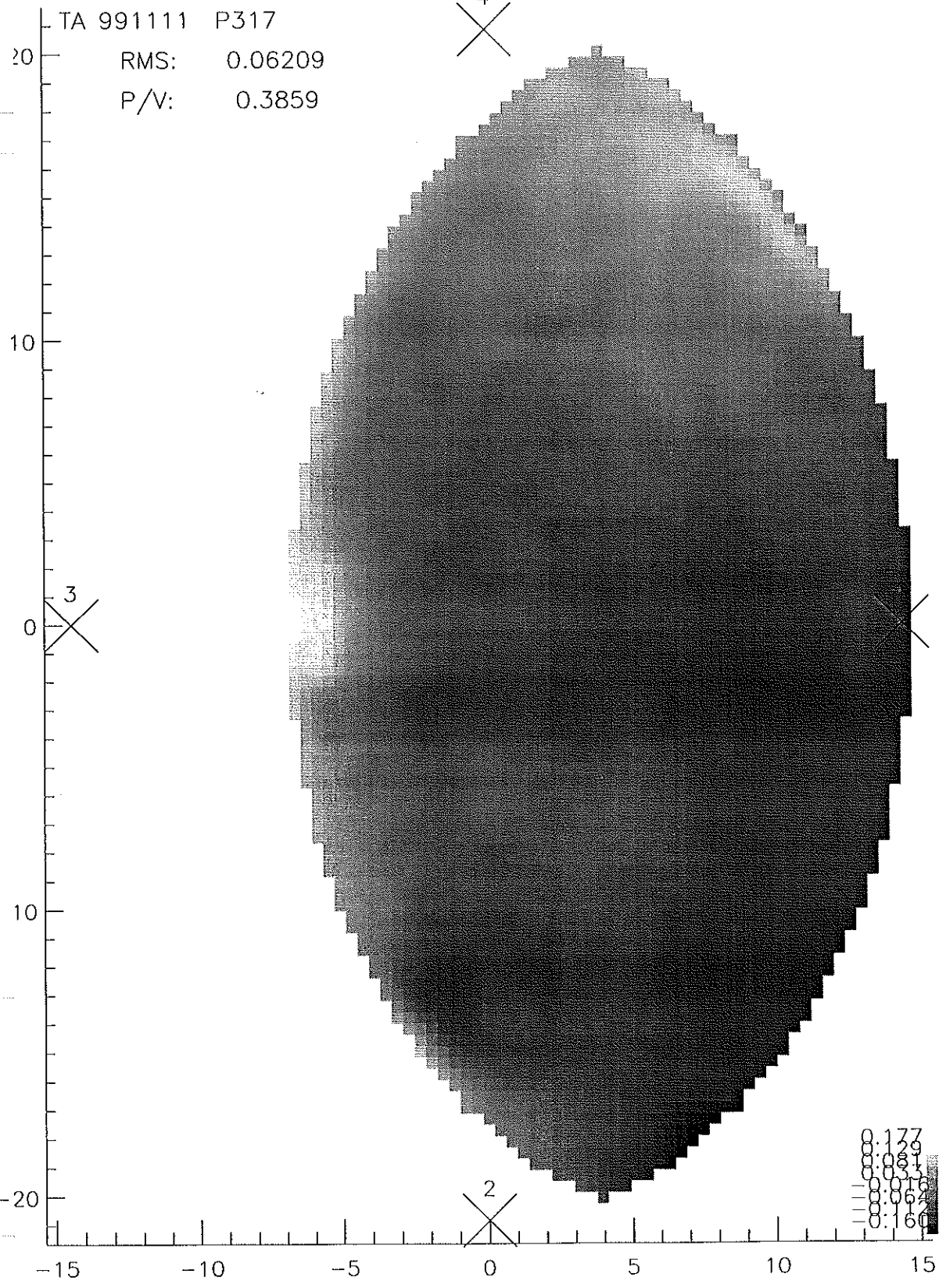
TA/PIC	Power mag	Astig mag	ang	Coma mag	ang	Spher mag	ang	Trefoil mag	ang	Tetra mag	ang
991111103	-0.120	0.292	61.4	0.142	26.1	-0.001	0.085	24.4	0.076	-42.0	
991111211	-0.124	0.409	57.2	0.186	23.2	-0.012	0.188	28.0	0.140	-43.7	
999999999	-0.038	0.075	-47.5	0.027	160.4	-0.004	0.045	-25.4	0.069	-4.5	

20cm ΔX
NOISE

TA 991111 P317

RMS: 0.06209

P/V: 0.3859



0.177
0.169
0.161
0.153
0.145
0.137
0.160

***** WAVEFRONT COMBINATION PROCESS started at 9911121514 *****

WAVEFRONT COMBINATION PARAMETERS
 combination type: add area: common aggregate focus: none

TA	Pic	Flip	Rot	Mult	Focus
991111	103	--	--	1.0000	none
991111	220	--	--	-1.0000	none

OPD SUMMARY *****

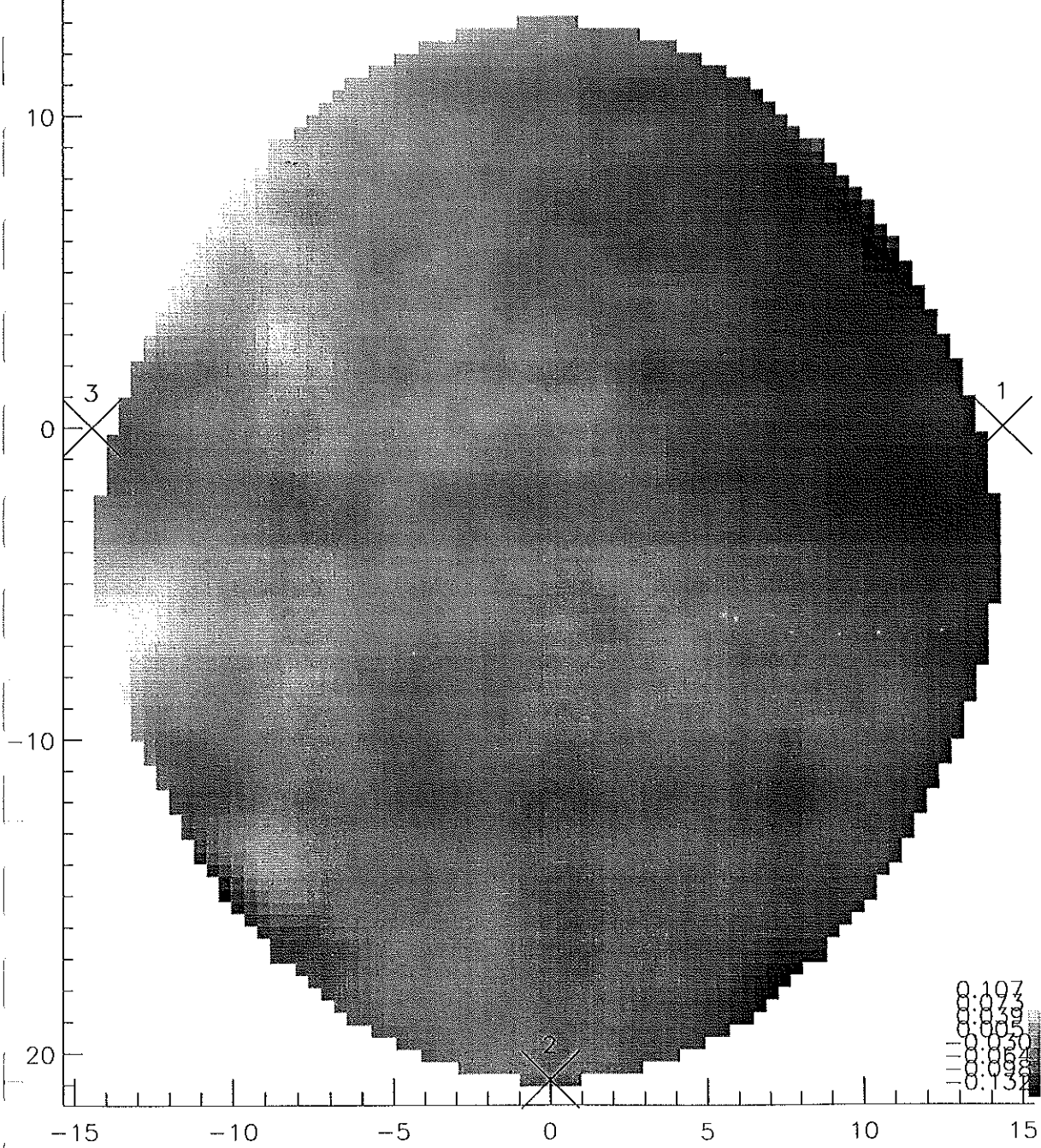
TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid		RMS
								pts	pts	
991111103	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169
991111220	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	5101	5101	0.111
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6681	4153	0.202

TA/PIC	Diff. RMS	Corr. ind.	--Barchart--			Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
			S/2	1S	2S						
991111103	0.041	0.748	38	72	94	99	0.051	0.029	0.020	0.020	0.016
991111220	0.045	0.697	39	74	94	98	0.092	0.050	0.031	0.031	0.013
999999999			32	66	96	99	0.067	0.045	0.039	0.038	0.019

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil		Tetra			
					ang	mag	ang	mag		
991111103	-0.120	0.292	61.4	0.142	26.1	-0.001	0.085	24.4	0.076	-42.0
991111220	-0.426	0.602	84.9	0.335	16.1	-0.006	0.262	9.6	0.041	41.7
999999999	0.217	0.432	0.6	0.194	164.6	-0.017	0.343	51.1	0.103	-19.2

20cm $\Delta\theta$
NONE

TA 991111 P318
RMS: 0.04254
P/V: 0.2734



0.107
0.074
0.050
0.027
0.009
0.003
0.001

***** WAVEFRONT COMBINATION PROCESS started at 9911121513 *****

WAVEFRONT COMBINATION PARAMETERS
 combination type: add area: common aggregate focus: none

TA	Pic	Flip	Rot	Mult	Focus
991111	103	--	--	1.0000	none
991111	221	--	--	-1.0000	none

OPD SUMMARY *****

TA/PIC	Title	X	Y	XST	YST	XINC	YINC	Exist Valid		Peak	Valley	RMS
								pts	pts			
991111103	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	6253	6253	0.169	-0.185	0.047
991111221	Magellan Tertiary Mi	079	111	-15.354	-21.653	0.39370	0.39370	5575	5575	0.169	-0.167	0.047
999999999	AGGREGATE	079	111	-15.354	-21.653	0.39370	0.39370	6681	4759	0.124	-0.149	0.043

TA/PIC	Diff. RMS	Corr. ind.	--Barchart--			Power rms	Astig rms	Coma rms	Spher rms	Tref rms	Tetra rms
			S/2	1S	2S						
991111103	0.043	0.549	38	72	94	99	0.051	0.029	0.020	0.020	0.016
991111221	0.039	0.612	37	72	94	99	0.091	0.044	0.025	0.021	0.012
999999999			37	65	96	99	0.027	0.021	0.019	0.018	0.016

TA/PIC	Power mag	Astig mag	Coma mag	Spher mag	Trefoil mag	Tetra mag	ang	ang		
									991111103	-0.120
991111221	-0.095	0.511	50.0	0.218	20.9	-0.012	0.371	28.4	0.233	44.5
999999999	-0.088	0.161	-53.1	0.054	-150.6	-0.004	0.134	-29.7	0.095	-6.1