

## No. 61 SELENODETTIC MEASURES ON YERKES LUNAR PHOTOGRAPH NO. 1170

by D. W. G. ARTHUR

July 17, 1965

### ABSTRACT

Details are given of 1538 coordinate measurements on Yerkes lunar photograph No. 1170. The catalog lists the refraction-free photographic coordinates of 1099 points on the disk. The selenographic coordinates of the projections of these on the spherical lunar datum are also listed. The limb of this photograph is represented by the refraction-free rectangular and polar coordinates of 439 points on the profile.

### *1. The Photograph*

Yerkes 1170 was obtained by E. Moore using the full aperture of the 40-in. refractor of the Yerkes Observatory at  $5^{\text{h}}49^{\text{m}}32^{\text{s}}$  UT on July 8, 1960. The phase was close to full with the terminator just outside the walled plain Riccioli.

The resolution is quite good and considerably above that of the average full-moon photograph obtained at Yerkes, where the relatively high northern latitude does not favor lunar photography at this phase. The limb on 1170 is so sharply defined that it was decided to make a detailed survey. Accordingly, 439 points of the profile were measured. The coordinates so obtained supplement the surveys of Hayn (1907), Weimer (1952), Nefedyev (1957), and Watts (1963).

The photograph carries a star trail for orientation. The measures and reductions for this will be given in a later paper.

### *2. The Measuring Equipment*

All measures on 1170 were made with the Mann 422-C of this laboratory. This is a two-screw machine

in which the plate moves on double cross slides, while the optical system remains stationary. The latter consists of a microscope whose power may be varied from  $\times 12$  to  $\times 20$ . The microscope is equipped with four interchangeable measuring marks, but as supplied by the manufacturer, none of these marks are very suitable for measures on lunar photographs.

The comparator screws are coupled through 10:1 gears to Coleman digitizers. Careful tests indicate that these gears do not introduce errors larger than 1 micron. The digitizers are six-place models and, hence, read to a single micron. The digitizing equipment includes a keyboard on which a seven-digit identifying number may be set. The screw readings and this number are transferred to paper tape by a Frieden punch unit. The comparator was calibrated in the summer of 1964 to determine an approximate scheme of corrections to reduce the effects of the errors of construction. This calibration was to some extent hampered by residual thermal effects that could not be entirely suppressed despite the fact that the comparator is housed in a windowless interior room which is air-conditioned to a nominal

temperature of 70° F. On hot summer afternoons, temperatures sometimes rose to 74° F, but measures were suspended at 73° F, so that the mean temperatures for the calibration measures can be assumed to be 71.5° F. The mean temperature for the measures on 1170 was a little lower, at 71.0° F.

The calibration measures were made on a precise glass scale and on two special reversible templates. The latter were used to detect and measure way errors. Since the parallel ways are relatively widely spaced, it was assumed that vertical errors in these ways would not appreciably affect the measures. With this assumption, the errors are limited to those originating from the screws and the horizontal curvatures of the ways. Thus, the plate may be regarded as a plane rigid body moving in its own plane, and all possible movements can be interpreted as rectangular cartesian displacements of one particular point together with a rotation  $\alpha$  about this point. Note that  $\alpha$  is the sum of two independent rotations, one of which arises from errors in the  $X$ -ways, while the other arises from errors in the  $Y$ -ways. From these considerations, it follows that the comparator errors can be expressed in the forms

$$\left. \begin{aligned} \delta X &= f(X) + g(Y) + (Y - Y_0)h(X) \\ \delta Y &= \theta(X) + \varphi(Y) + (X - X_0)\psi(Y) \end{aligned} \right\} \quad (2.1)$$

in which the functions  $f$  and  $\varphi$  correspond approximately to screw errors while  $g$  and  $\theta$  represent the way errors. The rotation functions  $h$  and  $\psi$  have a more derived character and are not really independent of the way errors, but have been so treated in our calibration. The gross overconstraints present in the 422-C preclude any determination of  $h$  and  $\psi$  as derived functions of  $g$  and  $\theta$ . The readings  $X_0$  and  $Y_0$  correspond to the point about which the plate rotates and are quite arbitrary. In our calibration they were assigned the values  $X_0 = 125.000$  mm and  $Y_0 = 125.000$  mm, corresponding to the middle of each run. The six functions  $f, g, \dots, \psi$  were determined with considerable redundancy at 5-mm intervals. The correction program interpolates linearly between the nearest values on either side of the reading. This rather rough method of interpolation is quite justified by the flatness of the error curves. The irregular screw errors were found to be quite small, not exceeding 2 microns; but the  $Y$ -way errors showed an error of 6 microns, arising largely from a departure from perpendicularity of the  $X$ - and  $Y$ -ways.

It may be remarked that (2.1) is not a perfect model for the errors found in the calibration, since it

fails to represent these by about 2 or 3 microns; the exact amount was somewhat masked by thermal effects. However, (2.1) has been accepted for the present.

### 3. Organization of the Measures

Since a relatively large number of points were measured in two orientations on 1170, careful organization was necessary to avoid mistakes. The plate was an original negative with good pictorial content, so the use of fiducial marks in the plane of the emulsion was avoided. The measures in the two orientations were combined by using the measured points themselves.

To avoid needless repetition, each complete set of measures in one orientation is here called a *round*. Two such rounds with orientations differing by about 180° were observed for 1170. In the first (direct) round the measures were guided by reference to marked enlargements on which the more important points were also numbered. In starting the second (reverse) round, two of these numbered points were again identified and measured. The two sets of coordinates for the same points were then used in a computer program to determine the coefficients of the transformation,

$$\left. \begin{aligned} x_2 &= x_1 \cos \theta - y_1 \sin \theta + h \\ y_2 &= y_1 \cos \theta + x_1 \sin \theta + k \end{aligned} \right\} \quad (3.1)$$

and the predicted comparator readings  $(x_2, y_2)$  for the second round were printed out. This printout was used to identify the points taken into the first round, so that in the second round it was possible to measure the points in exactly the same sequence as the first round. Since many of the measured points were not numbered or identified, this identity of sequence was essential in the reductions of the measures.

### 4. The Measures

The measures were made by the author on the original negative of 1170. As already indicated, these were made in two rounds with orientations differing by approximately 180°. During each round the plate remained in the comparator the whole time and was not disturbed in any way.

In each round each point was measured four times. This repetition may have increased the precision to some extent, but its real purpose was to facilitate the editing of the raw measures. The screws were backed off three full turns between successive measures.

Most of the points were measured by simple bisection, but the larger craters were tangented, that is, the measuring mark (a simple cross with horizontal and vertical arms) was placed in two diametrically opposite positions relative to the crater, such that in each position its horizontal and vertical arms tangented the crater rim. The mean of the two positions corresponds to the center of the rim.

For the extremely elongated ellipses of large craters near the limb a third method was used, the mark then being placed at the estimated ends of the major axis of the ellipse. Again, the mean corresponds to the center of the rim. In the second and third methods, the measures were alternated between the two positions.

### 5. Editing the Rounds

The raw measures for each round were printed out and inspected visually to detect (i) garbled punchings, (ii) spurious readings, (iii) incomplete sets, (iv) redundant sets, (v) points measured by the second and third methods.

Since for each point measured by simple bisection four consecutive very similar readings must be present, it was simple to detect garbled punching and spurious readings. Points for which there were too few or too many readings were also obvious. Incomplete sets were reobserved, while in the case of points with more than four readings only the last four were retained. Points that were measured by the second and third methods revealed themselves by their values alternating between two positions. The original cards for these were replaced by four new cards carrying the means.

The net result of this stage was a deck of cards for the round, in which each point is represented by four consecutive cards.

### 6. Condensation and Correction of the Round

The cleaned-up deck for the round was then subjected to a computer run in which the four readings were meaned and calibration corrections applied to the means. The result was a deck in which each point was represented by a single card.

### 7. Combination of the Rounds

The appropriate transformation to convert the measures of Round II to the system of Round I is

$$\left. \begin{aligned} x_1 &= x_2 \cos \theta - y_2 \sin \theta + h \\ y_1 &= y_2 \cos \theta + x_2 \sin \theta + k \end{aligned} \right\} \quad (7.1)$$

The method of least squares may be applied directly to the equations of (7.1), treating  $\cos \theta$  and  $\sin \theta$  as independent unknowns. However, it should be noted that in general these functions will not be consistent and must be normalized by the square root of the sum of their squares. The resulting values of  $h$ ,  $k$ , and  $\theta$  are then identical with those obtained in a rigorous application of the method of least squares. In this case, 33 points were used to determine the coefficients of (7.1). Denoting the transformed values for the second round by  $(x_1', y_1')$ , the residual differences are

$$\begin{aligned} v_x &= x_1 - x_1' \\ &= x_1 - (x_2 \cos \theta - y_2 \sin \theta + h), \\ v_y &= y_1 - y_1' \\ &= y_1 - (y_2 \cos \theta + x_2 \sin \theta + k). \end{aligned}$$

The coordinate values and the residual differences for the 33 points are given in Table 1. The root-mean-square values are 12.5 and 16.3 microns. Hence, applying the Bessel factor

$$\sqrt{(33/30)} = 1.049$$

together with the factor  $1/\sqrt{2}$  to allow for two coordinate errors in each difference, the estimates of the standard errors for a single round are

$$\begin{aligned} \sigma_x &= 9.3 \text{ microns,} \\ \sigma_y &= 12.1 \text{ microns.} \end{aligned}$$

### 8. Final Editing of the Measures

After the residual differences of Table 1 had been inspected, the measures of Round II were transformed by (7.1). The same program also produced the mean coordinates

$$\begin{aligned} x &= \frac{1}{2} (x_1 + x_1'), \\ y &= \frac{1}{2} (y_1 + y_1'), \end{aligned}$$

and printed out the values  $x$ ,  $y$ ,  $x_1$ ,  $y_1$ ,  $x_1'$ ,  $y_1'$ ,  $v_x$ ,  $v_y$ . Values of 30 microns or more were marked with asterisks so that they would not escape notice.

In view of the diversity in the nature of the measured points, rejection limits were not applied automatically. Instead, all points with differences exceeding 30 microns were examined again in the comparator. For some the differences were judged acceptable. Others were reobserved in Round II. In all cases, except those marked with asterisks in the catalog, the means are those of pairs that do not differ by more than 30 microns. Multiplying the standard errors of a single round by  $1/\sqrt{2}$ , the standard errors of the means of the two rounds are

TABLE 1  
LEAST SQUARES FIT OF REVERSE READING TO DIRECT READINGS\*

ROUND I (DIRECT)		ROUND II (REVERSE)		RESIDUALS I-II	
+ 29.1377	- 4.4389	+ 29.1450	- 4.4256	-0.0073	-0.0133
+ 22.4793	+ 4.8048	+ 22.4834	+ 4.8253	-0.0042	-0.0205
+ 19.4073	+ 1.0254	+ 19.4103	+ 1.0253	-0.0030	0.0000
+ 35.8751	+14.6898	+ 35.8705	+14.6966	+0.0046	-0.0068
+ 10.0446	-85.6354	+ 10.0322	-85.6325	+0.0125	-0.0029
+ 27.1883	-89.4665	+ 27.1861	-89.4618	+0.0023	-0.0046
- 34.6428	-57.1859	- 34.6483	-57.2104	+0.0055	+0.0245
- 55.5596	+33.6706	- 55.5706	+33.6583	+0.0110	+0.0123
- 50.8322	+29.3351	- 50.8282	+29.3615	-0.0040	-0.0264
- 51.3256	+45.7537	- 51.3289	+45.7603	+0.0032	-0.0066
- 45.5753	+53.1222	- 45.5224	+53.1722	-0.0530	-0.0501
+ 60.3541	+85.7758	+ 60.3565	+85.7839	-0.0024	-0.0081
+103.2097	+59.7493	+103.2167	+59.7469	-0.0070	+0.0024
+108.6789	+ 9.9490	+108.6679	+ 9.9610	+0.0110	-0.0120
- 12.2915	-79.0778	- 12.3202	-79.0964	+0.0287	+0.0186
- 6.8767	-75.1083	- 6.8746	-75.1239	-0.0021	+0.0155
- 34.6469	-53.5939	- 34.6664	-53.6214	+0.0195	+0.0275
- 47.2650	-46.1388	- 47.2725	-46.1601	+0.0075	+0.0213
- 39.2380	-32.9156	- 39.2379	-32.9285	-0.0001	+0.0129
- 49.3841	-24.1920	- 49.3801	-24.2106	-0.0040	+0.0186
- 43.2442	-27.1259	- 43.2478	-27.1386	+0.0037	+0.0126
- 51.0405	-20.9099	- 51.0324	-20.9205	-0.0082	+0.0106
- 59.3576	+ 7.5476	- 59.3574	+ 7.5399	-0.0003	+0.0077
- 57.0473	+14.6212	- 57.0417	+14.6139	-0.0055	+0.0073
- 59.4063	+20.4748	- 59.4047	+20.4575	-0.0016	+0.0173
+ 54.6055	+ 8.0989	+ 54.5960	+ 8.1063	+0.0095	-0.0075
+ 41.6683	+14.6310	+ 41.6675	+14.6438	+0.0008	-0.0129
+ 42.8915	+11.4689	+ 42.8894	+11.4723	+0.0021	-0.0034
+ 36.2634	+14.8193	+ 36.2602	+14.8176	+0.0031	+0.0017
+ 55.3299	+89.5817	+ 55.3389	+89.5759	-0.0090	+0.0058
+ 18.9223	+ 5.8114	+ 18.9189	+ 5.8233	+0.0034	-0.0119
+ 11.4561	- 8.4923	+ 11.4686	- 8.4877	-0.0125	-0.0047
+ 20.2232	+79.3518	+ 20.2247	+79.3746	-0.0015	-0.0228

\*All coordinates and residuals are given in millimeters. Coordinates reduced to centroid.

$$\sigma_x = 6.6 \text{ microns,}$$

$$\sigma_y = 8.6 \text{ microns.}$$

These estimates must be on the optimistic side since they are derived from the better-than-average points used for combining the two rounds. Those who are interested may obtain fuller and less biased data from the catalog. It should be noted, however, that any figure obtained in this way shows only the dispersion in the measures themselves and does not reveal the errors due to seeing and photographic effects.

### 9. The Least Squares Fit to the Controls

The measures were fitted to the selenodetic control system of Schrutka-Rechtenstamm (1958), with 85 of his points. Table 2 gives the residual differences in the horizontal and vertical plate coordinates in units of the moon's radius (see *Comm. LPL* No. 60).

The root-mean-square values of 0.00020 and 0.00024, with a mean of 0.00022, correspond to about 20 microns in the plane of the photograph.

This is about three times larger than the internal value quoted in the last section. Undoubtedly, some of this extra dispersion comes from errors in the Schrutka-Rechtenstamm values, but at present it is not possible to say how much.

### 10. The Selenographic Coordinates and References

The selenographic positions, as the standard direction-cosines ( $\xi$ ,  $\eta$ ,  $\zeta$ ), were computed merely to provide the measured points with unambiguous identities in numerical form. These values correspond to the straight-line projection of the point on the mean spherical datum.

The  $\xi$  and  $\eta$  values, rounded to three places, were used to construct a reference for each point. This reference is a seven-figure number of the form

$$Q \xi_1 \eta_1 \xi_2 \eta_2 \xi_3 \eta_3,$$

in which  $Q$  is the number of the quadrant and the remaining symbols represent the first, second, and

TABLE 2  
LEAST SQUARES FIT TO SELENODETTIC CONTROLS

POINT		RESIDUALS*		POINT		RESIDUALS*	
Blagg and Müller	Consol. Catalog	$u'$	$v'$	Blagg and Müller	Consol. Catalog	$u'$	$v'$
12	19233	-10	+75	2396	36258	-8	-3
177	16446	-13	-1	2419	35356	-10	-38
182	16313	+29	+17	2491	34339	-15	-15
183	16315	+20	+14	2777	32550	+19	+44
199	16253	+15	+5	2831	33285	-19	-32
216	17152	-14	+22	2856	31290	+6	-20
267	15330	+20	-3	2880	32176	+13	+15
385	15610	+13	+10	2918	31161	+5	+10
391	15645 A	+10	-21	2920	31019	-20	+5
458	14732 A	-7	+2	2922	32022	-7	+3
482	14512	-10	+22	2933	30095	-3	-22
519	14229	+13	-12	2935	31043	-36	-5
537	13047	+25	-44	2947	30058	+46	-21
553	12094	-11	+2	2963	30114	-8	-7
561	12066	-4	+3	3004	31231	+25	-2
573	13113	+35	-3	3063	31338	-33	+38
587	13218	+18	+8	3550	41229	+12	+33
619	12387	+43	-17	3570	40370	-25	+6
622	13421	-5	-8	3606	41142	-12	-7
727	12731	+25	+21	3607	41025	+10	-9
819	12122	+8	-11	3609	41028	+2	-34
834	10093	+11	-24	3648	42061	+9	-29
835	11012	-6	-17	3651	42074	-22	-63
857	10002	+19	-6	3667	44001	+3	0
865	10016	+7	-4	3683	43100	-6	+4
895	10470	+7	-21	3736	41278	-6	+13
932	11606	+12	+22	3741	41268	+15	+42
965	11718	+17	-30	3780	41365	-13	-25
987	10950	+42	+32	3791	42359	+17	+20
1145	20497	+40	-5	3845	42559	-10	-2
1212	20141	+33	+1	4004	42697	+5	+12
1214	20115	-1	-8	4078	44475	-45	+46
1215	20155	-6	-40	4083 A	44443	-5	+12
1498	23021	-27	-10	4083 B	44494	-2	+7
1529	24197	-14	-6	4108	44339	-4	+31
1832	28112	+8	+19	4109	43483	-7	+29
1843	28178	-57	+1	4158	44229	+5	-41
1977	38081	-23	-18	4254	47033	+1	+20
1992	38049	-21	-37	4258 A	47099	-11	+21
2047	38411	+15	-25	4286	45057	-28	+11
2088	38243	+7	+62	4312	46135	-29	-1
2201	36533	+6	-28	4488	44761	-19	+19
				4690	49106	-45	+3

\*Residuals are stated in units of  $10^{-5}r$ .

third digits of the rounded  $\xi$  and  $\eta$  values. The catalog of points is arranged in order of increasing references.

### 11. The Refraction-Free Photographic Coordinates ( $x'$ , $y'$ )

The prime results of the measures and reductions are the refraction-free rectangular coordinates in the plane of the photograph. These are in millimeters. In the case of 1170, these are virtually the values as at exposure since the exposure temperature was  $22^\circ\text{C} = 72^\circ\text{F}$ , whereas the mean measuring temperature was  $71^\circ\text{F}$ . Temperature corrections have *not* been applied to the published results.

### 12. Computation of the Refraction

A slight error in the computation of the refractions should be noted. Since the Yerkes Observatory barometer was not functioning correctly during the LPL photographic program, we availed ourselves of the records of the Madison Airport Station of the Weather Bureau, which is about 70 miles from the observatory. The pressures at Madison should be within a few millimeters of those at Yerkes except in disturbed weather conditions in which lunar photography would not be attempted. The Madison pressures were reduced to sea level and, accordingly, a correction was made for the altitude (335 m) of the observatory.

Unfortunately, the programmer erred in using the Madison dry-bulb temperature of 60° F in place of the Yerkes temperature of 72° F to compute the differential refraction. The mistake does not produce errors in the coordinates of more than two units in the fifth place of the moon's radius, and for reasons of economy I have not recomputed the coordinates. The errors are quite unimportant but should nevertheless be noted.

### 13. The Limb Survey

On 1170 the profile of the limb was surveyed by coordinating 439 points. These correspond either to definite changes in direction of the profile or, in the smoother sections, to local maxima and minima in the radius.

Each point was measured only once by simple bisection, the mark being placed in the center of the zone of reduced density which lies outside the hard profile.

The measures were cleared of instrumental and refraction errors to obtain the refraction-free coordinates  $(x', y')$ , and then fitted with the circle

$$(x' - h)^2 + (y' - k)^2 = r^2 \quad (13.1)$$

by using the method of least squares. The solution, applied to all 439 points, minimized the sum

$$\Sigma [(x' - h)^2 + (y' - k)^2 - r^2]^2,$$

whereas in a more rigorous approach the sum of the squares of the normal deviations from the circle

$$\Sigma \left\{ \sqrt{[(x' - h)^2 + (y' - k)^2]} - r \right\}^2$$

would be minimized. However, in this case the errors of the measures are swamped by the irregularities of the limb, and the extra labor of the rigorous approach is not really worth while. The gross overdetermination ensures that the values formed for the parameters  $h$ ,  $k$ , and  $r$  do not differ appreciably from the correct least squares values. The solution gave the values

$$\begin{aligned} h &= 0.0696 \text{ mm,} \\ k &= 0.0101 \text{ mm,} \\ r &= 95.0374 \text{ mm.} \end{aligned}$$

Since the  $(x', y')$  system has its origin at the center of face determined by the 85 controls of Schrutka-Rechtenstamm, the parameters  $h$  and  $k$  represent the displacements in  $x'$  and  $y'$  of the center of the limb circle from the computed center of face. It will be noticed that the displacement in  $x'$  is appreciable.

The polar coordinates of the points of the profile are  $R$  and  $\theta$  where

$$\begin{aligned} R &= \sqrt{[(x' - h)^2 + (y' - k)^2]} \\ \text{and } \tan \theta &= (y' - k)/(x' - h) \end{aligned} \quad (13.2)$$

but in place of these it is preferred to give the position angle

$$P = \theta - 90^\circ \quad (13.3)$$

and the excess of radius

$$\delta r = R - r. \quad (13.4)$$

Thus  $\delta r$  is the normal deviation of the limb from the fitted circle, being positive when the limb lies outside this circle. The position angle  $P$  is measured counterclockwise from the north direction of the apparent first lunar meridian.

Note carefully that  $\delta r$  and  $P$  are not in the same system as  $(x', y')$  but are easily connected to this by the shifts  $h$  and  $k$ . The units for  $P$  and  $\delta r$  are degrees and millimeters respectively.

### 14. Description of the Main Catalog

The measures and reduced values for the 1099 points distributed over the disk are given in the main catalog under the heading POSITIONS ON THE DISK. Each entry is distributed over two facing pages. The left page gives the details of the measures and the right page gives the reduced values. For convenience, both pages carry the reference and serial number, the latter being a unique identification of the measure. This number is never repeated in the LPL selenodetic measures.

The means of Rounds I and II are given under the headings  $x$  and  $y$ . The semidifferences between the rounds are indicated by  $\delta x$  and  $\delta y$ , so the individual rounds may be reconstructed from

$$\begin{aligned} x_1 &= x + \delta x, & y_1 &= y + \delta y, \\ \text{and} & & & \\ x_2 &= x - \delta x, & y_2 &= y - \delta y. \end{aligned}$$

The weights are given for each coordinate and are objective estimates of the measurability of the feature, being computed from the internal dispersion in each round.

The variance of a single measure is computed from

$$\sigma^2 = (v_1^2 + v_2^2 + v_3^2 + v_4^2) / 3,$$

where the  $v_i$  are the deviations from the mean of the four measures in the round. Two estimates of this variance were obtained from Rounds I and II, and the mean of these was divided into the constant

$C = 40$  to derive the weight. To provide some protection against extreme sampling errors, no weight was allowed to exceed the value 9.9.

On the right page, the main catalog gives the refraction-free photographic coordinates  $x'$  and  $y'$  in millimeters. The origin is at the computed center of face and the  $y'$ -axis is aligned on the computed apparent first lunar meridian. The selenographic coordinates of the straight-line projection of the measured point on the lunar spherical datum are given as the standard direction-cosines  $\xi$ ,  $\eta$ , and  $\zeta$ .

### 15. Description of the Limb Catalog

The measures for the points of the limb profile are given in the second catalog, with the title LIMB PROFILE POSITIONS. The measures, corrected for comparator errors only, are denoted by  $x$  and  $y$  and are strictly comparable with the  $x$  and  $y$  of the points on the disk. The refraction-free photographic coordinates are given under the headings  $x'$  and  $y'$ . The position angles measured counterclockwise about the center of the limb circle from the north direction of the apparent first lunar meridian are given in degrees under the heading  $P$ . The normal deviation of the limb from the limb circle is given in millimeters under the heading  $\delta r$ .

### 16. Data for the Reduction of Yerkes 1170

The values quoted below were either adopted for the reduction of Yerkes 1170, or derived in the course of the computations and subsequently used.

LIBRATIONS:	$l' =$	$-0^{\circ}40,$
	$b' =$	$-5^{\circ}28,$
	$c' =$	$356^{\circ}24.$
GEODETIC:	$\rho =$	$0.99852,$
	$\phi =$	$+42^{\circ}57,$
	$\phi' =$	$+42^{\circ}38,$
	$L =$	$5^{\text{h}}54^{\text{m}}13^{\circ}.64 \text{ W.}$

SEMIDIAMETER:	$\pi =$	$61.3875,$
	$s =$	$1003''6,$
	$\sin s' =$	$0.004908.$
ATMOSPHERIC:	$b =$	$28.53,$
	$F =$	$60^{\circ} \text{ F.}$
REFRACTION:	$\sin ZD' =$	$0.877\ 436,$
	$\cos ZD' =$	$0.479\ 694,$
	$\sin Q' =$	$0.102\ 550,$
	$\cos Q' =$	$0.994\ 728,$
	$1/\kappa =$	$0.99886,$
	$1/\kappa' =$	$0.99974.$
LEAST SQUARES FIT:	$p =$	$+0.010\ 4679,$
	$q =$	$-0.001\ 0811,$
	$\mu =$	$0.010\ 5236.$

*Acknowledgments.* The selenodetic work reported in this paper has been supported by the Air Force Cambridge Research Laboratories, U.S. Air Force, under Contract AF19(628)-4332.

### REFERENCES

- Hayn, F. 1907, "Selenographische Koordinaten III," *Abh. Kaiserl. Sächs. Gessel. der Wiss. Math.-Phys. Kl.*, Vol. 30.
- Nefedyev, A. A. 1957, "Karty relyefa Krayevoy zony luny . . .," *Bull. Engelhardt Obs.*, Vol. 30.
- Schrutka-Rechtenstamm, G. 1958, "Neureduktion der 150 Mondpunkte der Breslauer Messungen von J. Franz," *Österr. Akad. Wiss. Math.-Naturw. Kl. Sitzber.*, Abt. II, Vol. 167.
- Watts, C. B. 1963, "The Marginal Zone of the Moon," *American Ephemeris and Nautical Almanac*, A. P. XVII.
- Weimer, T. 1952, *Atlas de Profile Lunaire*, Obs. de Paris.

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
1000271	135.2530	140.7294	0.0023	-0.0130	1.9 1.2	1
1002262	137.0748	140.6939	0.0020	-0.0018	2.9 1.6	2
1002700	136.7784	145.2877	-0.0046	0.0064	1.0 1.4	3
1003056	137.7798	139.1110	0.0081	-0.0029	0.9 2.1	4
1004537	138.9168	143.9221	0.0023	-0.0003	3.8 3.7	5
1004579	139.3067	144.0440	0.0015	0.0008	6.5 4.2	6
1004947	139.1861	147.6992	0.0041	-0.0080	4.3 1.9	7
1009311	143.2668	141.0851	0.0012	0.0049	1.4 1.3	8
1017958	142.7581	156.8808	-0.0069	-0.0047	0.6 0.9	9
1018383	143.6452	150.7073	-0.0079	-0.0022	1.5 1.7	10
1019190	144.5004	148.5416	0.0045	-0.0012	2.3 0.9	11
1025464	141.2588	161.2446	-0.0059	-0.0025	1.2 1.4	12
1027992	143.6761	165.5618	-0.0002	-0.0014	1.1 1.9	13
1033629	139.7133	172.9638	-0.0112	-0.0039	0.3 0.7	14
1047031	143.7350	175.5248	-0.0051	-0.0019	3.8 4.2	15
1047646	144.2159	181.4486	-0.0048	-0.0061	3.3 0.9	16
1064690	142.9345	198.7292	-0.0129	-0.0097	1.4 0.7	17
1065422	143.1159	197.1785	-0.0029	-0.0135	8.7 1.2	18
1066449	144.2200	197.6914	-0.0121	-0.0032	1.9 0.5	19
1069841	147.2504	200.2232	-0.0063	-0.0094	2.5 1.7	20
1075008	143.2514	202.9074	0.0038	-0.0078	0.6 1.2	21
1079791	148.1449	207.8735	-0.0029	-0.0017	1.3 1.8	22
1095066	144.6231	218.9841	-0.0070	-0.0010	0.5 0.9	23
1100641	144.7127	143.8629	0.0004	-0.0064	2.6 1.2	24
1101299	145.9353	140.6962	0.0010	-0.0018	2.2 0.7	25
1107113	150.7581	138.8613	0.0005	-0.0033	0.7 0.5	26
1114344	148.9275	150.4438	-0.0078	0.0009	0.4 3.2	27
1114389	149.4077	150.8913	-0.0025	-0.0056	1.2 1.2	28
1127981	153.1621	164.7405	-0.0072	-0.0088	2.7 4.1	29
1130249	146.3474	168.7799	-0.0057	-0.0026	1.1 1.3	30
1130348	146.3589	169.6361	-0.0062	-0.0130	2.9 6.8	31
1134036	149.8981	166.3614	0.0037	-0.0037	1.2 1.9	32
1134657	150.4256	171.9272	-0.0113	-0.0012	1.0 2.0	33
1135013	150.6172	166.0063	-0.0011	-0.0111	3.0 9.9	34
1137669	153.3803	171.8699	0.0010	-0.0042	1.3 0.7	35
1138429	153.8396	169.9994	-0.0147	-0.0017	0.4 1.6	36
1140243	146.8485	177.3509	-0.0034	-0.0026	3.2 1.2	37
1140778	147.4839	182.3091	0.0029	-0.0085	9.9 2.4	38
1143162	149.8502	176.1298	-0.0077	0.0002	1.0 1.6	39
1144077	150.8285	175.5885	0.0067	0.0082	1.9 1.6	40
1145008	151.1738	175.5865	-0.0021	0.0123	0.8 1.4	41
1146292	152.9970	176.7764	-0.0054	0.0000	2.2 0.7	42
1148615	154.4083	180.5047	-0.0047	-0.0081	1.0 0.7	43
1149083	155.7010	174.7796	0.0016	-0.0024	0.8 1.2	44
1154212	150.9025	185.9866	-0.0004	-0.0059	3.1 4.0	45
1154360	151.4619	186.5870	-0.0065	-0.0043	1.8 0.6	46
1154473	151.5537	187.7557	-0.0120	-0.0053	0.8 1.7	47
1156016	152.7432	184.3641	0.0039	0.0004	1.7 5.6	48
1160615	147.8997	198.8290	-0.0057	0.0028	1.1 3.0	49
1166876	154.1729	200.1352	0.0031	-0.0072	1.5 0.8	50
1171842	149.6124	208.6801	-0.0035	0.0037	1.1 4.5	51
1174647	152.4285	207.1684	-0.0005	-0.0007	1.8 2.9	52
1186398	155.0929	212.7175	-0.0032	-0.0098	3.2 1.8	53
1204043	157.6456	137.3282	0.0047	-0.0038	4.7 6.1	54
1206609	159.5861	143.3911	-0.0022	0.0097	1.6 1.9	55
1209479	162.9836	141.1382	-0.0020	0.0070	2.8 1.2	56
1211068	155.6620	147.4337	0.0037	0.0068	2.9 0.9	57
1211665	155.9543	152.7610	0.0013	-0.0069	1.2 1.0	58
1212271	156.7847	148.5361	-0.0045	-0.0038	1.5 2.2	59
1222924	157.2811	164.6060	0.0003	-0.0049	2.4 2.2	60
1226276	161.1472	157.9937	-0.0068	-0.0019	2.1 1.6	61
1226650	161.1851	161.1797	-0.0046	-0.0011	3.0 9.9	62
1226830	161.1541	162.9837	-0.0153	-0.0084	0.3 0.7	63
1229916	163.9101	164.2219	-0.0017	0.0032	1.7 2.4	64
1230961	156.3498	173.6177	0.0022	0.0020	0.3 0.9	65
1232160	157.7538	166.0686	-0.0108	-0.0024	2.3 7.5	66
1232632	157.7996	170.8673	-0.0003	0.0008	1.9 1.0	67
1234303	159.2420	168.0450	0.0024	0.0162	2.5 0.6	68
1233485	159.1496	169.1776	-0.0063	0.0146	3.4 2.9	69
1233671	159.1506	170.6122	0.0047	0.0010	0.9 2.5	70
1234432	159.5823	168.8987	-0.0090	-0.0110	1.6 1.0	71
1235315	160.2940	168.1825	0.0006	-0.0023	2.9 0.5	72
1236521	161.4158	169.5336	-0.0058	-0.0059	2.9 3.7	73

## POSITIONS ON THE DISK

1b

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
1000271	1.3473	10.7567	0.00717	0.02082	0.99976	1
1002262	3.1680	10.8403	0.02624	0.02175	0.99942	2
1002700	2.5712	15.4100	0.02000	0.07000	0.99735	3
1003056	3.9754	9.3049	0.03469	0.00561	0.99938	4
1004537	4.7951	14.1854	0.04329	0.05713	0.99743	5
1004579	5.1762	14.3326	0.04729	0.05870	0.99716	6
1004947	4.8163	17.9762	0.04354	0.09729	0.99430	7
1009311	9.3229	11.6353	0.09073	0.03052	0.99541	8
1017958	7.7800	27.3817	0.07471	0.19783	0.97739	9
1018383	9.0701	21.2724	0.08814	0.13265	0.98724	10
1019190	10.0655	19.1648	0.09856	0.11032	0.98900	11
1025464	5.9976	31.6432	0.05610	0.24351	0.96828	12
1027992	8.1276	36.1138	0.07853	0.29198	0.95320	13
1033629	3.6871	43.2496	0.03218	0.36935	0.92873	14
1047031	7.5335	46.0705	0.07260	0.40052	0.91341	15
1047646	7.6253	52.0197	0.07380	0.46616	0.88162	16
1064690	5.2141	69.1990	0.04948	0.65965	0.74994	17
1065422	5.4967	67.6617	0.05234	0.64202	0.76490	18
1066449	6.5652	68.2462	0.06359	0.64882	0.75828	19
1069841	9.4240	70.9733	0.09381	0.68061	0.72661	20
1075008	5.2566	73.3936	0.05026	0.70825	0.70417	21
1079791	9.8155	78.6742	0.09865	0.77119	0.62892	22
1095066	5.5722	89.5436	0.05563	0.90609	0.41941	23
1100641	10.5841	14.5047	0.10396	0.06096	0.99271	24
1101299	12.0119	11.4210	0.11891	0.02856	0.99249	25
1107113	16.9459	9.9029	0.17064	0.01330	0.98524	26
1114344	14.3598	21.3540	0.14360	0.13417	0.98050	27
1114389	14.8097	21.8324	0.14832	0.13934	0.97907	28
1127981	17.6497	35.9127	0.17839	0.29118	0.93989	29
1130249	10.5830	39.5030	0.10436	0.32904	0.93853	30
1130348	10.5384	40.3591	0.10392	0.33836	0.93526	31
1134036	14.2856	37.3188	0.14313	0.30583	0.94127	32
1134657	14.4474	42.9134	0.14501	0.36681	0.91892	33
1135013	15.0266	37.0111	0.15090	0.30261	0.94109	34
1137669	17.4003	43.0491	0.17600	0.36885	0.91267	35
1138429	17.9813	41.2105	0.18203	0.34888	0.91932	36
1140243	10.5215	48.0981	0.10401	0.42314	0.90007	37
1140778	10.8309	53.0926	0.10747	0.47844	0.87152	38
1143162	13.5976	47.0741	0.13624	0.41232	0.90080	39
1144077	14.6096	46.5973	0.14684	0.40724	0.90144	40
1145008	14.9544	46.6179	0.15046	0.40753	0.90071	41
1146292	16.6962	47.9255	0.16879	0.42227	0.89062	42
1148615	17.8606	51.7422	0.18119	0.46472	0.86672	43
1149083	19.5260	46.1073	0.19843	0.40287	0.89349	44
1154212	14.0022	56.9896	0.14095	0.52240	0.84097	45
1154360	14.5211	57.6260	0.14643	0.52963	0.83550	46
1154473	14.5362	58.7995	0.14666	0.54280	0.82696	47
1156016	15.9458	55.4889	0.16127	0.50601	0.84732	48
1160615	10.1635	69.6229	0.10147	0.66512	0.73981	49
1166876	16.3394	71.3373	0.16650	0.68628	0.70802	50
1171842	11.2274	79.5758	0.11359	0.78229	0.61247	51
1174647	14.1374	78.2495	0.14404	0.76711	0.62514	52
1186398	16.4332	83.9669	0.16896	0.83763	0.51945	53
1204043	23.9211	8.8210	0.24382	0.00340	0.96982	54
1206609	25.4606	15.0044	0.26001	0.06907	0.96313	55
1209479	28.9995	12.9756	0.29715	0.04864	0.95359	56
1211068	21.2790	18.7868	0.21615	0.10816	0.97035	57
1211665	21.2216	24.1277	0.21562	0.16509	0.96242	58
1212271	22.3274	19.9613	0.22717	0.12090	0.96632	59
1222924	21.7699	36.0473	0.22164	0.29357	0.92989	60
1226276	26.0620	29.6941	0.26654	0.22608	0.93693	61
1226650	25.8911	32.8793	0.26483	0.26039	0.92847	62
1226830	25.7419	34.6795	0.26331	0.27983	0.92324	63
1229916	28.4116	36.0964	0.29140	0.29604	0.90964	64
1230961	20.2498	44.9890	0.20598	0.39076	0.89715	65
1232160	22.1458	37.5393	0.22563	0.30986	0.92362	66
1232632	21.8771	42.3360	0.22297	0.36210	0.90508	67
1234303	23.5017	39.6108	0.23993	0.33277	0.91197	68
1233485	23.3353	40.7362	0.23822	0.34500	0.90787	69
1233671	23.2423	42.1694	0.23730	0.36064	0.90201	70
1234432	23.7854	40.4859	0.24294	0.34240	0.90760	71
1235315	24.5427	39.8169	0.25087	0.33532	0.90809	72
1236521	25.5739	41.2398	0.26176	0.35116	0.89898	73

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
1237603	162.2776	170.5594	0.0019	-0.0048	1.1 1.3	74
1237703	162.3598	171.4377	0.0025	0.0006	2.9 0.4	75
1237844	162.7534	172.4191	0.0020	0.0026	2.4 1.1	76
1238001	162.8642	164.7401	0.0077	-0.0005	0.9 1.1	77
1238760	163.8154	171.0073	-0.0113	0.0116	0.4 0.2	78
1240146	156.2767	175.9038	0.0002	-0.0008	0.4 0.7	79
1241243	157.3246	176.4826	-0.0025	0.0057	0.7 0.9	80
1241874	157.9377	181.9435	0.0030	-0.0077	1.1 3.6	81
1242227	158.1198	176.7940	-0.0061	-0.0046	0.3 0.8	82
1242518	158.1209	179.5675	0.0039	0.0030	1.7 2.1	83
1245437	161.1260	178.3096	-0.0065	0.0033	1.9 0.5	84
1245880	161.7616	181.2042	-0.0113	-0.0181	0.6 3.1	85
1246154	162.0597	175.2547	-0.0047	0.0003	0.8 1.3	86
1246396	162.5294	177.1611	0.0007	0.0038	0.8 0.8	87
1246598	162.6516	179.1438	0.0079	0.0122	0.7 1.0	88
1247352	163.1639	176.7583	-0.0011	0.0021	1.3 1.1	89
1247535	163.0906	178.8267	0.0041	0.0043	1.5 0.9	90
1248474	164.3699	177.6939	-0.0094	0.0092	1.1 2.0	91
1248865	164.4796	181.4063	-0.0012	0.0118	0.4 0.5	92
1249511	164.7293	178.2954	-0.0128	0.0102	0.8 0.1	93
1250344	156.9272	186.5158	-0.0016	-0.0048	1.1 0.5	94
1251018	157.4670	184.0865	-0.0076	-0.0093	7.1 6.2	95
1256359	162.7092	186.3929	-0.0004	0.0025	0.4 0.8	96
1257314	163.3003	185.9058	-0.0092	0.0066	0.3 0.9	97
1259008	164.9601	183.4045	0.0021	0.0072	0.7 2.4	98
1259234	165.2959	184.8246	0.0030	0.0076	0.9 1.4	99
1260406	157.1261	196.3556	-0.0090	-0.0016	0.6 0.8	100
1260793	158.0904	198.6455	0.0001	-0.0015	2.5 3.2	101
1270195	158.3277	202.2143	-0.0028	0.0028	3.0 1.2	102
1272162	159.9431	201.7741	-0.0130	0.0040	3.2 3.0	103
1272255	159.9255	202.8927	-0.0042	-0.0003	2.3 3.6	104
1274107	161.2544	202.0995	-0.0028	0.0107	1.7 0.7	105
1277926	164.6898	208.3644	-0.0071	0.0016	1.2 0.4	106
1281599	159.8851	213.8886	0.0032	0.0068	2.4 2.6	107
1282038	160.0424	209.7886	-0.0118	0.0012	0.6 2.6	108
1282415	160.0428	212.8053	-0.0097	-0.0002	1.0 1.0	109
1283696	161.8163	214.1965	-0.0018	0.0041	0.7 0.6	110
1285759	163.3999	215.0043	-0.0034	-0.0020	1.3 1.1	111
1285804	162.9284	215.4468	-0.0050	-0.0002	0.4 0.6	112
1287033	164.7329	208.8549	0.0040	0.0091	1.1 1.3	113
1290212	158.3793	218.8043	-0.0045	0.0029	0.5 9.9	114
1291024	159.3540	217.4045	-0.0046	0.0086	0.5 6.9	115
1292203	160.2297	218.5969	-0.0129	0.0045	0.6 1.5	116
1302127	165.1368	137.9252	-0.0046	0.0059	1.5 1.4	117
1304810	167.3472	143.6476	-0.0086	0.0050	8.5 1.0	118
1305650	168.5036	141.6991	-0.0003	-0.0104	1.4 1.8	119
1306658	169.5390	142.3121	0.0027	-0.0026	0.6 0.5	120
1311345	165.1253	149.1262	-0.0005	0.0089	1.2 1.4	121
1312236	165.8579	148.1610	0.0082	-0.0061	1.1 1.4	122
1312699	166.6836	152.1475	0.0129	0.0034	3.3 2.4	123
1313988	167.7452	154.6967	0.0040	0.0007	1.0 1.2	124
1314498	168.5340	149.9960	0.0129	-0.0028	4.8 3.3	125
1316758	170.2016	152.6026	0.0061	-0.0002	1.8 1.4	126
1317280	171.0855	147.1166	0.0011	0.0023	0.6 2.5	127
1318153	171.6741	146.3703	0.0115	0.0044	1.5 0.9	128
1318428	171.5758	149.6668	0.0106	-0.0038	7.5 1.3	129
1318992	172.5786	153.6788	-0.0013	0.0028	0.4 0.6	130
1321081	165.8736	155.2421	0.0044	0.0017	3.1 2.8	131
1321856	166.0823	163.1019	0.0057	0.0038	1.2 2.1	132
1323594	168.1970	159.8994	0.0064	-0.0043	1.3 2.0	133
1323662	167.9621	160.6855	0.0020	0.0001	4.4 2.3	134
1325303	169.0733	157.8585	0.0008	-0.0056	4.3 0.8	135
1326433	170.3878	158.6291	0.0036	-0.0067	3.5 4.1	136
1329295	173.6567	156.6265	0.0013	-0.0077	0.9 1.8	137
1332680	167.7425	169.7362	-0.0020	-0.0021	3.4 0.7	138
1334516	168.9625	169.2267	0.0077	0.0029	6.3 1.8	139
1335586	170.5776	169.0216	-0.0056	-0.0011	0.5 1.4	140
1336307	170.6647	167.2723	0.0029	-0.0026	1.0 1.1	141
1337641	172.0991	169.3247	0.0006	0.0005	0.5 1.6	142
1338397	173.3805	167.0268	0.0045	-0.0023	4.1 0.4	143
1338731	173.0216	170.1617	-0.0098	0.0049	0.9 0.9	144
1340276	166.1210	175.9088	-0.0001	-0.0083	5.7 0.7	145
1340529	165.7959	178.9269	0.0003	-0.0098	3.1 3.8	146

## POSITIONS ON THE DISK

2b

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
1237603	26.3669	42.3208	0.27013	0.36323	0.89168	74
1237703	26.3914	43.2036	0.27042	0.37291	0.88759	75
1237844	26.7200	44.2097	0.27391	0.38406	0.88174	76
1238001	27.3338	36.5457	0.28009	0.30056	0.91171	77
1238760	27.8725	42.8686	0.28597	0.36973	0.88403	78
1240146	20.0270	47.2680	0.20374	0.41577	0.88636	79
1241243	21.0351	47.9146	0.21435	0.42316	0.88034	80
1241874	21.2891	53.4099	0.21728	0.48413	0.84759	81
1242227	21.8084	48.2776	0.22249	0.42737	0.87627	82
1242518	21.6277	51.0483	0.22072	0.45798	0.86113	83
1245437	24.7097	49.9879	0.25305	0.44714	0.85793	84
1245880	25.1544	52.9211	0.25787	0.47986	0.83859	85
1246154	25.8417	46.9971	0.26481	0.41444	0.87070	86
1246396	26.1857	48.9323	0.26851	0.43593	0.85899	87
1246598	26.1777	50.9209	0.26853	0.45797	0.84744	88
1247352	26.8454	48.5713	0.27543	0.43216	0.85871	89
1247535	26.6367	50.6328	0.27333	0.45493	0.84754	90
1248474	27.9878	49.5846	0.28749	0.44378	0.84877	91
1248865	27.8541	53.3005	0.28628	0.48504	0.82630	92
1249511	28.3072	50.2090	0.29088	0.45082	0.84389	93
1250344	19.9809	57.9117	0.20379	0.53410	0.82049	94
1251018	20.6789	55.5200	0.21098	0.50750	0.83542	95
1256359	25.7603	58.1664	0.26455	0.53880	0.79982	96
1257314	26.3821	57.7184	0.27106	0.53398	0.80087	97
1259008	28.2028	55.3280	0.29006	0.50784	0.81115	98
1259234	28.4449	56.7686	0.29270	0.52410	0.79978	99
1260406	19.5347	67.7544	0.19978	0.64578	0.73693	100
1260793	20.3472	70.1050	0.20853	0.67319	0.70946	101
1270195	20.3502	73.6856	0.20890	0.71499	0.66720	102
1272162	21.9914	73.3513	0.22614	0.71167	0.66512	103
1272255	21.9005	74.4677	0.22530	0.72479	0.65109	104
1274107	23.2790	73.7620	0.23974	0.71703	0.65452	105
1277926	26.2974	80.2448	0.27237	0.79646	0.53987	106
1281599	21.1398	85.4497	0.21884	0.85874	0.46334	107
1282038	21.5654	81.3642	0.22264	0.80764	0.54603	108
1282415	21.3681	84.3778	0.22105	0.84517	0.48665	109
1283696	23.0472	85.8834	0.23907	0.86558	0.44001	110
1285759	24.5749	86.7937	0.25542	0.87877	0.40313	111
1285804	24.0753	87.2050	0.25024	0.88389	0.39512	112
1287033	26.3084	80.7376	0.27257	0.80254	0.53069	113
1290212	19.3146	90.2621	0.20073	0.92247	0.32978	114
1291024	20.3793	88.9273	0.21160	0.90444	0.37043	115
1292203	21.1752	90.1757	0.22040	0.92295	0.31558	116
1302127	31.3592	9.9065	0.32193	0.01702	0.94661	117
1304810	33.1905	15.7674	0.34121	0.07962	0.93661	118
1305650	34.4724	13.8964	0.35466	0.06028	0.93305	119
1306658	35.4657	14.5764	0.36511	0.06786	0.92849	120
1311345	30.6137	21.0953	0.31419	0.13538	0.93966	121
1312236	31.4082	20.1790	0.32253	0.12588	0.93815	122
1312699	31.9711	24.2153	0.32851	0.16919	0.92922	123
1313988	32.8638	26.8312	0.33794	0.19757	0.92020	124
1314498	33.9591	22.1868	0.34937	0.14824	0.92518	125
1316758	35.4528	24.8997	0.36512	0.17786	0.91381	126
1317280	36.6945	19.4769	0.37809	0.12042	0.91790	127
1318153	37.3309	18.7698	0.38477	0.11316	0.91605	128
1318428	37.0168	22.0566	0.38152	0.14808	0.91242	129
1318992	37.7549	26.1299	0.38936	0.19204	0.90084	130
1321081	30.9599	27.2539	0.31794	0.20142	0.92647	131
1321856	30.6532	35.1193	0.31493	0.28621	0.90493	132
1323594	32.9738	32.0581	0.33923	0.25393	0.90578	133
1323662	32.6878	32.8281	0.33625	0.26215	0.90455	134
1325303	33.9822	30.0766	0.34978	0.23293	0.90741	135
1326433	35.2437	30.9322	0.36307	0.24268	0.89961	136
1329295	38.6378	29.1451	0.39873	0.22488	0.88907	137
1332680	31.8756	41.8552	0.32802	0.36010	0.87334	138
1334516	33.1267	41.4260	0.34116	0.35591	0.87002	139
1335586	34.7522	41.3265	0.35825	0.35551	0.86329	140
1336307	34.9538	39.5847	0.36030	0.33654	0.87001	141
1337641	36.2511	41.7286	0.37404	0.36059	0.85444	142
1338397	37.6806	39.5167	0.38900	0.33703	0.85737	143
1338731	37.1170	42.6250	0.38320	0.37083	0.84596	144
1340276	29.8526	47.9157	0.30701	0.42601	0.85104	145
1340529	29.3304	50.9095	0.30167	0.45899	0.83566	146

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
1340821	165.9891	180.9278	-0.0005	0.0005	1.1 1.4	147
1341925	166.9299	182.0619	0.0015	-0.0065	2.9 0.7	148
1342158	167.8101	175.0204	0.0007	0.0023	3.4 4.5	149
1343365	168.8816	176.4484	-0.0122	-0.0017	0.2 0.4	150
1344344	169.6970	176.2679	-0.0022	0.0033	1.3 0.4	151
1345782	171.1661	179.5334	0.0040	0.0062	0.8 1.5	152
1356040	171.9247	181.9661	-0.0140	-0.0042	2.2 0.9	153
1348362	173.5967	175.6305	0.0074	-0.0063	1.1 1.9	154
1349023	174.0734	172.9989	0.0073	0.0051	1.3 7.5	155
1351838	167.5439	190.2548	-0.0002	0.0102	1.9 0.7	156
1352185	168.5791	183.6316	0.0053	0.0068	0.7 2.1	157
1352553	168.5108	187.0767	-0.0075	0.0070	0.7 0.4	158
1354427	170.0781	186.3717	-0.0066	0.0071	0.5 1.9	159
1358431	173.9179	185.4353	0.0015	0.0117	0.6 0.4	160
1358553	174.1819	186.4101	-0.0016	0.0154	1.3 0.1	161
1359111	174.5035	182.6625	-0.0031	-0.0028	0.6 0.3	162
1361420	167.7203	194.7778	-0.0045	-0.0044	0.7 1.5	163
1363759	170.0294	197.8966	-0.0099	0.0068	1.3 0.7	164
1364082	170.8925	191.0990	0.0002	0.0026	3.7 0.7	165
1366697	173.1955	196.4661	-0.0094	0.0011	0.7 1.0	166
1367646	173.6969	196.3249	0.0057	0.0004	1.8 1.0	167
1371862	168.7548	206.6811	0.0016	0.0053	0.9 3.1	168
1373640	170.3642	204.6931	-0.0167	0.0067	1.2 2.0	169
1373753	170.5240	205.7665	-0.0058	-0.0002	9.9 1.5	170
1374540	171.2061	203.7714	-0.0018	0.0074	0.9 1.0	171
1377239	173.8912	201.7055	-0.0068	0.0094	1.1 1.1	172
1403926	176.0411	144.2997	0.0045	-0.0010	5.3 3.5	173
1404480	177.2469	138.8533	0.0121	0.0011	0.5 1.4	174
1404736	176.9289	142.3347	0.0158	-0.0100	1.0 0.4	175
1406203	178.1870	137.0763	0.0061	-0.0040	1.6 0.7	176
1406813	178.6767	142.7726	0.0005	-0.0056	0.5 0.4	177
1406926	178.9029	143.9497	0.0053	-0.0014	0.9 0.6	178
1406996	179.5607	143.9108	0.0085	0.0017	1.0 2.5	179
1407320	179.3735	137.6789	0.0083	0.0031	3.3 2.6	180
1407344	179.5920	137.9846	0.0050	0.0052	0.7 0.7	181
1408335	180.5197	137.9528	-0.0089	0.0005	1.2 1.0	182
1409547	181.6898	139.9059	0.0090	-0.0006	2.7 2.5	183
1410304	173.2864	148.1636	0.0134	-0.0016	3.0 1.4	184
1410930	173.8452	153.3502	0.0029	-0.0074	2.8 4.5	185
1411426	174.4887	149.1369	0.0106	-0.0007	0.9 1.1	186
1411731	174.7072	151.4925	0.0055	-0.0153	1.6 0.7	187
1411836	174.7884	152.8592	0.0044	-0.0116	2.0 0.8	188
1413632	176.5040	150.4016	0.0010	-0.0036	2.7 3.3	189
1415113	177.8927	145.6643	0.0065	0.0022	1.6 2.4	190
1415169	178.3972	146.1952	0.0100	-0.0009	1.0 0.4	191
1416036	179.0547	144.8786	0.0085	0.0019	1.4 1.7	192
1416102	178.8077	145.4310	-0.0025	0.0080	1.7 0.8	193
1416336	179.2152	147.6976	0.0064	0.0032	2.4 0.3	194
1417411	180.0372	148.1022	0.0056	0.0014	1.4 0.9	195
1418032	180.8968	144.3322	-0.0016	-0.0054	0.4 1.0	196
1418758	181.4895	151.3324	0.0148	-0.0033	2.0 5.7	197
1428050	181.6881	153.3826	0.0046	-0.0004	6.7 1.1	198
1420177	174.3658	155.8487	0.0004	-0.0091	0.7 0.6	199
1420238	174.0860	156.8615	0.0092	-0.0084	2.0 0.9	200
1421391	175.6073	156.9806	0.0024	-0.0100	3.0 3.2	201
1422946	176.4320	162.8839	-0.0030	0.0085	1.0 1.4	202
1423596	177.6782	159.0729	-0.0077	0.0019	2.9 1.3	203
1424430	177.8925	157.5154	-0.0060	0.0144	1.8 0.9	204
1425520	178.8364	158.3791	-0.0049	0.0022	2.2 0.7	205
1425791	179.5697	160.2132	0.0028	-0.0027	6.5 0.8	206
1426352	179.9707	156.5998	0.0078	0.0011	3.9 1.2	207
1426789	180.5316	160.9053	-0.0018	-0.0053	1.2 1.3	208
1428554	181.9612	158.3490	-0.0009	0.0038	5.0 0.8	209
1429974	183.3320	161.9249	0.0093	0.0022	4.3 1.4	210
1430657	175.0613	169.5695	0.0044	0.0037	0.6 0.3	211
1431338	175.6548	166.8744	0.0155	-0.0085	0.4 0.8	212
1431810	175.7127	170.7093	0.0064	-0.0031	0.7 0.8	213
1432619	176.5856	169.5981	-0.0057	-0.0064	4.3 2.0	214
1434974	179.1531	171.5720	-0.0045	0.0044	2.1 0.7	215
1436629	180.4245	169.1774	-0.0082	-0.0040	0.9 8.7	216
1440795	176.0670	179.2298	-0.0098	0.0108	1.7 1.8	217
1442537	177.2210	177.4936	0.0020	0.0057	1.1 1.6	218
1444007	178.6267	172.7809	-0.0097	-0.0015	0.6 0.9	219

## POSITIONS ON THE DISK

3b

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
1340821	29.3921	52.9210	0.30243	0.48140	0.82267	147
1341925	30.2569	54.1153	0.31160	0.49509	0.81104	148
1342158	31.5968	47.1385	0.32532	0.41811	0.84815	149
1343365	32.5727	48.6350	0.33566	0.43507	0.83549	150
1344344	33.3985	48.5080	0.34434	0.43403	0.83250	151
1345782	34.6509	51.8660	0.35771	0.47193	0.80580	152
1356040	35.2487	54.3457	0.36416	0.49996	0.78577	153
1348362	37.3327	48.1258	0.38574	0.43165	0.81540	154
1349023	37.9809	45.5280	0.39243	0.40323	0.82668	155
1351838	30.3328	62.3400	0.31296	0.58794	0.74591	156
1352185	31.8001	55.7911	0.32794	0.51454	0.79228	157
1352553	31.5062	59.2283	0.32509	0.55315	0.76704	158
1354427	33.1168	58.6263	0.34200	0.54711	0.76401	159
1358431	37.0108	57.9416	0.38297	0.54140	0.74847	160
1358553	37.2104	58.9326	0.38515	0.55275	0.73900	161
1359111	37.7770	55.2099	0.39085	0.51100	0.76558	162
1361420	30.2126	66.8699	0.31208	0.63985	0.70228	163
1363759	32.3130	70.1363	0.33454	0.67897	0.65351	164
1364082	33.6199	63.4020	0.34768	0.60172	0.71906	165
1366697	35.5670	68.9140	0.36874	0.66666	0.64776	166
1367646	36.0767	68.8057	0.37410	0.66572	0.64565	167
1371862	30.4652	78.8287	0.31615	0.78178	0.53746	168
1373640	32.2019	76.9477	0.33422	0.76004	0.55735	169
1373753	32.2910	78.0305	0.33532	0.77332	0.53809	170
1374540	33.1025	76.0820	0.34360	0.75018	0.56494	171
1377239	35.9181	74.1935	0.37309	0.72948	0.57329	172
1403926	41.8255	16.9865	0.43204	0.09623	0.89671	173
1404480	43.3859	11.6243	0.44841	0.04016	0.89293	174
1404736	42.8403	15.0815	0.44270	0.07649	0.89340	175
1406203	44.4407	9.9105	0.45951	0.02260	0.88789	176
1406813	44.5562	15.6330	0.46077	0.08322	0.88361	177
1406926	44.7048	16.8237	0.46235	0.09595	0.88149	178
1406996	45.3640	16.8278	0.46929	0.09635	0.87777	179
1407320	45.5855	10.5900	0.47156	0.03037	0.88131	180
1407344	45.7835	10.9096	0.47365	0.03385	0.88006	181
1408335	46.7116	10.9385	0.48343	0.03466	0.87470	182
1409547	47.7516	12.9659	0.49440	0.05668	0.86738	183
1410304	38.8227	20.6666	0.40049	0.13402	0.90645	184
1410930	39.0406	25.8844	0.40288	0.18998	0.89532	185
1411426	39.9590	21.7174	0.41246	0.14576	0.89924	186
1411731	40.0228	24.0849	0.41318	0.17113	0.89442	187
1411836	40.0142	25.4555	0.41312	0.18583	0.89152	188
1413632	41.8876	23.1124	0.43279	0.16161	0.88689	189
1415113	43.5842	18.4706	0.45057	0.11290	0.88557	190
1415169	44.0530	19.0339	0.45552	0.11914	0.88222	191
1416036	44.7955	17.7615	0.46332	0.10598	0.87983	192
1416102	44.5128	18.2972	0.46035	0.11153	0.88071	193
1416336	44.7710	20.5881	0.46310	0.13610	0.87579	194
1417411	45.5650	21.0460	0.47147	0.14143	0.87047	195
1418032	46.6700	17.3360	0.48305	0.10247	0.86957	196
1418758	46.8029	24.3678	0.48459	0.17770	0.85650	197
1428050	46.8668	26.4288	0.48531	0.19990	0.85118	198
1420177	39.3966	28.4143	0.40669	0.21736	0.88733	199
1420238	39.0509	29.4078	0.40308	0.22791	0.88633	200
1421391	40.5615	29.6261	0.41899	0.23098	0.87812	201
1422946	40.9979	35.5773	0.42377	0.29570	0.85614	202
1423596	42.4915	31.8515	0.43937	0.25603	0.86105	203
1424430	42.8075	30.3096	0.44265	0.23951	0.86411	204
1425520	43.6930	31.2341	0.45201	0.24998	0.85627	205
1425791	44.3048	33.1142	0.45852	0.27070	0.84645	206
1426352	44.9418	29.5307	0.46511	0.23225	0.85424	207
1426789	45.2195	33.8683	0.46818	0.27942	0.83829	208
1428554	46.8140	31.4080	0.48490	0.25365	0.83698	209
1429974	47.9479	35.0698	0.49699	0.29415	0.81638	210
1430657	39.1917	42.1666	0.40502	0.36682	0.83750	211
1431338	39.9606	39.5130	0.41300	0.33812	0.84564	212
1431810	39.7672	43.3477	0.41113	0.38011	0.82854	213
1432619	40.7113	42.2947	0.42103	0.36902	0.82859	214
1434974	43.1447	44.4342	0.44678	0.39397	0.80323	215
1436629	44.5706	42.1251	0.46169	0.36935	0.80649	216
1440795	39.5625	51.8827	0.40945	0.47468	0.77912	217
1442537	40.8281	50.2236	0.42269	0.45687	0.78269	218
1444007	42.5400	45.6075	0.44047	0.40659	0.80042	219

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
1444281	179.3844	174.0353	0.0023	-0.0019	1.0 1.4	220
1445947	180.4078	180.6857	0.0038	-0.0071	2.1 1.4	221
1449062	183.8610	171.6833	-0.0047	-0.0001	1.1 0.4	222
1451295	177.2015	183.5709	-0.0039	0.0082	1.8 4.2	223
1451624	176.8014	187.0669	-0.0029	-0.0011	4.7 0.9	224
1452836	177.9572	188.9159	0.0000	-0.0050	0.7 1.1	225
1452935	177.9578	189.7074	0.0026	-0.0007	2.7 1.0	226
1453417	178.5068	185.3499	-0.0070	0.0011	0.9 0.7	227
1455881	181.1441	188.0235	-0.0047	-0.0025	2.1 4.5	228
1456131	181.2720	181.8597	-0.0046	-0.0061	2.7 0.7	229
1457625	182.4185	186.4487	0.0000	0.0014	2.6 6.9	230
1458629	183.3838	186.6621	-0.0003	-0.0051	1.3 1.1	231
1458890	184.0964	187.5284	-0.0090	0.0090	0.8 0.8	232
1458942	183.6904	188.6667	0.0025	-0.0036	1.4 1.6	233
1459883	184.9416	187.7136	0.0086	0.0024	1.4 2.0	234
1460880	176.9645	197.1469	-0.0106	0.0088	1.1 1.5	235
1461078	177.4565	190.8343	-0.0022	-0.0026	2.8 0.9	236
1462758	178.5192	196.7878	-0.0073	0.0046	1.3 3.6	237
1462965	178.7208	198.2057	-0.0069	0.0027	1.1 1.3	238
1468119	183.5251	190.9888	0.0021	-0.0017	0.8 1.2	239
1472658	178.9444	204.1536	-0.0063	0.0072	0.3 0.3	240
1473253	179.7168	200.4035	-0.0034	0.0134	0.6 0.6	241
1475034	181.3167	198.5673	-0.0063	0.0107	2.0 3.1	242
1477305	182.9649	200.8561	-0.0047	-0.0012	1.1 1.2	243
1500933	182.7599	143.2511	0.0015	-0.0088	6.7 2.4	244
1503826	185.4263	142.2121	0.0020	-0.0084	3.4 1.7	245
1504652	186.5123	139.7696	0.0090	-0.0104	1.8 4.6	246
1510524	183.0138	148.8865	0.0118	-0.0084	1.6 2.3	247
1510688	183.6376	150.1850	0.0037	-0.0007	1.1 0.5	248
1511584	184.4964	148.7723	-0.0013	-0.0021	0.7 1.6	249
1512053	184.8829	143.8623	0.0043	-0.0026	1.2 0.7	250
1512703	184.8470	150.5019	0.0153	-0.0003	2.7 1.7	251
1514014	186.3794	143.8404	-0.0050	-0.0045	0.8 1.1	252
1514129	186.5496	145.2069	0.0003	-0.0090	4.8 1.3	253
1514744	187.0890	150.3325	0.0051	-0.0034	4.2 1.9	254
1514769	187.2596	150.7749	0.0075	-0.0126	3.2 3.7	255
1514917	186.8831	152.4704	0.0125	0.0087	3.6 1.8	256
1515657	188.0911	149.4699	0.0070	-0.0020	2.2 0.4	257
1516676	189.1783	149.2789	0.0128	0.0035	1.5 2.2	258
1517679	190.1611	149.3930	0.0088	-0.0023	1.4 9.9	259
1519616	191.4195	148.9730	0.0071	-0.0066	2.2 0.3	260
1519685	192.1125	148.7674	0.0054	-0.0061	3.9 5.0	261
1520148	183.5574	154.8571	0.0078	0.0091	2.0 0.8	262
1522028	185.2326	153.7147	0.0089	0.0042	1.5 2.1	263
1525411	188.1127	156.3675	0.0054	-0.0045	2.4 1.6	264
1526767	189.7297	159.4728	0.0035	0.0028	2.5 1.9	265
1527238	190.1471	154.9645	0.0074	0.0103	9.9 1.8	266
1528408	190.8690	156.6797	0.0064	0.0051	1.8 2.1	267
1528242	191.1266	154.2518	0.0132	0.0030	7.8 1.7	268
1532935	186.3330	170.7689	0.0008	0.0014	3.6 0.4	269
1533005	186.5084	162.5188	-0.0042	0.0076	1.9 0.4	270
1533874	187.5625	169.5905	0.0023	0.0019	0.7 2.0	271
1535462	189.1419	165.5910	0.0070	0.0061	4.3 0.5	272
1538006	191.2542	161.9919	0.0012	-0.0003	1.5 1.3	273
1543334	187.4656	174.1160	0.0131	-0.0028	2.5 2.2	274
1543634	187.6749	176.7778	-0.0011	-0.0042	2.7 2.0	275
1550305	184.9333	183.5270	-0.0060	-0.0033	0.7 0.2	276
1551224	185.9420	182.3478	-0.0086	0.0075	1.4 3.9	277
1554785	189.5879	186.3166	-0.0014	0.0052	1.3 2.7	278
1554808	188.9604	187.5035	0.0002	0.0014	0.5 0.2	279
1556873	191.4095	186.7462	-0.0180	0.0068	0.2 0.4	280
1561004	186.1453	189.3103	0.0001	0.0127	0.7 4.0	281
1560526	185.6820	193.8941	-0.0006	-0.0049	4.0 2.3	282
1561794	187.3799	195.1016	-0.0007	0.0028	3.0 1.1	283
1564576	189.9108	193.1816	-0.0005	0.0047	1.4 0.6	284
1565013	190.0155	188.6410	-0.0041	-0.0005	1.9 3.6	285
1566635	191.4455	193.7107	0.0030	0.0005	3.8 2.3	286
1566828	191.4292	195.5454	0.0103	-0.0044	1.2 0.9	287
1573032	188.7932	197.1887	0.0009	-0.0071	1.0 1.2	288
1573150	188.9586	197.8406	0.0039	0.0016	1.9 0.7	289
1577271	192.9528	197.9461	0.0067	0.0083	0.9 1.6	290
1578546	193.7082	200.4011	0.0020	0.0117	1.0 2.4	291
1604688	196.1674	139.0688	-0.0032	0.0067	1.3 0.5	292

## POSITIONS ON THE DISK

4b

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
1444281	43.2141	46.9101	0.44764	0.42142	0.78868	220
1445947	43.7998	53.6206	0.45425	0.49678	0.73950	221
1449062	47.8365	44.8527	0.49629	0.40158	0.76970	222
1451295	40.4104	56.2934	0.41869	0.52476	0.74116	223
1451624	39.7820	59.7598	0.41234	0.56371	0.71569	224
1452836	40.8145	61.6823	0.42340	0.58637	0.69058	225
1452935	40.7632	62.4731	0.42293	0.59542	0.68308	226
1453417	41.5967	58.1559	0.43135	0.54663	0.71773	227
1455881	44.0540	60.9989	0.45755	0.58085	0.67325	228
1456131	44.5855	54.8497	0.46264	0.51118	0.72433	229
1457625	45.4291	59.5089	0.47194	0.56480	0.67696	230
1458629	46.3787	59.7851	0.48200	0.56872	0.66651	231
1458890	47.0332	60.6971	0.48901	0.57974	0.65175	232
1458942	46.5534	61.8077	0.48404	0.59216	0.64424	233
1459883	47.8647	60.9373	0.49783	0.58322	0.64189	234
1460880	39.2844	69.8401	0.40810	0.68017	0.60895	235
1461078	40.1891	63.5661	0.41698	0.60762	0.67597	236
1462758	40.8597	69.5829	0.42472	0.67838	0.59952	237
1462965	40.9680	71.0125	0.42605	0.69546	0.57864	238
1468119	46.2362	64.1167	0.48094	0.61870	0.62121	239
1472658	40.8014	76.9690	0.42521	0.76786	0.47916	240
1473253	41.8181	73.2732	0.43537	0.72342	0.53584	241
1475034	43.5353	71.5433	0.45329	0.70416	0.54652	242
1477305	45.0305	73.9374	0.46953	0.73492	0.48932	243
1500933	48.6004	16.3776	0.50338	0.09338	0.85900	244
1503826	51.3300	15.5138	0.53215	0.08586	0.84229	245
1504652	52.5740	13.1446	0.54524	0.06152	0.83602	246
1510524	48.4846	22.0238	0.50226	0.15356	0.85097	247
1510688	49.0222	23.3618	0.50795	0.16822	0.84480	248
1511584	49.9719	22.0066	0.51794	0.15428	0.84139	249
1512053	50.6795	17.1268	0.52531	0.10261	0.84470	250
1512703	50.2086	23.7573	0.52047	0.17321	0.83613	251
1514014	52.1746	17.2026	0.54108	0.10437	0.83447	252
1514129	52.2550	18.5788	0.54195	0.11910	0.83193	253
1514744	52.4575	23.7344	0.54420	0.17443	0.82062	254
1514769	52.5988	24.1876	0.54570	0.17940	0.81855	255
1514917	52.1119	25.8567	0.54061	0.19703	0.81788	256
1515657	53.5143	22.9382	0.55533	0.16660	0.81477	257
1516676	54.6120	22.8184	0.56691	0.16609	0.80686	258
1517679	55.5855	22.9965	0.57720	0.16871	0.79899	259
1519616	56.8690	22.6591	0.59075	0.16604	0.78959	260
1519685	57.5742	22.4989	0.59819	0.16487	0.78421	261
1520148	48.6360	28.0239	0.50400	0.21815	0.83570	262
1522028	50.3830	26.9920	0.52240	0.20813	0.82691	263
1525411	53.0839	29.8301	0.55099	0.24064	0.79906	264
1526767	54.4943	33.0379	0.56600	0.27654	0.77664	265
1527238	55.2064	28.5614	0.57336	0.22844	0.78681	266
1528408	55.8145	30.3220	0.57985	0.24800	0.77606	267
1528242	56.2307	27.9134	0.58416	0.22221	0.78063	268
1532935	50.3638	44.1007	0.52292	0.39504	0.75531	269
1533005	51.0794	35.8705	0.53006	0.30497	0.79122	270
1533874	51.6682	43.0038	0.53664	0.38386	0.75144	271
1535462	53.5067	39.1115	0.55585	0.34230	0.75754	272
1538006	55.8510	35.6540	0.58045	0.30618	0.75454	273
1543334	51.2750	47.5183	0.53276	0.43377	0.72664	274
1543634	51.3094	50.1911	0.53332	0.46375	0.70747	275
1550305	48.1307	56.7544	0.50024	0.53545	0.68047	276
1551224	49.2148	55.6423	0.51161	0.52367	0.68119	277
1554785	52.5939	59.8451	0.54778	0.57500	0.60771	278
1554808	51.8898	60.9898	0.54045	0.58759	0.60221	279
1556873	54.3839	60.3932	0.56682	0.58327	0.58182	280
1561004	48.9616	62.6109	0.50961	0.60362	0.61314	281
1560526	48.1987	67.1598	0.50209	0.65637	0.56310	282
1561794	49.8143	68.4769	0.51941	0.67388	0.52545	283
1564576	52.4664	66.7242	0.54731	0.65596	0.51978	284
1565013	52.8684	62.1951	0.55096	0.60269	0.57723	285
1566635	53.9635	67.3530	0.56333	0.66548	0.48969	286
1566828	53.8271	69.1847	0.56219	0.68772	0.45932	287
1573032	51.0883	70.6543	0.53331	0.70199	0.47201	288
1573150	51.2106	71.3163	0.53473	0.71035	0.45767	289
1577271	55.1905	71.6825	0.57728	0.72148	0.38239	290
1578546	55.7836	74.1842	0.58439	0.75641	0.29383	291
1604688	62.2570	13.0749	0.64752	0.06801	0.75901	292

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
1604927	195.8513	141.8135	-0.0080	0.0033	0.7 2.9	293
1605961	197.1142	141.1301	0.0070	-0.0043	0.5 2.9	294
1606517	197.3412	137.8923	0.0037	-0.0113	2.0 1.1	295
1606614	197.4232	138.5207	-0.0005	-0.0102	8.0 2.3	296
1607815	198.4562	140.3106	-0.0121	0.0062	0.7 2.2	297
1611666	193.7880	148.6754	-0.0166	0.0028	0.8 1.1	298
1620009	192.5564	152.8529	-0.0085	0.0171	0.5 0.8	299
1620236	192.9376	154.3624	0.0036	-0.0024	4.8 0.3	300
1620428	192.9882	156.3846	-0.0009	-0.0099	2.6 1.4	301
1621478	194.4025	156.1614	0.0060	0.0038	2.6 0.8	302
1621621	193.9958	157.4775	0.0027	-0.0048	1.2 1.1	303
1621751	194.3119	158.3154	0.0002	0.0028	0.3 1.0	304
1632060	195.4754	160.7859	-0.0055	0.0033	0.8 1.0	305
1623757	196.2358	158.6314	-0.0015	0.0046	2.6 4.7	306
1625291	198.1146	153.1513	0.0093	-0.0031	9.9 1.8	307
1625341	197.7367	154.0828	0.0022	-0.0030	2.5 0.6	308
1625583	198.2294	156.0716	-0.0032	-0.0066	0.9 1.0	309
1627224	199.3783	153.2346	0.0041	0.0001	3.3 3.5	310
1628065	200.5515	151.2175	0.0085	-0.0018	2.4 1.5	311
1629476	201.8571	154.8166	0.0035	0.0071	1.2 1.3	312
1631305	194.2307	164.1910	0.0006	0.0091	0.8 0.3	313
1631517	194.3866	166.2182	-0.0079	0.0111	1.1 0.3	314
1638195	201.4457	161.2849	-0.0066	0.0076	1.2 1.0	315
1639822	202.1051	167.2060	-0.0085	0.0013	2.0 0.5	316
1644691	198.5376	174.8518	-0.0063	0.0040	1.5 0.6	317
1647616	200.5990	174.9777	-0.0016	0.0029	4.0 2.6	318
1648588	202.0764	173.9759	-0.0099	0.0075	1.4 0.7	319
1650452	194.7570	182.6297	-0.0064	0.0001	0.9 0.5	320
1650683	195.1753	184.3536	0.0048	-0.0030	7.7 1.6	321
1653039	197.2101	179.2932	-0.0020	0.0076	1.6 1.0	322
1654142	198.2884	179.3774	0.0014	0.0014	1.2 0.2	323
1654985	199.0603	186.3964	-0.0012	0.0165	0.4 0.4	324
1660812	195.0030	194.3998	-0.0050	0.0111	0.6 0.4	325
1660925	195.1636	195.3633	-0.0081	0.0050	0.5 1.1	326
1660983	195.6819	195.1203	0.0069	0.0052	1.2 2.0	327
1662187	197.2986	188.5387	0.0047	0.0022	6.8 2.5	328
1662571	197.2866	191.4110	-0.0114	-0.0023	0.6 0.5	329
1666846	200.8005	193.3249	0.0059	0.0138	0.2 0.8	330
1668586	202.9652	190.3842	-0.0104	0.0103	0.3 0.8	331
1672178	197.5448	196.5943	-0.0031	0.0103	1.2 0.7	332
1702558	203.3972	137.0000	0.0040	-0.0044	0.7 1.0	333
1703643	204.2041	137.3355	0.0073	-0.0069	3.6 1.4	334
1705392	206.3812	134.0583	-0.0039	-0.0147	1.1 0.3	335
1706046	206.6701	131.4679	0.0011	-0.0089	3.0 1.6	336
1706081	207.0002	130.9437	0.0019	-0.0056	0.8 1.2	337
1706937	207.1422	140.0350	-0.0031	0.0068	0.8 0.3	338
1708031	208.3822	130.7311	0.0030	-0.0027	2.6 3.9	339
1708122	208.4186	131.7058	0.0011	-0.0091	3.8 0.2	340
1709141	209.5191	131.3915	-0.0114	-0.0131	2.5 0.9	341
1711048	202.6080	141.8608	0.0034	0.0086	0.6 0.7	342
1715286	206.8458	142.8636	-0.0050	-0.0001	0.3 0.9	343
1716196	207.8593	141.7387	0.0070	-0.0053	5.4 3.2	344
1720728	202.4645	157.6869	0.0000	0.0132	1.2 0.3	345
1723299	205.6764	152.6073	0.0032	0.0118	2.6 0.9	346
1726377	208.3545	152.9099	0.0017	-0.0002	0.8 1.0	347
1727238	208.8573	151.9112	0.0036	0.0064	1.1 0.5	348
1728311	209.6031	152.0559	0.0106	-0.0138	0.3 0.5	349
1736112	208.1462	159.8131	-0.0055	0.0082	0.7 0.1	350
1737891	210.2303	165.5286	0.0084	-0.0028	1.6 3.3	351
1741140	204.3298	169.3476	0.0012	0.0003	2.3 0.8	352
1741872	204.9138	175.5098	0.0013	0.0041	0.7 0.3	353
1743383	206.6100	170.9020	-0.0012	-0.0019	0.5 0.8	354
1743566	206.5557	172.9017	-0.0077	-0.0073	0.5 1.3	355
1744481	207.6442	171.3994	-0.0014	0.0076	2.9 0.7	356
1745169	208.2200	169.2999	-0.0090	-0.0038	0.9 0.4	357
1746077	209.2423	168.0583	0.0024	-0.0015	1.2 0.2	358
1746304	208.6933	170.5607	-0.0030	0.0036	0.3 0.3	359
1747043	209.8573	167.6136	-0.0086	0.0112	2.5 0.5	360
1750597	204.5180	182.0728	-0.0147	0.0081	0.4 0.7	361
1754844	207.8066	183.4118	-0.0117	0.0065	0.9 3.3	362
1755718	208.4543	182.7605	-0.0039	0.0148	0.5 0.6	363
1756848	209.6334	183.1415	-0.0063	0.0025	0.8 2.7	364
1762551	206.2559	188.9719	-0.0049	0.0050	1.5 0.6	365

## POSITIONS ON THE DISK

5b

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
1604927	61.7617	15.7963	0.64232	0.09654	0.76033	293
1605961	63.0670	15.1960	0.65612	0.09127	0.74912	294
1606517	63.5058	11.9763	0.66072	0.05743	0.74843	295
1606614	63.5464	12.6094	0.66115	0.06419	0.74750	296
1607815	64.4602	14.4649	0.67085	0.08474	0.73673	297
1611666	59.2526	22.5164	0.61593	0.16639	0.77003	298
1620009	57.7495	26.6092	0.60016	0.20929	0.77201	299
1620236	58.0312	28.1421	0.60319	0.22611	0.76488	300
1620428	57.9491	30.1656	0.60240	0.24800	0.75869	301
1621478	59.3755	30.0349	0.61748	0.24777	0.74655	302
1621621	58.8833	31.3232	0.61232	0.26137	0.74615	303
1621751	59.1438	32.1808	0.61512	0.27095	0.74042	304
1632060	60.1433	34.7247	0.62581	0.29966	0.72011	305
1623757	61.0434	32.6221	0.63524	0.27746	0.72076	306
1625291	63.2779	27.2702	0.65867	0.22125	0.71916	307
1625341	62.8396	28.1762	0.65407	0.23067	0.72041	308
1625583	63.2011	30.1951	0.65798	0.25299	0.70927	309
1627224	64.5338	27.4360	0.67199	0.22425	0.70579	310
1628065	65.8369	25.4975	0.68572	0.20452	0.69854	311
1629476	66.9042	29.1782	0.69719	0.24566	0.67348	312
1631305	58.6778	38.0451	0.61047	0.33485	0.71777	313
1631517	58.7006	40.0805	0.61083	0.35736	0.70653	314
1638195	66.0698	35.6130	0.68867	0.31539	0.65288	315
1639822	66.3400	41.5712	0.69195	0.38199	0.61261	316
1644691	62.2782	48.9763	0.64942	0.46075	0.60495	317
1647616	64.3275	49.2366	0.67122	0.46623	0.57627	318
1648588	65.8677	48.3323	0.68752	0.45791	0.56359	319
1650452	57.9949	56.4994	0.60470	0.54207	0.58352	320
1650683	58.2995	58.2489	0.60814	0.56278	0.55987	321
1653039	60.6621	53.3265	0.63268	0.50859	0.58399	322
1654142	61.7328	53.4810	0.64408	0.51169	0.56863	323
1654985	62.0434	60.5432	0.64831	0.59511	0.47490	324
1660812	57.4693	68.2736	0.60087	0.68223	0.41654	325
1660925	57.5664	69.2466	0.60213	0.69472	0.39346	326
1660983	58.0996	69.0377	0.60779	0.69308	0.38760	327
1662187	60.1446	62.5684	0.62838	0.61651	0.47439	328
1662571	59.9445	65.4370	0.62676	0.65123	0.42788	329
1666846	63.3264	67.5784	0.66362	0.68634	0.29755	330
1668586	65.6797	64.7819	0.68822	0.65556	0.31080	331
1672178	59.8625	70.6318	0.62718	0.71820	0.30139	332
1702558	69.6089	11.4803	0.72537	0.05806	0.68590	333
1703643	70.3923	11.8681	0.73369	0.06302	0.67655	334
1705392	72.7801	8.7364	0.75901	0.03249	0.65027	335
1706046	73.2382	6.1676	0.76386	0.00588	0.64536	336
1706081	73.6020	5.6654	0.76772	0.00102	0.64078	337
1706937	73.1481	14.7567	0.76301	0.09696	0.63907	338
1708031	74.9954	5.5433	0.78254	0.00142	0.62260	339
1708122	74.9679	6.5193	0.78225	0.01168	0.62286	340
1709141	76.0869	6.2772	0.79416	0.01055	0.60762	341
1711048	68.5027	16.2847	0.71372	0.10809	0.69204	342
1715286	72.6669	17.5631	0.75796	0.12645	0.63992	343
1716196	73.7522	16.5055	0.76948	0.11643	0.62797	344
1720728	67.3225	32.0853	0.70177	0.27794	0.65595	345
1723299	70.8612	27.2206	0.73912	0.22880	0.63352	346
1726377	73.5145	27.6977	0.76737	0.23740	0.59563	347
1727238	74.0818	26.7328	0.77336	0.22761	0.59170	348
1728311	74.8167	26.9260	0.78120	0.23074	0.58007	349
1736112	72.8543	34.5802	0.76075	0.31246	0.56887	350
1737891	74.5600	40.4260	0.77945	0.38086	0.49739	351
1741140	68.4202	43.8558	0.71426	0.41041	0.56691	352
1741872	68.5994	50.0499	0.71683	0.48168	0.50412	353
1743383	70.5943	45.5576	0.73761	0.43299	0.51812	354
1743566	70.4091	47.5516	0.73585	0.45565	0.50090	355
1744481	71.5940	46.1219	0.74835	0.44110	0.49538	356
1745169	72.3063	44.0622	0.75573	0.41860	0.50362	357
1746077	73.4080	42.8886	0.76739	0.40701	0.49544	358
1746304	72.6961	45.3527	0.76005	0.43411	0.48361	359
1747043	74.0510	42.4845	0.77422	0.40349	0.48762	360
1750597	67.7743	56.5804	0.70894	0.55743	0.43207	361
1754844	70.9690	58.1327	0.74363	0.58399	0.32552	362
1755718	71.6581	57.5244	0.75095	0.57819	0.31902	363
1756848	72.8101	57.9820	0.76362	0.58802	0.26669	364
1762551	69.0568	63.5859	0.72460	0.65107	0.22595	365

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
1763329	206.8951	187.8623	-0.0139	-0.0036	0.1 0.0	366
1800432	210.5571	134.1692	-0.0019	-0.0023	0.6 1.8	367
1810030	210.8848	139.6079	-0.0011	-0.0088	0.7 0.2	368
1801927	211.7164	139.1822	0.0011	-0.0051	2.0 0.7	369
1802523	212.3949	134.8492	0.0033	-0.0005	0.4 1.0	370
1802972	213.0244	138.4484	0.0043	-0.0077	3.1 1.6	371
1803237	213.2105	132.2339	-0.0026	-0.0023	2.7 1.2	372
1809431	218.8520	132.2518	-0.0035	-0.0040	2.9 2.1	373
1813808	213.8425	147.2019	0.0046	-0.0012	1.6 1.1	374
1814817	214.8753	146.9043	0.0043	-0.0038	0.8 1.8	375
1815060	215.8109	138.6134	0.0088	0.0046	0.7 0.6	376
1819063	219.5144	137.9617	0.0150	-0.0120	0.5 1.8	377
1820074	211.8110	149.1104	0.0061	0.0006	1.0 0.6	378
1820581	212.1584	153.3891	-0.0110	0.0044	0.7 1.0	379
1821149	212.5571	150.3611	0.0078	-0.0009	1.8 1.2	380
1822182	213.8528	149.4116	0.0110	0.0046	3.4 0.7	381
1824002	214.8448	148.3297	0.0072	-0.0145	1.1 1.1	382
1823223	214.2396	150.3887	0.0050	0.0070	2.1 4.5	383
1824247	215.3718	150.5268	0.0091	-0.0096	1.5 0.4	384
1825266	216.4667	150.1756	0.0049	0.0036	0.5 0.6	385
1825974	216.9762	156.1627	-0.0132	-0.0067	0.7 0.9	386
1826243	217.2293	149.6477	-0.0050	-0.0110	0.3 1.3	387
1836994	218.4583	164.4353	-0.0061	-0.0019	1.8 0.7	388
1841955	213.9972	174.3315	0.0025	0.0084	0.4 0.7	389
1845336	217.2427	168.4090	-0.0098	0.0142	0.9 0.5	390
1853210	215.4894	175.6882	0.0062	0.0070	0.5 0.7	391
1900479	220.1426	132.7032	-0.0054	-0.0004	0.8 0.3	392
1901194	221.0382	129.0771	0.0097	0.0110	0.8 0.1	393
1902205	221.1751	130.0939	-0.0072	-0.0076	2.2 3.7	394
1901388	221.1464	131.3026	-0.0062	-0.0008	0.5 0.3	395
1902754	221.9956	134.5531	0.0033	0.0020	1.6 1.5	396
1904580	223.8879	131.5959	0.0026	-0.0029	3.1 0.4	397
1907952	226.5669	134.3633	-0.0129	-0.0020	1.9 0.2	398
1920030	220.6935	146.5819	-0.0002	0.0028	0.7 0.1	399
1910997	221.1743	146.2118	0.0106	0.0006	4.2 0.4	400
1912746	222.4588	143.8565	-0.0011	-0.0119	2.2 0.9	401
1913431	223.0195	140.4318	0.0023	0.0037	3.0 1.2	402
1913592	223.6421	141.2152	0.0057	-0.0069	4.0 1.3	403
1914558	224.2458	141.5509	-0.0233	-0.0041	0.5 0.3	404
1915577	225.2700	141.0388	-0.0048	-0.0064	1.6 0.9	405
1923381	223.9531	148.3147	0.0084	0.0007	1.7 0.3	406
1930879	221.8307	162.5298	-0.0034	0.0035	2.1 0.2	407
1932364	223.3079	157.3484	-0.0128	0.0125	1.6 1.7	408
2001369	133.1201	142.5923	0.0073	-0.0016	0.5 2.0	409
2008909	127.3860	148.5761	-0.0085	-0.0045	0.6 1.2	410
2012507	133.5229	153.6710	-0.0043	0.0011	3.4 2.4	411
2012741	133.1715	155.0541	-0.0041	0.0010	2.7 3.4	412
2013692	131.7312	154.2880	0.0008	-0.0118	2.3 1.0	413
2014128	131.1903	150.1327	-0.0040	0.0078	2.2 1.0	414
2015532	130.3373	153.4305	-0.0128	0.0010	2.4 5.3	415
2020541	135.6198	162.3531	0.0035	-0.0071	7.5 6.7	416
2023537	132.9024	163.1043	-0.0005	-0.0073	2.1 0.4	417
2023916	133.2890	166.6324	0.0029	-0.0121	7.0 1.6	418
2027762	128.8622	164.6645	-0.0044	-0.0064	0.5 0.9	419
2028442	127.8858	161.9902	0.0006	-0.0036	2.3 1.4	420
2037445	129.4798	171.3748	-0.0064	-0.0159	1.0 0.3	421
2039218	127.7157	169.9660	-0.0083	-0.0042	0.4 0.4	422
2049780	127.8983	182.8643	-0.0026	0.0027	1.1 0.7	423
2052224	135.3794	187.2354	0.0034	-0.0155	1.6 1.3	424
2053392	133.8080	188.0769	-0.0026	0.0001	0.6 6.3	425
2057054	130.2840	185.7564	0.0024	-0.0061	1.7 3.8	426
2058450	129.4776	189.0040	0.0037	-0.0061	2.9 2.0	427
2059974	128.7031	193.8934	-0.0019	0.0017	2.5 1.3	428
2062741	136.0237	200.2096	-0.0041	-0.0036	1.7 0.8	429
2064627	134.3087	199.9539	-0.0150	-0.0059	1.4 0.9	430
2070831	138.5529	209.3626	-0.0035	0.0011	3.6 1.8	431
2075524	133.7522	207.4643	-0.0055	-0.0026	1.9 9.9	432
2082200	137.0909	212.7032	-0.0100	-0.0045	1.0 1.2	433
2090221	139.2017	220.4469	-0.0118	-0.0020	0.2 1.4	434
2121101	125.2326	159.2799	0.0079	-0.0043	3.0 2.0	435
2131310	125.8019	170.2484	0.0066	-0.0119	2.1 2.5	436
2132229	124.7956	170.1349	0.0087	-0.0019	0.3 1.2	437
2133174	123.2806	168.9203	-0.0103	-0.0029	4.4 1.1	438

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
1763329	69.7676	62.5192	0.73196	0.63874	0.23718	366
1800432	76.9410	9.1198	0.80328	0.04176	0.59414	367
1810030	76.9117	14.5744	0.80306	0.09987	0.58747	368
1801927	77.7696	14.2034	0.81220	0.09710	0.57524	369
1802523	78.7308	9.9192	0.82237	0.05277	0.56650	370
1802972	79.1233	13.5558	0.82663	0.09216	0.55515	371
1803237	79.7163	7.3598	0.83285	0.02706	0.55283	372
1809431	85.3460	7.7460	0.89314	0.04090	0.44792	373
1813808	79.3663	22.3538	0.82953	0.18763	0.52599	374
1814817	80.4167	22.1240	0.84076	0.18688	0.50813	375
1815060	81.8938	13.9025	0.85625	0.10034	0.50672	376
1819063	85.6331	13.4933	0.89637	0.10308	0.43116	377
1820074	77.2135	24.1277	0.80662	0.20361	0.55489	378
1820581	77.2799	28.4248	0.80757	0.25090	0.53374	379
1821149	77.8763	25.4258	0.81377	0.21885	0.53841	380
1822182	79.2318	24.5619	0.82821	0.21157	0.51895	381
1824002	80.2929	23.5459	0.83951	0.20223	0.50431	382
1823223	79.5539	25.5633	0.83171	0.22312	0.50840	383
1824247	80.6749	25.7752	0.84373	0.22744	0.48620	384
1825266	81.7907	25.4958	0.85568	0.22646	0.46533	385
1825974	81.9070	31.5101	0.85740	0.29392	0.42245	386
1826243	82.5865	25.0183	0.86419	0.22275	0.45117	387
1836994	82.8443	39.8710	0.86865	0.39362	0.30085	388
1841955	77.7431	49.4659	0.81506	0.49483	0.30134	389
1845336	81.3706	43.7613	0.85335	0.43612	0.28566	390
1853210	79.1436	50.9186	0.83094	0.52002	0.19780	391
1900479	86.6047	8.2812	0.90669	0.04925	0.41891	392
1901194	87.7363	4.7173	0.91884	0.01394	0.39438	393
1902205	87.8063	5.7420	0.91961	0.02496	0.39204	394
1901388	87.6984	6.9476	0.91846	0.03752	0.39373	395
1902754	88.3330	10.2502	0.92540	0.07442	0.37162	396
1904580	90.4156	7.4196	0.94793	0.04986	0.31456	397
1907952	92.9082	10.3591	0.97548	0.09152	0.20016	398
1920030	86.2451	22.1817	0.90342	0.19956	0.37948	399
1910997	86.7493	21.8434	0.90885	0.19710	0.36760	400
1912746	88.1858	19.5744	0.92427	0.17586	0.33882	401
1913431	88.9698	16.1897	0.93257	0.14074	0.33244	402
1913592	89.5399	17.0130	0.93883	0.15160	0.30922	403
1914558	90.1205	17.3878	0.94520	0.15774	0.28585	404
1915577	91.1764	16.9431	0.95678	0.15687	0.24489	405
1923381	89.3851	24.1256	0.93782	0.23139	0.25876	406
1930879	86.3352	38.1877	0.90693	0.38899	0.16178	407
1932364	88.1493	33.1079	0.92581	0.33389	0.17721	408
2001369	-0.9037	12.4785	-0.01640	0.03898	0.99911	409
2008909	-7.0193	18.0818	-0.08040	0.09854	0.99188	410
2012507	-1.2276	23.5722	-0.01971	0.15675	0.98744	411
2012741	-1.6690	24.9310	-0.02432	0.17128	0.98492	412
2013692	-3.0564	24.0716	-0.03886	0.16213	0.98600	413
2014128	-3.3240	19.8853	-0.04170	0.11751	0.99220	414
2015532	-4.3915	23.1239	-0.05285	0.15206	0.98696	415
2020541	0.2965	32.3823	-0.00361	0.25128	0.96791	416
2023537	-2.4651	32.9554	-0.03253	0.25749	0.96573	417
2023916	-2.3103	36.5051	-0.03083	0.29588	0.95473	418
2027762	-6.6000	34.2502	-0.07580	0.27169	0.95940	419
2028442	-7.3994	31.5149	-0.08422	0.24223	0.96656	420
2037445	-6.4232	40.9940	-0.07380	0.34488	0.93574	421
2039218	-8.0917	39.4715	-0.09130	0.32843	0.94010	422
2049780	-8.7546	52.3685	-0.09785	0.47014	0.87715	423
2052224	-1.5739	57.2236	-0.02241	0.52374	0.85158	424
2053392	-3.1975	57.9617	-0.03939	0.53206	0.84579	425
2057054	-6.5628	55.4135	-0.07477	0.50379	0.86058	426
2058450	-7.5805	58.6051	-0.08528	0.53958	0.83760	427
2059974	-8.6740	63.4389	-0.09650	0.59422	0.79849	428
2062741	-1.7809	70.2267	-0.02382	0.67131	0.74080	429
2064627	-3.4759	69.8593	-0.04162	0.66714	0.74377	430
2070831	0.1438	79.5355	-0.00283	0.78058	0.62506	431
2075524	-4.5235	77.3257	-0.05201	0.75442	0.65432	432
2082200	-1.5343	82.7772	-0.02008	0.81985	0.57223	433
2090221	0.0651	90.6509	-0.00203	0.92053	0.39067	434
2121101	-9.8700	28.6342	-0.11013	0.21147	0.97116	435
2131310	-10.0204	39.6287	-0.11149	0.33034	0.93725	436
2132229	-11.0175	39.4495	-0.12194	0.32851	0.93660	437
2133174	-12.4501	38.1373	-0.13696	0.31444	0.93935	438

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
2134231	122.7474	169.5096	0.0036	-0.0140	1.1 1.3	439
2142836	125.5793	184.4357	0.0099	-0.0022	2.0 1.2	440
2144559	123.3293	182.1107	-0.0057	-0.0029	2.6 7.0	441
2148667	119.4746	183.0299	0.0054	-0.0089	2.1 0.9	442
2150188	127.1650	187.1697	0.0000	0.0019	1.0 3.1	443
2150440	127.7307	189.1008	-0.0154	-0.0077	0.3 1.9	444
2151195	126.1650	186.9797	-0.0095	-0.0089	0.4 1.7	445
2152478	125.5858	189.9843	-0.0024	-0.0018	0.7 4.0	446
2152482	125.4253	189.4527	0.0006	-0.0033	0.3 4.5	447
2161016	127.3735	195.0400	0.0066	0.0054	3.9 7.3	448
2163837	125.7443	202.1228	0.0101	-0.0005	2.3 1.0	449
2166348	122.5358	198.0838	-0.0107	-0.0040	2.1 1.8	450
2176279	122.6886	205.8404	0.0037	-0.0060	0.8 2.1	451
2176622	123.2688	208.5887	-0.0008	-0.0114	1.7 1.3	452
2177989	121.9671	211.7071	-0.0043	-0.0034	0.8 0.6	453
2178224	121.2053	205.5412	-0.0057	-0.0039	0.9 1.4	454
2200308	115.6350	143.4639	-0.0038	-0.0018	1.0 2.5	455
2200549	115.3543	145.4352	-0.0038	-0.0021	0.8 2.0	456
2203196	111.7246	141.5410	-0.0043	0.0004	2.6 0.8	457
2222414	114.8366	162.8425	-0.0047	-0.0102	1.5 0.6	458
2223367	113.3958	162.2639	0.0005	-0.0081	0.8 0.9	459
2240856	117.7566	184.7738	-0.0038	0.0085	0.5 2.3	460
2242049	115.5534	177.9371	0.0002	-0.0092	0.7 1.2	461
2242129	115.7344	178.8511	0.0044	-0.0052	2.4 4.1	462
2243095	114.0456	177.6247	0.0010	0.0005	1.0 5.1	463
2244200	114.0807	178.9685	-0.0051	-0.0098	1.6 1.8	464
2248660	109.8909	182.7961	0.0046	-0.0003	4.4 2.5	465
2251383	116.7425	189.0644	0.0025	-0.0089	1.6 2.1	466
2253414	115.5941	190.0456	0.0014	0.0013	1.2 1.7	467
2302117	103.9069	141.9786	-0.0092	0.0108	1.6 6.9	468
2311200	105.5615	151.6512	0.0094	-0.0039	1.6 3.5	469
2324993	102.8600	167.7926	0.0000	-0.0036	1.9 1.1	470
2332591	105.1903	173.0347	-0.0088	0.0065	2.9 0.6	471
2342485	105.8329	181.5586	0.0052	-0.0025	0.9 1.5	472
2414074	92.4213	150.4475	0.0047	-0.0017	1.4 2.9	473
2419754	88.2226	157.0902	-0.0020	-0.0003	4.8 1.2	474
2422182	94.8816	160.5108	-0.0107	0.0038	1.1 0.5	475
2429655	88.7934	165.4715	-0.0068	0.0042	0.4 0.9	476
2432593	95.5625	173.4667	0.0065	-0.0092	0.9 1.8	477
2435605	93.6730	174.5374	0.0035	-0.0068	0.9 3.0	478
2443217	95.7991	180.1804	0.0004	-0.0113	2.9 2.7	479
2478340	92.3288	206.3014	-0.0136	-0.0011	2.3 0.3	480
2482528	98.8105	216.2784	0.0083	0.0043	0.2 0.2	481
2483518	97.9657	216.2367	-0.0026	-0.0023	1.8 1.4	482
2500797	86.2855	148.0120	0.0071	-0.0012	0.6 0.6	483
2509471	77.6359	144.7367	-0.0051	-0.0007	1.0 9.9	484
2582092	88.2765	211.5368	0.0001	0.0005	0.4 0.8	485
2621913	77.7995	168.0882	0.0004	-0.0039	1.2 1.6	486
2625706	73.9870	166.4410	-0.0100	-0.0074	1.3 1.5	487
2733637	66.4993	174.3313	-0.0053	0.0061	1.7 1.5	488
2811221	57.5005	151.5645	-0.0014	-0.0014	0.8 0.2	489
2817842	51.8944	156.6928	-0.0089	0.0015	1.6 1.8	490
2827023	52.2168	158.5771	-0.0034	-0.0110	2.0 1.1	491
2838985	51.7147	174.9784	0.0008	-0.0039	0.4 0.5	492
2843722	57.5217	182.3987	0.0041	0.0003	0.2 0.2	493
2847085	52.7293	176.0295	0.0073	-0.0146	1.1 1.0	494
2902560	46.0004	143.8431	-0.0028	0.0036	0.5 0.9	495
2905503	43.6856	143.7331	0.0060	-0.0009	2.0 3.1	496
2914918	45.4851	157.0839	0.0009	-0.0021	0.5 0.6	497
2915159	43.6414	149.6824	-0.0014	0.0046	1.8 0.3	498
2915924	44.3410	156.4482	0.0018	-0.0029	0.8 0.4	499
2916472	42.5828	151.3472	-0.0078	0.0009	0.3 0.4	500
2922640	47.4798	162.8909	0.0045	0.0013	1.7 0.3	501
3001890	132.0877	131.3245	0.0020	0.0126	3.7 0.5	502
3005847	128.7063	130.8699	-0.0069	-0.0010	2.4 1.2	503
3007790	126.4888	132.6154	0.0003	-0.0139	2.4 1.2	504
3009506	125.5238	134.0443	-0.0003	-0.0096	1.6 1.2	505
3011448	132.1868	124.7944	-0.0029	-0.0053	2.2 1.1	506
3019109	125.1228	128.0047	0.0094	-0.0004	0.8 1.4	507
3018403	125.9121	125.6788	-0.0018	-0.0010	1.3 2.8	508
3018666	125.1589	123.4685	0.0009	-0.0097	2.6 1.1	509
3019234	124.7666	127.5559	-0.0004	0.0051	9.9 0.9	510
3020688	131.9322	113.1076	-0.0035	0.0036	0.3 0.9	511

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
2134231	-13.0208	38.6912	-0.14292	0.32054	0.93639	439
2142836	-11.1723	53.7870	-0.12311	0.48620	0.86513	440
2144559	-13.2657	51.3174	-0.14512	0.45911	0.87644	441
2148667	-17.1735	51.9840	-0.18601	0.46725	0.86434	442
2150188	-9.7687	56.6217	-0.10829	0.51762	0.84873	443
2150440	-9.3306	58.5877	-0.10362	0.53959	0.83553	444
2151195	-10.7544	56.3666	-0.11863	0.51490	0.84900	445
2152478	-11.5294	59.3303	-0.12661	0.54823	0.82669	446
2152482	-11.6548	58.7888	-0.12795	0.54217	0.83047	447
2161016	-10.0763	64.4976	-0.11113	0.60643	0.78733	448
2163837	-12.1666	71.4668	-0.13259	0.68681	0.71464	449
2166348	-15.1044	67.2225	-0.16364	0.63848	0.75204	450
2176279	-15.4602	74.9811	-0.16684	0.72868	0.66423	451
2176622	-15.0611	77.7645	-0.16242	0.76157	0.62740	452
2177989	-16.5647	80.7948	-0.17789	0.79857	0.57502	453
2178224	-16.9211	74.5853	-0.18217	0.72444	0.66484	454
2200308	-18.4133	12.2076	-0.19965	0.03787	0.97913	455
2200549	-18.8227	14.1585	-0.20393	0.05856	0.97723	456
2203196	-22.1905	10.0314	-0.23916	0.01572	0.97085	457
2222414	-20.4801	31.5143	-0.22111	0.24423	0.94417	458
2223367	-21.8803	30.8423	-0.23577	0.23732	0.94239	459
2240856	-19.0025	53.6140	-0.20509	0.48580	0.84967	460
2242049	-20.7537	46.6404	-0.22365	0.40904	0.88468	461
2242129	-20.6329	47.5652	-0.22235	0.41920	0.88024	462
2243095	-22.2382	46.2299	-0.23919	0.40492	0.88251	463
2244200	-22.2912	47.5745	-0.23971	0.41974	0.87542	464
2248660	-26.7240	51.1247	-0.28597	0.46042	0.84038	465
2251383	-20.2959	57.8340	-0.21846	0.53332	0.81722	466
2253414	-21.5064	58.7392	-0.23109	0.54384	0.80674	467
2302117	-30.0223	9.9581	-0.32106	0.01712	0.94690	468
2311200	-29.0046	19.7288	-0.31039	0.12029	0.94297	469
2324993	-32.7587	35.6775	-0.34947	0.29307	0.88993	470
2332591	-30.7763	41.0663	-0.32863	0.35104	0.87680	471
2342485	-30.6933	49.6235	-0.32754	0.44525	0.83335	472
2414074	-42.0415	17.6684	-0.44670	0.10358	0.88867	473
2419754	-46.6676	24.0303	-0.49502	0.17400	0.85128	474
2422182	-40.2451	27.8822	-0.42785	0.21203	0.87863	475
2429655	-46.6470	32.4403	-0.49472	0.26475	0.82775	476
2432593	-40.4144	40.8693	-0.42942	0.35321	0.83117	477
2435605	-42.3705	41.8155	-0.44985	0.36467	0.81526	478
2443217	-40.6182	47.5916	-0.43139	0.42747	0.79446	479
2478340	-45.7936	73.4594	-0.48429	0.72991	0.48239	480
2482528	-39.9777	83.8495	-0.42231	0.85793	0.29260	481
2483518	-40.8182	83.7526	-0.43107	0.85826	0.27849	482
2500797	-48.0062	14.8349	-0.50906	0.07664	0.85731	483
2509471	-56.4251	10.9981	-0.59705	0.04142	0.80114	484
2582092	-50.1814	78.4249	-0.52949	0.80217	0.27599	485
2621913	-57.7919	34.3365	-0.61118	0.29335	0.73512	486
2625706	-61.4894	32.4421	-0.64985	0.27590	0.70822	487
2733637	-69.4801	39.8354	-0.73323	0.36653	0.57274	488
2811221	-76.9704	16.5043	-0.81175	0.12066	0.57140	489
2817842	-82.9021	21.2613	-0.87370	0.18200	0.45113	490
2827023	-82.7038	23.1648	-0.87162	0.20252	0.44640	491
2838985	-84.2796	39.5166	-0.88770	0.39475	0.23699	492
2843722	-78.9697	47.3085	-0.83206	0.47190	0.29152	493
2847085	-83.3358	40.6329	-0.87783	0.40474	0.25613	494
2902560	-87.9432	8.0399	-0.92640	0.04976	0.37325	495
2905503	-90.2464	7.7789	-0.95044	0.05319	0.30633	496
2914918	-89.3251	21.2336	-0.94074	0.19810	0.27524	497
2915159	-90.6803	13.7192	-0.95495	0.11909	0.27184	498
2915924	-90.4254	20.5239	-0.95222	0.19430	0.23565	499
2916472	-91.8461	15.3133	-0.96707	0.14153	0.21151	500
2922640	-87.7146	27.1650	-0.92386	0.26021	0.28067	501
3001890	-1.1959	1.1547	-0.01944	-0.07989	0.99661	502
3005847	-4.5412	0.4798	-0.05446	-0.08683	0.99473	503
3007790	-6.8689	2.0788	-0.07884	-0.07000	0.99443	504
3009506	-7.9257	3.4433	-0.08991	-0.05566	0.99439	505
3011448	-0.6691	-5.3623	-0.01387	-0.14771	0.98893	506
3019109	-7.9302	-2.6164	-0.08991	-0.11887	0.98883	507
3018403	-6.9900	-4.8884	-0.08005	-0.14255	0.98655	508
3018666	-7.5970	-7.1456	-0.08638	-0.16590	0.98235	509
3019234	-8.2564	-3.0880	-0.09332	-0.12375	0.98792	510
3020688	-0.1575	-17.0537	-0.00834	-0.26831	0.96330	511

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
3032858	129.5932	101.4735	0.0070	-0.0069	0.5 0.6	512
3036865	125.6386	102.0662	0.0030	0.0008	6.0 3.4	513
3037942	124.8463	101.3989	-0.0002	-0.0021	1.9 1.5	514
3041147	130.4128	98.6032	0.0041	-0.0038	2.6 1.6	515
3041195	129.8889	98.7732	-0.0032	0.0009	2.5 0.5	516
3046553	125.2546	95.3392	-0.0038	0.0066	0.9 1.3	517
3049763	122.2505	93.5300	0.0007	0.0019	2.0 6.3	518
3073253	126.2420	67.8370	-0.0001	0.0014	1.4 4.7	519
3087112	122.1582	58.7475	-0.0085	-0.0037	1.7 1.8	520
3092608	125.6223	40.9855	0.0012	0.0075	0.3 0.9	521
3101997	122.4546	130.2529	-0.0016	0.0024	1.9 1.5	522
3102487	121.9654	135.0429	0.0017	-0.0060	1.3 2.2	523
3104301	120.8572	136.6465	0.0025	-0.0066	0.7 4.7	524
3105564	119.2366	134.5071	-0.0058	-0.0014	1.0 0.5	525
3110780	123.0367	123.1811	-0.0119	-0.0051	1.4 0.2	526
3111314	123.0599	126.6552	-0.0139	0.0028	2.2 3.7	527
3111581	122.2407	125.1069	-0.0100	-0.0065	1.3 2.0	528
3112097	121.4959	129.3041	0.0118	-0.0089	1.6 1.1	529
3112667	121.3981	123.5547	0.0036	-0.0020	9.9 3.1	530
3112790	121.0704	123.3057	0.0038	-0.0003	1.6 1.0	531
3115541	118.8210	125.2943	0.0042	0.0034	3.3 2.9	532
3115828	118.7771	121.6597	-0.0073	0.0030	2.3 2.4	533
3116195	117.6476	128.7938	-0.0042	0.0027	1.4 0.9	534
3116716	117.9646	122.8392	0.0041	-0.0020	2.0 0.8	535
3129060	114.5073	120.7356	-0.0063	-0.0024	2.0 1.0	536
3121650	121.8340	114.5258	-0.0075	0.0043	2.5 2.4	537
3121848	121.7174	111.8445	0.0103	0.0052	0.4 2.5	538
3122788	120.4858	112.8127	0.0085	-0.0046	1.1 7.0	539
3123111	120.6222	119.3480	-0.0134	0.0029	2.9 0.6	540
3124484	118.7989	116.1988	0.0001	0.0032	1.6 5.6	541
3124963	118.6546	111.5123	-0.0024	0.0053	5.3 1.1	542
3125799	117.5158	112.9190	0.0055	0.0035	3.9 2.3	543
3127551	116.1485	115.7169	0.0003	-0.0104	2.6 3.3	544
3128580	114.8930	115.8534	0.0073	-0.0021	1.2 0.8	545
3129865	113.8983	112.4471	0.0049	-0.0057	1.9 0.8	546
3133789	118.8614	102.9805	-0.0009	-0.0062	0.8 0.7	547
3136748	116.3392	103.2107	-0.0047	-0.0019	5.8 1.6	548
3145114	117.4007	99.6278	0.0046	0.0134	0.5 1.5	549
3145478	116.5272	96.2619	-0.0025	-0.0066	0.7 3.4	550
3146317	116.2486	97.4479	0.0006	-0.0039	8.7 1.8	551
3147120	115.4195	100.1344	-0.0029	0.0088	0.8 2.7	552
3147246	115.0996	98.5170	-0.0015	-0.0031	9.9 4.5	553
3147479	114.6597	96.3391	0.0040	0.0042	0.9 2.2	554
3170963	118.9034	60.9753	-0.0055	0.0050	1.8 1.1	555
3173872	116.0819	62.2299	0.0012	0.0060	1.2 0.5	556
3174887	114.9727	61.7140	0.0026	0.0103	0.9 1.2	557
3181514	118.0123	54.4695	-0.0083	0.0055	0.3 0.9	558
3183403	116.2072	55.6676	0.0066	0.0025	0.6 1.4	559
3185090	113.8766	60.4148	-0.0055	0.0031	1.9 1.5	560
3186437	113.0298	55.3659	0.0005	0.0084	2.2 8.0	561
3195531	113.0833	43.5916	0.0062	-0.0015	2.9 2.2	562
3197115	111.7131	47.9015	0.0056	-0.0009	0.8 3.4	563
3199037	109.7137	48.8754	-0.0085	0.0099	1.6 0.9	564
3200743	114.5647	132.9628	0.0046	-0.0026	4.6 1.3	565
3202284	112.5130	137.7358	-0.0043	0.0039	1.3 1.5	566
3204238	111.0635	137.4166	0.0014	-0.0007	4.3 1.9	567
3206916	108.8889	130.9852	0.0013	0.0032	6.7 0.7	568
3208308	107.4891	136.5942	0.0067	-0.0033	1.2 1.4	569
3207484	107.6352	135.9949	0.0121	-0.0087	1.1 0.1	570
3210753	113.7813	123.3442	-0.0056	-0.0025	1.1 2.4	571
3211189	112.9014	128.6529	0.0085	-0.0090	2.0 0.8	572
3211620	113.1835	124.7029	-0.0093	0.0103	3.0 2.1	573
3212525	112.2579	125.1886	0.0103	0.0041	6.1 1.3	574
3215323	109.5932	127.4682	0.0098	-0.0055	2.5 1.5	575
3217615	107.5733	124.4581	-0.0029	-0.0072	0.9 0.4	576
3217992	106.5626	121.8093	-0.0010	0.0017	1.3 3.5	577
3218074	106.3727	130.3411	0.0064	-0.0017	1.1 0.5	578
3218197	106.1316	129.1286	-0.0050	-0.0055	1.3 3.6	579
3218569	106.1397	125.0103	0.0054	-0.0069	0.8 1.0	580
3219757	105.1451	123.3942	0.0007	0.0029	2.6 9.9	581
3219913	105.4758	121.8205	-0.0052	-0.0060	1.3 5.7	582
3220293	113.0487	118.5812	0.0056	0.0047	2.0 3.7	583
3220698	112.7811	114.2445	-0.0118	0.0070	1.0 1.5	584

## POSITIONS ON THE DISK

8b

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
3032858	-1.7297	-28.8287	-0.02451	-0.38832	0.92120	512
3036865	-5.7158	-28.4948	-0.06626	-0.38478	0.92063	513
3037942	-6.4629	-29.2132	-0.07406	-0.39201	0.91698	514
3041147	-0.7236	-31.6426	-0.01389	-0.41679	0.90890	515
3041195	-1.2576	-31.5069	-0.01949	-0.41541	0.90942	516
3046553	-5.6583	-35.2401	-0.06545	-0.45287	0.88917	517
3049763	-8.5383	-37.2435	-0.09553	-0.47277	0.87599	518
3073253	-2.8706	-62.6497	-0.03489	-0.72335	0.68960	519
3087112	-6.3512	-71.9966	-0.07065	-0.81199	0.57938	520
3092608	-1.7297	-89.5144	-0.01992	-0.96767	0.25143	521
3101997	-10.7408	-0.5447	-0.11934	-0.09704	0.98810	522
3102487	-11.5430	4.2085	-0.12776	-0.04729	0.99068	523
3104301	-12.7542	5.7381	-0.14044	-0.03111	0.98960	524
3105564	-14.2316	3.4950	-0.15589	-0.05441	0.98627	525
3110780	-9.6964	-7.5713	-0.10835	-0.17013	0.97945	526
3111314	-9.9009	-4.0992	-0.11053	-0.13411	0.98478	527
3111581	-10.6171	-5.6994	-0.11800	-0.15064	0.98152	528
3112097	-11.6356	-1.5551	-0.12870	-0.10746	0.98584	529
3112667	-11.3565	-7.3050	-0.12572	-0.16720	0.97788	530
3112790	-11.6673	-7.5752	-0.12897	-0.16996	0.97698	531
3115541	-14.0428	-5.7355	-0.15385	-0.15058	0.97655	532
3115828	-13.8484	-9.3692	-0.15177	-0.18823	0.97033	533
3116195	-15.4432	-2.3161	-0.16853	-0.11486	0.97898	534
3116716	-14.7367	-8.2440	-0.16108	-0.17646	0.97104	535
3129060	-18.0497	-10.5712	-0.19571	-0.19995	0.96006	536
3121650	-10.3297	-16.2963	-0.11484	-0.25999	0.95876	537
3121848	-10.2704	-18.9825	-0.11417	-0.28753	0.95094	538
3122788	-11.5632	-18.0957	-0.12772	-0.27830	0.95196	539
3123111	-11.8552	-11.5581	-0.13089	-0.21108	0.96867	540
3124484	-13.4688	-14.8232	-0.14772	-0.24448	0.95834	541
3124963	-13.3057	-19.5143	-0.14592	-0.29260	0.94503	542
3125799	-14.5346	-18.1834	-0.15881	-0.27880	0.94713	543
3127551	-16.0827	-15.4776	-0.17505	-0.25081	0.95208	544
3128580	-17.3448	-15.4233	-0.18826	-0.25003	0.94976	545
3129865	-18.1144	-18.8910	-0.19625	-0.28544	0.93809	546
3133789	-12.5403	-28.0239	-0.13771	-0.37936	0.91495	547
3136748	-15.0729	-27.9587	-0.16422	-0.37833	0.91099	548
3145114	-13.7786	-31.4686	-0.15057	-0.41403	0.89772	549
3145478	-14.4300	-34.8881	-0.15728	-0.44839	0.87989	550
3146317	-14.7857	-33.7215	-0.16104	-0.43659	0.88513	551
3147120	-15.7893	-31.0918	-0.17163	-0.40991	0.89583	552
3147246	-16.0027	-32.7285	-0.17381	-0.42639	0.88768	553
3147479	-16.2990	-34.9329	-0.17684	-0.44853	0.87610	554
3170963	-9.7460	-69.9836	-0.10639	-0.79267	0.60030	555
3173872	-12.6444	-68.9145	-0.13685	-0.78211	0.60793	556
3174887	-13.7178	-69.5023	-0.14804	-0.78745	0.59833	557
3181514	-10.2091	-76.5410	-0.11066	-0.85365	0.50896	558
3183403	-12.0894	-75.4620	-0.13047	-0.84338	0.52124	559
3185090	-14.7267	-70.8717	-0.15850	-0.80012	0.57852	560
3186437	-15.2411	-75.9708	-0.16344	-0.84735	0.50526	561
3195531	-14.4162	-87.7296	-0.15332	-0.95056	0.27004	562
3197115	-16.0663	-83.5135	-0.17125	-0.91459	0.36634	563
3199037	-18.1257	-82.6712	-0.19293	-0.90653	0.37549	564
3200743	-18.7936	1.6473	-0.20361	-0.07295	0.97633	565
3202284	-21.1542	6.2815	-0.22832	-0.02394	0.97329	566
3204238	-22.5801	5.8680	-0.24323	-0.02796	0.96957	567
3206916	-24.3292	-0.6989	-0.26149	-0.09619	0.96040	568
3208308	-26.0940	4.8130	-0.27997	-0.03812	0.95925	569
3207484	-25.9089	4.2239	-0.27804	-0.04434	0.95955	570
3210753	-18.9452	-8.0127	-0.20511	-0.17335	0.96327	571
3211189	-20.1714	-2.7668	-0.21799	-0.11868	0.96871	572
3211620	-19.6310	-6.6943	-0.21230	-0.15956	0.96409	573
3212525	-20.5867	-6.2696	-0.22230	-0.15496	0.96259	574
3215323	-23.3958	-4.1663	-0.25170	-0.13250	0.95869	575
3217615	-25.2147	-7.3052	-0.27069	-0.16459	0.94849	576
3217992	-26.0499	-10.0173	-0.27939	-0.19240	0.94070	577
3218074	-26.7985	-1.5066	-0.28731	-0.10395	0.95218	578
3218197	-26.9598	-2.7336	-0.28898	-0.11667	0.95020	579
3218569	-26.6818	-6.8471	-0.28604	-0.15945	0.94486	580
3219757	-27.5687	-8.5265	-0.29529	-0.17657	0.93895	581
3219913	-27.1354	-10.0771	-0.29074	-0.19272	0.93719	582
3220293	-19.3644	-12.8187	-0.20943	-0.22287	0.95209	583
3220698	-19.3473	-17.1684	-0.20918	-0.26756	0.94056	584

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
3220964	112.9360	111.6916	0.0082	-0.0057	3.0 2.2	585
3221055	112.6721	120.3208	0.0089	-0.0006	9.9 5.2	586
3221159	112.5279	118.9744	0.0131	-0.0025	2.0 0.6	587
3222569	111.2585	115.1175	0.0133	-0.0045	1.6 0.7	588
3222621	111.6465	114.9797	0.0018	-0.0069	1.8 0.8	589
3224067	109.6390	120.2458	-0.0012	-0.0017	1.0 1.8	590
3224105	110.1673	119.4659	0.0020	-0.0017	2.4 4.0	591
3224549	109.4784	115.2331	0.0016	-0.0067	4.1 1.4	592
3225402	109.0158	116.9311	0.0055	-0.0102	4.1 0.6	593
3226472	107.4102	116.9574	0.0126	-0.0015	1.7 3.5	594
3228355	105.7741	117.7146	0.0066	-0.0028	1.5 3.0	595
3228762	105.4399	114.1366	0.0009	-0.0060	1.3 2.2	596
3228863	105.2977	113.0746	0.0048	0.0018	1.4 1.8	597
3229932	104.6097	112.1839	0.0017	-0.0019	4.3 0.9	598
3230703	112.9711	103.9382	-0.0029	-0.0027	2.2 0.7	599
3248280	104.2642	99.5688	-0.0050	-0.0089	1.8 3.3	600
3253340	108.6761	88.4159	-0.0003	-0.0071	5.8 2.0	601
3255031	107.0293	91.4635	-0.0019	-0.0019	1.6 2.0	602
3257058	104.8540	90.7868	-0.0019	0.0136	0.8 0.4	603
3257945	104.3290	82.0032	0.0001	-0.0032	1.1 4.9	604
3262916	108.6625	71.4969	-0.0020	0.0077	0.5 0.7	605
3264219	107.3195	78.4836	-0.0052	0.0053	1.4 5.1	606
3281622	108.2513	53.9065	0.0030	-0.0001	1.0 0.8	607
3281887	107.4554	51.1553	-0.0056	0.0044	1.4 5.5	608
3283628	106.2739	53.2761	0.0032	0.0077	0.5 2.0	609
3291421	107.5271	44.7605	0.0039	0.0018	9.9 2.9	610
3292501	106.6768	43.5757	-0.0050	0.0092	0.7 0.6	611
3294554	104.2274	43.0904	-0.0019	0.0147	0.4 1.9	612
3295497	103.0019	43.9614	0.0106	0.0066	2.5 2.9	613
3296590	102.0020	43.4470	0.0128	0.0072	0.4 0.7	614
3298086	100.5944	48.9550	-0.0090	0.0038	0.3 1.1	615
3298490	100.2038	44.7684	-0.0008	0.0103	0.8 1.0	616
3299073	99.8250	49.3428	0.0058	0.0004	1.4 2.0	617
3299436	99.6984	43.8776	0.0014	0.0093	0.5 0.5	618
3300813	105.2327	132.3531	0.0037	-0.0010	1.1 2.6	619
3305776	99.8456	133.2914	0.0057	0.0018	1.3 0.7	620
3310786	103.9562	123.5037	-0.0031	0.0022	1.0 0.7	621
3311835	103.4218	122.6380	-0.0035	-0.0064	1.3 2.2	622
3313428	101.7751	126.2461	-0.0018	0.0026	2.4 0.6	623
3313923	101.5066	121.9240	0.0042	-0.0054	2.8 2.8	624
3313947	101.3261	121.5915	0.0040	-0.0131	1.6 1.0	625
3314917	100.6719	121.5833	-0.0003	0.0028	1.1 3.4	626
3315380	99.4681	128.0292	-0.0025	-0.0140	1.9 0.9	627
3315473	99.5055	126.8713	0.0073	-0.0093	0.7 2.4	628
3316809	98.9125	122.4156	-0.0059	-0.0047	1.6 2.0	629
3316311	99.1917	128.0127	0.0119	-0.0062	1.1 0.7	630
3317699	97.2140	124.3593	-0.0001	-0.0119	2.6 1.2	631
3319922	95.8220	122.2393	0.0022	0.0005	2.0 1.9	632
3321051	103.1257	121.1247	-0.0034	-0.0082	1.5 2.0	633
3325437	99.1381	116.7243	0.0022	-0.0099	1.6 1.3	634
3328562	95.9979	116.4127	-0.0092	0.0109	6.3 2.6	635
3335124	98.8219	110.2480	-0.0047	-0.0030	9.9 1.6	636
3351502	101.2256	86.4686	-0.0042	0.0042	1.7 0.9	637
3362154	99.3302	80.2301	-0.0033	0.0107	1.2 0.8	638
3366854	94.9934	73.1272	0.0063	0.0073	2.1 0.8	639
3377347	93.7716	67.6609	0.0087	-0.0011	1.3 1.6	640
3378121	93.1911	70.3369	-0.0008	0.0034	0.8 7.3	641
3380932	99.2694	50.5759	0.0102	0.0007	2.4 0.8	642
3381593	98.1285	55.0336	-0.0161	0.0102	1.9 1.4	643
3383485	96.3382	55.9106	-0.0040	0.0021	0.8 1.6	644
3383681	96.1739	54.1055	0.0008	0.0058	1.6 3.2	645
3385433	94.9258	56.1909	0.0089	0.0009	9.9 4.9	646
3386377	93.6639	56.8085	-0.0050	0.0121	2.9 2.0	647
3389923	90.7390	50.1385	0.0143	0.0093	2.1 1.8	648
3390075	98.7848	49.0075	0.0153	0.0066	3.0 6.5	649
3390462	98.4968	44.3039	0.0057	0.0122	1.1 1.1	650
3395150	94.1337	48.2074	0.0119	0.0051	0.2 0.2	651
3395293	93.6324	46.4224	0.0031	0.0066	1.2 8.6	652
3399052	90.3557	48.8749	0.0121	0.0011	1.9 1.6	653
3407403	89.2890	136.6262	-0.0092	0.0033	9.9 2.6	654
3433974	90.2001	102.5401	-0.0074	0.0029	2.2 1.9	655
3451196	91.0921	90.3302	-0.0026	-0.0098	1.4 2.2	656
3471353	89.9107	68.0976	0.0017	0.0046	1.1 3.0	657

## POSITIONS ON THE DISK

9b

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
3220964	-19.0255	-19.7086	-0.20576	-0.29363	0.93351	585
3221055	-19.8543	-11.1054	-0.21458	-0.20511	0.95493	586
3221159	-19.9100	-12.4599	-0.21514	-0.21906	0.95170	587
3222569	-20.9243	-16.3957	-0.22569	-0.25931	0.93906	588
3222621	-20.5280	-16.5080	-0.22154	-0.26054	0.93970	589
3224067	-22.8769	-11.3783	-0.24619	-0.20726	0.94680	590
3224105	-22.2984	-12.1230	-0.24013	-0.21507	0.94662	591
3224549	-22.7087	-16.3964	-0.24435	-0.25891	0.93448	592
3225402	-23.2817	-14.7303	-0.25037	-0.24166	0.93750	593
3226472	-24.8860	-14.8089	-0.26715	-0.24207	0.93276	594
3228355	-26.5687	-14.1593	-0.28476	-0.23493	0.92937	595
3228762	-26.6678	-17.7555	-0.28573	-0.27181	0.91895	596
3228863	-26.7401	-18.8257	-0.28647	-0.28274	0.91542	597
3229932	-27.3685	-19.7604	-0.29302	-0.29212	0.91039	598
3230703	-18.4824	-27.4518	-0.19990	-0.37258	0.90621	599
3248280	-26.8868	-32.3852	-0.28768	-0.42039	0.86053	600
3253340	-21.7523	-43.2387	-0.23361	-0.53042	0.81491	601
3255031	-23.5957	-40.3017	-0.25300	-0.50070	0.82782	602
3257058	-25.7226	-41.1197	-0.27522	-0.50825	0.81605	603
3257945	-25.6711	-49.9287	-0.27433	-0.59546	0.75509	604
3262916	-20.6573	-60.1414	-0.22134	-0.69644	0.68263	605
3264219	-22.4555	-53.2494	-0.24053	-0.62897	0.73928	606
3281622	-19.9150	-77.7407	-0.21222	-0.86205	0.46025	607
3281887	-20.5292	-80.5410	-0.21836	-0.88688	0.40715	608
3283628	-21.8475	-78.4995	-0.23238	-0.86814	0.43855	609
3291421	-20.0386	-86.9246	-0.21234	-0.94141	0.26203	610
3292501	-20.8097	-88.1638	-0.22019	-0.95066	0.21853	611
3294554	-23.2227	-88.8085	-0.24529	-0.95362	0.17449	612
3295497	-24.5031	-88.0184	-0.25884	-0.94677	0.19138	613
3296590	-25.4674	-88.5976	-0.26879	-0.95003	0.15875	614
3298086	-27.2333	-83.1871	-0.28819	-0.90621	0.30941	615
3298490	-27.3488	-87.3949	-0.28871	-0.93957	0.18402	616
3299073	-28.0267	-82.8499	-0.29654	-0.90283	0.31139	617
3299436	-27.7949	-88.3178	-0.29316	-0.94556	0.14133	618
3300813	-28.0682	0.4289	-0.30060	-0.08340	0.95010	619
3305776	-33.5068	1.0145	-0.35746	-0.07550	0.93087	620
3310786	-28.7626	-8.4948	-0.30777	-0.17589	0.93506	621
3311835	-29.2392	-9.3945	-0.31275	-0.18504	0.93164	622
3313428	-31.1192	-5.8976	-0.33244	-0.14825	0.93140	623
3313923	-31.1040	-10.2328	-0.33224	-0.19310	0.92322	624
3313947	-31.2625	-10.5768	-0.33389	-0.19660	0.92188	625
3314917	-31.9149	-10.6277	-0.34071	-0.19690	0.91932	626
3315380	-33.5388	-4.2669	-0.35776	-0.13049	0.92465	627
3315473	-33.4256	-5.4212	-0.35656	-0.14251	0.92334	628
3316809	-33.7255	-9.9111	-0.35965	-0.18887	0.91377	629
3316311	-33.8136	-4.3014	-0.36063	-0.13075	0.92350	630
3317699	-35.5483	-8.0802	-0.37873	-0.16926	0.90990	631
3319922	-36.7987	-10.2890	-0.39177	-0.19159	0.89989	632
3321051	-29.4356	-10.9256	-0.31478	-0.20079	0.92768	633
3325437	-33.1275	-15.5819	-0.35331	-0.24745	0.90218	634
3328562	-36.2414	-16.0982	-0.38586	-0.25157	0.88759	635
3335124	-33.0187	-22.0722	-0.35206	-0.31387	0.88178	636
3351502	-29.0613	-45.6704	-0.30997	-0.55236	0.77383	637
3362154	-30.5444	-52.0263	-0.32521	-0.61433	0.71891	638
3366854	-34.4077	-59.4052	-0.36525	-0.68419	0.63124	639
3377347	-35.2690	-64.9457	-0.37393	-0.73652	0.56366	640
3378121	-36.0238	-62.3103	-0.38199	-0.71114	0.59023	641
3380932	-28.6620	-81.6544	-0.30334	-0.89226	0.33445	642
3381593	-30.0928	-77.2757	-0.31880	-0.85305	0.41312	643
3383485	-31.9373	-76.5165	-0.33817	-0.84514	0.41398	644
3383681	-31.9830	-78.3305	-0.33846	-0.86119	0.37921	645
3385433	-33.3655	-76.3286	-0.35312	-0.84253	0.40675	646
3386377	-34.6655	-75.7940	-0.36677	-0.83687	0.40636	647
3389923	-37.1479	-82.6483	-0.39189	-0.89288	0.22179	648
3390075	-29.0429	-83.2528	-0.30711	-0.90546	0.29295	649
3390462	-29.0222	-87.9704	-0.30605	-0.94174	0.13949	650
3395150	-33.6330	-84.3558	-0.35491	-0.91015	0.21368	651
3395293	-34.0164	-86.1716	-0.35856	-0.92288	0.14047	652
3399052	-37.4477	-83.9356	-0.39480	-0.90222	0.17360	653
3407403	-44.2622	3.6567	-0.46991	-0.04323	0.88166	654
3433974	-41.1194	-30.3352	-0.43656	-0.39421	0.80871	655
3451196	-39.4289	-42.4744	-0.41851	-0.51639	0.74712	656
3471353	-39.1513	-64.7615	-0.41454	-0.73250	0.53999	657

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
3478483	82.7754	66.8551	0.0053	0.0015	1.6 2.7	658
3478759	82.8003	62.9416	-0.0022	0.0135	0.3 0.5	659
3479428	82.3207	66.3338	-0.0021	0.0180	2.2 1.2	660
3481262	89.0988	58.3671	0.0002	0.0076	3.8 1.0	661
3483154	87.2928	59.2231	0.0045	0.0089	4.4 3.0	662
3503054	83.3407	140.4689	0.0024	-0.0139	0.8 1.4	663
3517584	78.2648	126.1141	0.0023	-0.0097	0.4 1.4	664
3518498	77.1905	126.6521	0.0023	-0.0071	0.4 1.3	665
3518623	77.7982	125.2631	0.0044	-0.0024	1.3 1.4	666
3518712	77.8591	124.4045	0.0122	-0.0086	3.4 2.3	667
3519248	76.8219	128.6399	0.0025	-0.0032	0.7 8.0	668
3526348	78.9881	117.9459	-0.0043	-0.0047	0.9 2.8	669
3535698	78.6258	105.2592	0.0004	-0.0003	1.2 3.1	670
3538506	76.7133	106.4308	0.0072	-0.0042	3.1 1.2	671
3539178	75.3634	110.1130	-0.0051	-0.0037	9.9 3.6	672
3541807	82.5620	93.4097	0.0062	0.0022	1.8 0.5	673
3542500	81.8735	97.0622	-0.0028	0.0037	0.8 1.0	674
3543313	80.9096	98.7444	0.0107	0.0005	0.6 1.6	675
3543549	80.4480	96.1331	0.0077	-0.0049	0.9 1.0	676
3571780	79.6739	63.7804	0.0088	0.0096	0.8 0.4	677
3573587	77.8983	65.1246	-0.0034	0.0007	2.3 1.8	678
3576436	75.5059	66.1737	0.0117	0.0118	1.5 0.5	679
3577167	74.4934	69.3919	0.0055	0.0097	2.0 1.0	680
3577717	74.5172	62.5294	0.0000	0.0157	0.5 0.4	681
3579336	72.7004	67.0588	-0.0023	0.0012	1.7 2.5	682
3580004	81.1155	59.9912	0.0107	0.0009	2.2 3.2	683
3582039	78.9055	59.3058	0.0017	0.0075	0.4 0.6	684
3608594	68.2235	135.6175	0.0045	-0.0118	1.8 2.3	685
3610644	75.6554	125.1848	0.0009	-0.0036	1.8 4.7	686
3611311	75.2265	128.3666	0.0041	-0.0006	6.5 4.8	687
3614486	71.5792	126.8355	0.0050	-0.0041	0.7 1.1	688
3616880	69.4541	123.4992	0.0045	-0.0010	1.5 0.9	689
3617346	69.1690	127.7251	-0.0025	-0.0014	2.3 1.3	690
3618622	68.1903	125.2938	0.0127	0.0009	1.8 5.1	691
3625822	70.3050	113.5787	-0.0019	0.0013	2.3 1.8	692
3630019	75.0169	111.0136	-0.0006	-0.0066	1.9 9.9	693
3645106	69.6027	100.3032	0.0018	0.0030	2.5 1.4	694
3645848	68.7011	93.0671	-0.0009	0.0002	1.6 0.6	695
3647141	67.3062	100.8013	-0.0057	0.0052	0.6 0.2	696
3647830	66.8956	93.8293	0.0032	0.0023	0.7 0.7	697
3649728	65.1246	93.9722	-0.0036	0.0038	2.1 0.5	698
3649871	64.6167	93.5841	0.0001	0.0092	0.8 0.5	699
3653333	70.4280	88.4791	-0.0050	0.0002	2.7 0.5	700
3660510	72.6277	76.4124	-0.0012	0.0099	2.1 3.3	701
3662862	70.0206	72.8707	0.0102	0.0081	1.8 0.8	702
3664555	68.3883	75.6180	0.0097	0.0137	0.7 1.3	703
3664828	68.4017	72.0162	0.0035	0.0051	0.7 1.2	704
3666204	67.0960	78.8771	-0.0079	0.0117	0.4 0.5	705
3667453	65.5780	76.6660	0.0059	0.0086	0.7 2.1	706
3669042	63.9786	80.9639	0.0032	0.0112	5.0 1.2	707
3669405	64.0543	76.3283	0.0073	0.0168	0.5 0.9	708
3669464	63.4862	76.3145	0.0137	0.0115	1.3 2.0	709
3669925	63.4114	70.4326	0.0054	0.0143	0.3 0.2	710
3671624	70.5931	63.5513	0.0054	0.0159	1.8 1.1	711
3671627	70.5736	63.1006	0.0164	0.0041	0.7 0.4	712
3672641	69.5074	63.6966	0.0124	0.0032	0.4 0.4	713
3701674	65.4205	134.5623	-0.0013	-0.0065	3.6 1.1	714
3712500	64.6640	126.3087	-0.0111	-0.0019	2.2 1.7	715
3722516	63.8247	116.0328	-0.0073	0.0013	1.5 2.0	716
3722757	63.3253	113.9654	-0.0006	-0.0043	2.9 1.5	717
3735934	59.7995	102.0899	0.0003	0.0070	1.8 1.0	718
3737749	57.9224	103.5057	0.0067	-0.0063	2.0 0.9	719
3739493	55.7491	106.9656	-0.0022	0.0049	1.1 1.2	720
3740574	63.8070	96.3035	-0.0001	0.0064	0.9 0.4	721
3750030	63.9201	91.5727	0.0064	0.0022	0.4 0.6	722
3751813	62.5469	82.8714	-0.0072	0.0006	2.0 0.9	723
3758712	55.7761	83.0762	0.0037	0.0106	0.4 0.5	724
3761234	62.0293	78.4224	0.0007	0.0121	1.0 0.6	725
3761679	61.2659	73.1073	0.0051	0.0081	0.4 0.6	726
3762759	60.3394	71.5910	-0.0139	0.0275	0.1 0.1	727
3767082	55.8265	79.6522	-0.0044	0.0079	0.4 0.3	728
3804125	53.7857	138.6278	-0.0028	0.0160	4.4 0.7	729
3804971	52.8041	131.3939	-0.0026	0.0001	2.2 0.9	730

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
3478483	-46.1919	-66.4686	-0.48804	-0.74321	0.45766	658
3478759	-45.9107	-70.3765	-0.48480	-0.77906	0.39753	659
3479428	-46.6117	-67.0191	-0.49238	-0.74791	0.44518	660
3481262	-39.3242	-74.5351	-0.41560	-0.82211	0.38913	661
3483154	-41.1829	-73.7979	-0.43509	-0.81397	0.38489	662
3503054	-50.4513	7.1071	-0.53461	-0.00357	0.84509	663
3517584	-54.5771	-7.5645	-0.57763	-0.15401	0.80164	664
3518498	-55.6846	-7.0972	-0.58921	-0.14842	0.79423	665
3518623	-54.9871	-8.4450	-0.58190	-0.16284	0.79679	666
3518712	-54.8701	-9.2988	-0.58067	-0.17173	0.79582	667
3519248	-56.1828	-5.1354	-0.59443	-0.12774	0.79393	668
3526348	-53.3199	-15.6771	-0.56438	-0.23836	0.79036	669
3535698	-52.8503	-28.3745	-0.55922	-0.36769	0.74302	670
3538506	-54.8360	-27.3290	-0.58000	-0.35577	0.73282	671
3539178	-56.4246	-23.7387	-0.59668	-0.31833	0.73664	672
3541807	-48.1450	-39.9550	-0.50972	-0.48653	0.70956	673
3542500	-49.0715	-36.3511	-0.51952	-0.45012	0.72629	674
3543313	-50.1439	-34.7336	-0.53077	-0.43328	0.72838	675
3543549	-50.4335	-37.3724	-0.53372	-0.45940	0.70999	676
3571780	-49.0862	-69.7427	-0.51803	-0.77015	0.37217	677
3573587	-50.9466	-68.5158	-0.53757	-0.75714	0.37116	678
3576436	-53.4033	-67.6239	-0.56330	-0.74628	0.35462	679
3577167	-54.6247	-64.4752	-0.57629	-0.71652	0.39306	680
3577717	-54.1513	-71.3291	-0.57077	-0.77736	0.26445	681
3579336	-56.2616	-66.9229	-0.59320	-0.73632	0.32549	682
3580004	-47.3990	-73.4339	-0.50007	-0.80448	0.32052	683
3582039	-49.5600	-74.2629	-0.52255	-0.80876	0.26991	684
3608594	-65.2224	1.2737	-0.68895	-0.05377	0.72281	685
3610644	-57.1208	-8.6632	-0.60420	-0.16359	0.77986	686
3611311	-57.7574	-5.5127	-0.61088	-0.13052	0.78089	687
3614486	-61.2976	-7.2803	-0.64786	-0.14610	0.74762	688
3616880	-63.2001	-10.7519	-0.66771	-0.18033	0.72225	689
3617346	-63.7616	-6.5490	-0.67362	-0.13646	0.72637	690
3618622	-64.5791	-9.0417	-0.68214	-0.16150	0.71317	691
3625822	-61.7007	-20.6068	-0.65189	-0.28240	0.70377	692
3630019	-56.8295	-22.8617	-0.60093	-0.30914	0.73710	693
3645106	-61.5319	-33.9146	-0.64982	-0.41636	0.63591	694
3645848	-61.9576	-41.2022	-0.65405	-0.48790	0.57808	695
3647141	-63.8567	-33.5670	-0.67412	-0.41072	0.61389	696
3647830	-63.8097	-40.5587	-0.67342	-0.47972	0.56247	697
3649728	-65.5868	-40.5316	-0.69199	-0.47755	0.54138	698
3649871	-66.0683	-40.9524	-0.69701	-0.48111	0.53170	699
3653333	-59.9333	-45.6728	-0.63273	-0.53347	0.56131	700
3660510	-56.9470	-57.5836	-0.60098	-0.65028	0.46471	701
3662862	-59.3172	-61.2919	-0.62552	-0.68177	0.37937	702
3664555	-61.1265	-58.6540	-0.64458	-0.65527	0.39388	703
3664828	-60.8771	-62.2512	-0.64174	-0.68824	0.33837	704
3666204	-62.6299	-55.4826	-0.66046	-0.62397	0.41767	705
3667453	-64.0002	-57.7906	-0.67464	-0.64333	0.36192	706
3669042	-66.8782	-53.6014	-0.69449	-0.60204	0.39399	707
3669405	-65.4990	-58.2273	-0.69026	-0.64492	0.32806	708
3669464	-66.0651	-58.2782	-0.69616	-0.64442	0.31636	709
3669925	-65.7544	-64.1590	-0.69244	-0.69539	0.19226	710
3671624	-58.1351	-70.5644	-0.61239	-0.76392	0.20350	711
3671627	-58.1251	-71.0159	-0.61223	-0.76749	0.19009	712
3672641	-59.2283	-70.4901	-0.62378	-0.76093	0.17856	713
3701674	-67.9510	0.0366	-0.71746	-0.06412	0.69364	714
3712500	-68.1653	-8.2581	-0.71963	-0.15003	0.67796	715
3722516	-68.3298	-18.5783	-0.72120	-0.25561	0.64385	716
3722757	-68.6927	-20.6762	-0.72496	-0.27652	0.63085	717
3735934	-71.4338	-32.7698	-0.75333	-0.39443	0.52623	718
3737749	-73.4002	-31.4780	-0.77391	-0.37911	0.50729	719
3739493	-75.7962	-28.1635	-0.79903	-0.34298	0.49388	720
3740574	-67.0547	-38.2887	-0.70741	-0.45396	0.54176	721
3750030	-66.6318	-43.0073	-0.70283	-0.50041	0.50559	722
3751813	-67.4323	-51.7894	-0.71081	-0.58292	0.39364	723
3758712	-74.2039	-52.0269	-0.78146	-0.57244	0.24825	724
3761234	-67.6574	-56.2676	-0.71291	-0.62361	0.32073	725
3761679	-68.0711	-61.6272	-0.71681	-0.66905	0.19635	726
3762759	-68.8965	-63.2024	-0.72521	-0.67858	0.11662	727
3767082	-73.9292	-55.4441	-0.77835	-0.60217	0.17767	728
3804125	-79.8306	3.3382	-0.84163	-0.01520	0.53984	729
3804971	-80.3363	-3.9523	-0.84686	-0.09059	0.52404	730

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
3807476	50.1649	135.4154	0.0056	0.0054	0.7 2.6	731
3808183	49.3565	138.4461	-0.0041	0.0006	3.1 0.7	732
3818172	48.8268	128.9698	-0.0086	0.0105	2.8 0.5	733
3824334	52.2797	117.4712	-0.0059	0.0076	1.4 0.6	734
3824950	51.6985	111.9015	-0.0046	0.0039	0.7 0.5	735
3825746	50.8982	113.2272	-0.0055	-0.0018	1.1 0.1	736
3830294	54.9308	108.7472	-0.0005	-0.0071	3.0 3.3	737
3831036	54.6124	110.5782	-0.0008	-0.0041	1.0 0.5	738
3831377	54.0223	107.4103	-0.0079	0.0092	0.7 0.3	739
3831691	53.6655	105.0173	-0.0033	0.0126	1.0 0.7	740
3832640	53.2015	105.0345	-0.0039	0.0080	1.4 1.0	741
3832592	52.7486	105.8050	-0.0025	-0.0001	0.7 0.6	742
3833296	52.0033	108.3118	-0.0064	0.0051	0.7 1.2	743
3833332	52.5940	107.8090	-0.0004	0.0055	3.8 1.4	744
3834242	51.5628	108.6311	0.0070	0.0026	2.2 0.4	745
3836051	49.6239	110.5617	-0.0015	0.0031	3.8 0.5	746
3836342	49.5220	107.3790	-0.0021	-0.0032	2.8 0.8	747
3838560	47.2569	105.2218	-0.0013	0.0087	2.1 0.3	748
3841165	53.5719	99.4699	-0.0009	0.0000	1.0 0.5	749
3843319	51.9486	96.7447	0.0072	0.0004	2.4 0.9	750
3849065	45.8777	99.0593	0.0058	-0.0006	0.8 0.6	751
3903162	44.6396	137.8675	-0.0022	-0.0025	2.7 0.3	752
3903541	44.6809	134.1910	-0.0031	0.0025	1.8 0.2	753
3904262	43.6874	136.7693	-0.0002	0.0038	2.0 0.4	754
3904844	43.4368	130.8082	-0.0021	-0.0039	4.0 8.9	755
3913365	43.8932	126.0700	0.0021	-0.0067	0.5 0.7	756
3920965	45.6968	110.5726	-0.0073	0.0057	1.1 0.4	757
3922463	44.1339	115.4771	0.0045	-0.0100	1.1 0.6	758
3930864	45.1197	101.1244	-0.0216	0.0234	0.4 0.1	759
4004742	138.1642	131.6441	0.0011	0.0053	0.6 0.4	760
4004905	137.6764	129.5140	0.0051	-0.0063	2.9 9.9	761
4005338	139.2366	134.8398	0.0033	-0.0032	2.1 2.3	762
4006709	139.6474	130.8778	0.0061	-0.0056	2.0 1.9	763
4013281	137.2871	127.0352	-0.0007	0.0010	1.6 0.5	764
4015091	139.3925	128.8102	0.0153	-0.0105	1.7 1.6	765
4015361	138.9316	125.9144	0.0016	-0.0095	3.3 1.9	766
4016127	139.6142	127.2369	0.0048	0.0110	0.6 0.8	767
4016748	139.4410	121.3376	0.0057	-0.0041	2.3 1.9	768
4017525	140.3237	123.5801	0.0005	-0.0089	1.2 1.4	769
4017714	140.0689	121.7399	0.0088	-0.0101	1.8 0.5	770
4017781	140.8091	121.9346	0.0038	-0.0081	4.4 0.6	771
4024931	136.6841	110.5334	-0.0103	-0.0045	0.6 0.3	772
4030878	132.6118	101.3282	-0.0046	-0.0007	0.8 3.2	773
4031069	133.9541	108.9577	-0.0052	-0.0093	2.8 0.6	774
4037042	139.5748	109.2678	-0.0099	0.0044	0.6 9.9	775
4040106	131.7671	98.6326	-0.0109	0.0008	1.7 0.4	776
4043060	135.2459	99.9233	-0.0101	-0.0078	5.5 2.4	777
4048108	139.3069	97.8364	-0.0007	-0.0057	0.8 0.5	778
4072050	132.1274	69.8876	-0.0078	-0.0043	1.7 2.3	779
4073188	133.2026	67.9324	0.0023	0.0015	1.9 2.4	780
4092795	130.2321	39.7614	0.0011	-0.0024	2.3 2.8	781
4093824	130.3588	38.5542	0.0069	0.0053	0.1 1.0	782
4094897	131.9306	37.9249	-0.0049	0.0006	0.4 1.0	783
4097891	134.8580	38.5355	0.0092	0.0063	1.0 0.4	784
4099807	135.7964	37.4366	0.0072	0.0039	0.3 1.0	785
4099972	136.4005	36.5249	0.0049	0.0010	0.5 1.1	786
4102396	146.4719	134.4733	0.0032	-0.0079	2.1 3.5	787
4102520	145.7420	133.2614	-0.0041	-0.0028	0.7 1.1	788
4102897	146.1590	129.6235	-0.0074	0.0021	1.0 1.9	789
4103720	146.6084	131.2164	0.0009	-0.0043	0.8 1.1	790
4106149	149.8882	135.8707	-0.0084	-0.0012	1.6 0.6	791
4114228	147.1457	125.6007	-0.0069	0.0004	0.7 0.3	792
4115169	148.5014	126.4166	-0.0002	-0.0004	0.9 0.6	793
4115787	148.3414	120.7913	0.0081	-0.0034	1.1 0.3	794
4121834	143.3980	110.8015	-0.0013	-0.0069	1.1 1.3	795
4122230	144.7441	116.8608	0.0067	-0.0068	2.7 1.4	796
4122982	144.7393	109.8748	-0.0018	-0.0052	1.4 1.7	797
4125966	147.4048	109.2541	-0.0003	-0.0047	1.1 1.1	798
4126898	148.6663	109.9954	-0.0018	-0.0074	2.0 9.9	799
4127892	149.6951	110.4449	-0.0048	0.0009	1.6 2.6	800
4129646	151.1558	111.8567	-0.0001	-0.0094	4.1 1.8	801
4134740	145.7477	102.0770	0.0038	-0.0056	1.5 0.9	802
4136545	147.7240	103.4534	-0.0136	-0.0039	3.3 1.9	803

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
3807476	-83.2342	-0.1073	-0.87717	-0.04583	0.47798	731
3808183	-84.2396	2.8676	-0.88770	-0.01283	0.46025	732
3818172	-84.1474	-6.6337	-0.88666	-0.11194	0.44867	733
3824334	-79.9475	-17.8952	-0.84262	-0.23397	0.48503	734
3824950	-80.1626	-23.4971	-0.84475	-0.28982	0.44988	735
3825746	-81.0483	-22.2250	-0.85403	-0.27562	0.44120	736
3830294	-76.7297	-26.4371	-0.80882	-0.32448	0.49043	737
3831036	-77.1675	-24.6288	-0.81344	-0.30582	0.49477	738
3831377	-77.5489	-27.8320	-0.81735	-0.33708	0.46725	739
3831691	-77.7482	-30.2458	-0.81937	-0.36057	0.44568	740
3832640	-78.2125	-30.2590	-0.82422	-0.35994	0.43716	741
3832592	-78.7150	-29.5188	-0.82949	-0.35183	0.43378	742
3833296	-79.6232	-27.0633	-0.83904	-0.32610	0.43551	743
3833332	-79.0006	-27.5270	-0.83252	-0.33173	0.44369	744
3834242	-80.0838	-26.7731	-0.84386	-0.32244	0.42888	745
3836051	-82.1456	-24.9710	-0.86543	-0.30089	0.40061	746
3836342	-82.0388	-28.1571	-0.86424	-0.33239	0.37763	747
3838560	-84.1583	-30.4600	-0.88630	-0.34995	0.30334	748
3841165	-77.4782	-35.7938	-0.81638	-0.41506	0.40156	749
3843319	-78.9199	-38.6222	-0.83134	-0.43936	0.34036	750
3849065	-85.1312	-36.7063	-0.89618	-0.40484	0.18156	751
3903162	-88.9098	1.9815	-0.93647	-0.01206	0.35054	752
3903541	-88.6277	-1.6885	-0.93350	-0.05118	0.35491	753
3904262	-89.7883	0.8223	-0.94563	-0.02189	0.32449	754
3904844	-89.6478	-5.1491	-0.94412	-0.08435	0.31863	755
3913365	-88.8818	-9.8527	-0.93606	-0.13457	0.32508	756
3920965	-86.0661	-25.2165	-0.90636	-0.29460	0.30285	757
3922463	-87.9475	-20.4191	-0.92612	-0.24272	0.28879	758
3930864	-86.0230	-34.6928	-0.90557	-0.38356	0.18120	759
4004742	4.8483	1.8707	0.04385	-0.07230	0.99642	760
4004905	4.5010	-0.2890	0.04023	-0.09485	0.99468	761
4005338	5.7094	5.1332	0.05286	-0.03812	0.99787	762
4006709	6.3790	1.2021	0.05989	-0.07919	0.99506	763
4013281	4.2749	-2.7907	0.03788	-0.12091	0.99194	764
4015091	6.2601	-0.8801	0.05866	-0.10092	0.99316	765
4015361	5.9898	-3.8030	0.05586	-0.13134	0.98976	766
4016127	6.5845	-2.4373	0.06207	-0.11711	0.99118	767
4016748	6.7981	-8.3419	0.06438	-0.17834	0.98186	768
4017525	7.5323	-6.0441	0.07204	-0.15450	0.98536	769
4017714	7.3985	-7.8990	0.07066	-0.17372	0.98226	770
4017781	8.1246	-7.6561	0.07827	-0.17115	0.98213	771
4024931	4.7543	-19.3150	0.04316	-0.29136	0.95564	772
4030878	1.2928	-28.7767	0.00714	-0.38780	0.92172	773
4031069	2.1327	-21.0674	0.01573	-0.30936	0.95081	774
4037042	7.7226	-20.3907	0.07428	-0.30217	0.95036	775
4040106	0.6263	-31.5248	0.00025	-0.41560	0.90955	776
4043060	4.0140	-30.0082	0.03569	-0.40019	0.91574	777
4048108	8.2042	-31.8279	0.07966	-0.41831	0.90480	778
4072050	2.8694	-60.2170	0.02513	-0.69987	0.71383	779
4073188	4.0707	-62.1000	0.03785	-0.71800	0.69501	780
4092795	2.9516	-90.4363	0.02948	-0.97473	0.22141	781
4093824	3.1573	-91.6339	0.03195	-0.98355	0.17781	782
4094897	4.7673	-92.1600	0.04905	-0.98695	0.15338	783
4097891	7.6493	-91.3589	0.07915	-0.98070	0.17877	784
4099807	8.6580	-92.3954	0.09011	-0.98738	0.13023	785
4099972	9.3207	-93.2667	0.09746	-0.99209	0.07905	786
4102396	12.9552	5.2395	0.12880	-0.03631	0.99101	787
4102520	12.3061	3.9812	0.12200	-0.04958	0.99129	788
4102897	12.9606	0.3742	0.12887	-0.08719	0.98782	789
4103720	13.3049	1.9949	0.13247	-0.07022	0.98870	790
4106149	16.2736	6.8586	0.16359	-0.01883	0.98635	791
4114228	14.2091	-3.5801	0.14199	-0.12819	0.98153	792
4115169	15.5089	-2.6765	0.15561	-0.11860	0.98067	793
4115787	15.7178	-8.3065	0.15787	-0.17696	0.97147	794
4121834	11.4382	-18.6089	0.11319	-0.28357	0.95225	795
4122230	12.3847	-12.4678	0.12299	-0.22039	0.96763	796
4122982	12.8376	-19.4471	0.12788	-0.29198	0.94784	797
4125966	15.5388	-19.8931	0.15621	-0.29614	0.94228	798
4126898	16.7494	-19.0702	0.16889	-0.28752	0.94277	799
4127892	17.7469	-18.5540	0.17934	-0.28206	0.94249	800
4129646	19.1124	-17.0483	0.19363	-0.26638	0.94422	801
4134740	14.3552	-27.1711	0.14400	-0.37045	0.91762	802
4136545	16.2375	-25.6670	0.16370	-0.35488	0.92047	803

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
4136687	148.0120	102.2756	0.0073	0.0021	1.7 1.0	804
4138500	149.2692	103.7914	0.0052	-0.0097	0.9 1.3	805
4143361	144.5528	96.2181	0.0065	0.0051	2.4 9.9	806
4143599	144.7037	93.3255	-0.0096	0.0067	1.8 3.3	807
4146856	146.9765	90.4995	-0.0011	-0.0005	0.8 6.2	808
4147687	148.3636	92.2550	0.0050	-0.0121	2.4 1.1	809
4148772	149.1080	91.7271	0.0042	-0.0030	4.9 3.2	810
4149384	150.4207	95.3640	-0.0052	0.0109	1.8 1.5	811
4151837	141.2815	80.7253	-0.0039	-0.0039	0.7 1.4	812
4153955	143.3144	79.7769	-0.0036	0.0082	1.3 2.0	813
4157683	147.6702	82.7002	-0.0123	0.0035	0.7 1.4	814
4165018	144.7634	78.3750	-0.0114	0.0000	2.9 0.9	815
4168051	148.0016	78.8312	-0.0035	-0.0072	1.5 1.9	816
4173615	141.7248	62.3706	-0.0038	-0.0049	2.5 0.9	817
4173680	142.3801	62.7830	-0.0053	0.0064	0.9 2.7	818
4173971	142.0180	59.5769	0.0046	0.0017	1.1 0.8	819
4174893	143.2210	60.2933	0.0077	-0.0077	4.9 0.9	820
4183266	141.7177	55.8288	-0.0052	-0.0032	1.3 1.9	821
4184113	142.2198	57.1721	0.0029	-0.0014	0.5 0.4	822
4194545	141.3085	41.1564	-0.0068	0.0068	0.6 2.0	823
4205214	158.1185	134.6318	0.0057	-0.0039	3.0 3.6	824
4206063	159.6852	136.5429	0.0077	-0.0048	1.3 1.3	825
4206164	159.6550	135.5236	-0.0046	-0.0035	0.5 1.4	826
4207422	160.0845	132.7954	-0.0072	-0.0098	0.4 1.9	827
4210806	152.2755	119.5681	0.0026	-0.0102	0.8 1.0	828
4211452	153.9765	123.7256	0.0058	-0.0086	1.6 2.2	829
4216777	158.6727	119.8605	0.0070	-0.0049	3.5 6.7	830
4217961	159.4902	118.4884	0.0065	0.0032	9.3 3.6	831
4219847	161.1903	118.6681	0.0067	0.0005	8.0 3.2	832
4220272	152.7070	116.0893	-0.0014	0.0005	1.6 4.4	833
4222200	153.9377	116.0985	0.0016	0.0010	2.1 1.6	834
4223451	155.2437	114.0240	0.0086	-0.0037	9.9 3.8	835
4224634	155.8254	111.7044	-0.0123	-0.0038	0.9 0.7	836
4225079	157.5101	116.8977	0.0003	0.0002	0.7 0.7	837
4225885	157.1669	109.4775	0.0043	0.0029	3.1 1.8	838
4231500	152.1939	103.5553	0.0000	-0.0068	2.3 0.6	839
4235920	155.8246	99.2987	-0.0034	0.0058	4.7 1.2	840
4239926	159.6457	98.3257	-0.0040	0.0022	2.3 2.6	841
4240366	151.2277	95.1015	-0.0062	-0.0186	3.1 0.3	842
4241187	152.4359	96.9051	-0.0016	-0.0107	2.8 2.4	843
4241399	152.4489	94.7063	0.0054	-0.0081	1.1 0.5	844
4243362	154.0496	95.3044	-0.0008	-0.0039	2.7 4.0	845
4245047	155.9151	97.5453	-0.0013	-0.0043	1.2 0.7	846
4246066	157.0509	97.5513	0.0042	-0.0053	0.8 0.5	847
4247112	157.4935	96.9713	0.0065	0.0009	2.0 4.3	848
4254574	154.2443	82.9730	-0.0013	0.0014	0.1 1.1	849
4255336	154.9394	84.7360	-0.0089	-0.0046	9.9 1.6	850
4255937	154.5246	78.5926	-0.0051	0.0094	1.5 2.6	851
4259376	159.0866	84.3347	-0.0058	-0.0068	1.8 3.4	852
4263114	152.2682	77.0822	0.0030	-0.0066	2.5 4.9	853
4264774	153.3387	70.8150	-0.0041	0.0037	0.7 0.3	854
4269764	157.9726	70.2920	0.0025	0.0000	1.0 0.4	855
4273088	152.2169	67.3277	0.0116	0.0064	1.1 0.3	856
4275237	153.5575	65.2983	0.0010	-0.0078	1.5 0.9	857
4275454	153.6409	63.4397	-0.0026	-0.0069	1.4 1.5	858
4277307	155.0365	64.0809	-0.0017	-0.0125	0.9 1.7	859
4278378	156.6670	63.7471	-0.0037	-0.0063	0.9 0.9	860
4282174	150.3931	56.2843	0.0031	-0.0061	0.9 0.6	861
4284249	151.8474	54.5635	0.0051	-0.0092	1.3 2.2	862
4285264	153.0578	54.9978	-0.0125	-0.0075	1.2 0.5	863
4286557	153.6073	51.2399	-0.0076	-0.0029	0.4 1.0	864
4286778	153.6089	48.8624	0.0124	-0.0147	1.2 0.7	865
4287082	155.3240	57.0336	0.0050	-0.0090	0.2 4.1	866
4288536	155.2788	51.1582	0.0044	-0.0109	2.8 0.9	867
4291575	148.1628	40.2494	0.0094	-0.0107	0.2 2.4	868
4292602	148.2913	39.3200	-0.0040	-0.0098	0.2 1.1	869
4297373	154.0439	42.2378	0.0010	0.0008	0.3 3.2	870
4298418	154.1714	40.1854	0.0038	-0.0004	0.3 0.8	871
4304095	167.5777	135.5434	0.0055	-0.0048	1.9 1.1	872
4304740	166.6403	129.4830	0.0013	-0.0003	1.6 0.4	873
4305661	167.8328	130.2025	0.0026	-0.0162	1.8 0.7	874
4305818	167.2463	127.6230	0.0044	-0.0008	1.0 2.2	875
4307875	169.7147	127.7339	-0.0134	0.0059	1.5 0.6	876

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
4136687	16.6022	-26.8249	0.16756	-0.36657	0.91518	804
4138500	17.7578	-25.2285	0.17963	-0.35015	0.91931	805
4143361	13.5464	-33.1020	0.13572	-0.43054	0.89231	806
4143599	13.8865	-35.9819	0.13939	-0.45946	0.87719	807
4146856	16.3403	-38.6566	0.16525	-0.48587	0.85827	808
4147687	17.6098	-36.8123	0.17849	-0.46716	0.86597	809
4148772	18.3873	-37.2911	0.18667	-0.47181	0.86172	810
4149384	19.4593	-33.5721	0.19777	-0.43423	0.87883	811
4151837	11.2963	-48.7926	0.11282	-0.58742	0.80138	812
4153955	13.3876	-49.6074	0.13481	-0.59516	0.79222	813
4157683	17.5437	-46.4027	0.17825	-0.56276	0.80718	814
4165018	14.9258	-50.9132	0.15102	-0.60776	0.77963	815
4168051	18.1280	-50.2460	0.18460	-0.60057	0.77797	816
4173615	12.9415	-67.0997	0.13135	-0.76485	0.63067	817
4173680	13.5686	-66.6449	0.13790	-0.76041	0.63463	816
4173971	13.4172	-69.8714	0.13660	-0.79099	0.59638	819
4174893	14.5710	-69.0772	0.14865	-0.78327	0.60366	820
4183266	13.3631	-73.6353	0.13641	-0.82622	0.54659	821
4184113	13.7762	-72.2606	0.14061	-0.81333	0.56456	822
4194545	13.9160	-88.3195	0.14442	-0.95548	0.25728	823
4205214	24.5698	6.1583	0.25063	-0.02442	0.96778	824
4206063	26.0083	8.1697	0.26573	-0.00291	0.96404	825
4206164	26.0450	7.1494	0.26611	-0.01362	0.96385	826
4207422	26.6524	4.4521	0.27249	-0.04175	0.96125	827
4210806	19.7246	-9.2716	0.19991	-0.18621	0.96196	828
4211452	21.1501	-5.0073	0.21481	-0.14175	0.96632	829
4216777	26.0908	-8.5618	0.26671	-0.17735	0.94732	830
4217961	26.9967	-9.8792	0.27624	-0.19071	0.94198	831
4219847	28.6818	-9.5886	0.29393	-0.18722	0.93731	832
4220272	20.3833	-12.7187	0.20688	-0.22163	0.95293	833
4222200	21.6111	-12.6291	0.21976	-0.22044	0.95032	834
4223451	23.0506	-14.6163	0.23490	-0.24055	0.94178	835
4224634	23.7832	-16.8955	0.24264	-0.26376	0.93357	836
4225079	25.1245	-11.5975	0.25661	-0.20895	0.94366	837
4225885	25.2682	-19.0326	0.25828	-0.28527	0.92299	838
4231500	20.6925	-25.2734	0.21042	-0.35001	0.91281	839
4235920	24.5953	-29.2887	0.25152	-0.38978	0.88590	840
4239926	28.4731	-30.0112	0.29228	-0.39595	0.87051	841
4240366	20.2820	-33.7817	0.20641	-0.43616	0.87588	842
4241187	21.3697	-31.9011	0.21775	-0.41696	0.88245	843
4241399	21.5268	-34.0967	0.21949	-0.43904	0.87124	844
4243362	23.0853	-33.3947	0.23582	-0.43160	0.87069	845
4245047	24.8005	-31.0343	0.25374	-0.40736	0.87731	846
4246066	25.9339	-30.9542	0.26564	-0.40624	0.87430	847
4247112	26.4136	-31.5047	0.27070	-0.41165	0.87021	848
4254574	24.0877	-45.7009	0.24693	-0.55422	0.79490	849
4255336	24.6660	-43.8943	0.25291	-0.53615	0.80534	850
4255937	24.6545	-50.0585	0.25314	-0.59705	0.76122	851
4259376	28.8317	-44.0244	0.29669	-0.53614	0.79027	852
4263114	22.5012	-51.7147	0.23062	-0.61393	0.75492	853
4264774	23.9805	-57.9057	0.24660	-0.67385	0.69650	854
4269764	28.6400	-58.1256	0.29562	-0.67436	0.67664	855
4273088	23.0893	-61.4627	0.23751	-0.70846	0.66459	856
4275237	24.5603	-63.4025	0.25314	-0.72657	0.63876	857
4275454	24.7654	-65.2537	0.25547	-0.74414	0.61724	858
4277307	26.1164	-64.5221	0.26962	-0.73669	0.62015	859
4278378	27.7657	-64.7490	0.28700	-0.73821	0.61047	860
4282174	21.9925	-72.6139	0.22705	-0.81431	0.53419	861
4284249	23.5568	-74.2379	0.24371	-0.82872	0.50382	862
4285264	24.7365	-73.7250	0.25607	-0.82352	0.50621	863
4286557	25.5312	-77.4433	0.26494	-0.85701	0.44198	864
4286778	25.6886	-79.8183	0.26696	-0.87808	0.39713	865
4287082	26.8650	-71.5434	0.27823	-0.80244	0.52790	866
4288536	27.2050	-77.4157	0.28258	-0.85592	0.43307	867
4291575	20.8170	-88.7780	0.21738	-0.95529	0.20043	868
4292602	21.0061	-89.6981	0.21966	-0.96176	0.16359	869
4297373	26.5569	-86.4077	0.27746	-0.93283	0.22987	870
4298418	26.8186	-88.4497	0.28085	-0.94757	0.15241	871
4304095	33.9516	7.6865	0.34916	-0.00543	0.93705	872
4304740	33.4130	1.5711	0.34351	-0.06972	0.93656	873
4305661	34.5562	2.3677	0.35553	-0.06098	0.93268	874
4305818	34.1398	-0.2475	0.35116	-0.08844	0.93213	875
4307875	36.5963	0.0245	0.37698	-0.08466	0.92234	876

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
4310096	163.1497	126.3375	0.0008	-0.0033	2.3 1.6	877
4315933	166.7192	117.5891	-0.0075	-0.0034	1.2 1.3	878
4322071	164.2406	117.0300	-0.0001	0.0003	2.3 3.5	879
4323306	164.2629	113.6074	-0.0078	0.0012	1.9 1.4	880
4323306	164.2503	113.6136	-0.0147	0.0012	2.5 4.7	881
4325126	166.4840	115.3048	-0.0061	0.0005	2.3 1.2	882
4334692	165.2728	101.1092	0.0001	-0.0020	4.4 2.5	883
4334892	165.0658	99.1788	0.0042	-0.0101	1.2 1.9	884
4336729	166.4028	99.3012	0.0107	0.0033	2.4 2.7	885
4343013	163.2518	97.2710	-0.0008	-0.0044	3.1 0.7	886
4346822	165.6197	89.1084	-0.0010	-0.0023	1.5 8.0	887
4348390	168.5621	93.9705	0.0008	0.0026	9.9 2.2	888
4351260	161.0056	85.7811	-0.0103	-0.0093	1.1 2.1	889
4351330	160.6929	84.8078	0.0012	-0.0007	5.2 0.7	890
4351684	160.9437	81.3478	-0.0034	-0.0024	1.0 0.8	891
4351779	160.6516	79.7890	0.0068	-0.0016	0.6 1.4	892
4352619	161.1953	80.7883	0.0090	0.0016	0.5 2.0	893
4352727	161.1663	79.9748	0.0073	0.0011	1.2 1.2	894
4353015	162.5482	87.0980	-0.0030	-0.0036	1.4 2.1	895
4354624	163.1844	81.0342	0.0006	-0.0108	1.6 1.4	896
4355676	164.6032	80.7138	0.0110	-0.0119	0.3 1.4	897
4358204	167.0591	84.6730	-0.0037	0.0002	2.2 1.3	898
4358448	167.2357	82.2892	-0.0048	0.0018	1.3 2.2	899
4358682	167.5267	80.8058	-0.0044	0.0011	0.5 3.3	900
4359855	168.0132	78.3479	0.0001	-0.0001	1.2 0.7	901
4361029	160.0239	76.8025	0.0128	-0.0098	2.5 3.6	902
4362076	161.4705	76.9538	0.0016	-0.0037	1.2 3.6	903
4364412	162.5066	73.1947	-0.0017	0.0128	6.7 0.5	904
4365124	163.7827	75.9524	-0.0014	-0.0090	0.4 0.6	905
4365775	163.7988	69.5923	-0.0014	-0.0039	0.7 1.0	906
4367904	164.8353	67.4236	0.0082	-0.0030	0.5 0.7	907
4371044	159.4474	67.0625	0.0115	-0.0112	2.2 1.4	908
4371838	158.6951	58.2014	0.0044	-0.0072	0.4 0.2	909
4372678	160.2409	60.1470	-0.0106	-0.0024	0.9 0.7	910
4372795	160.3684	59.4215	0.0031	-0.0056	0.7 2.2	911
4374769	161.9333	58.8300	-0.0010	-0.0152	0.3 1.0	912
4377076	165.3826	66.0917	-0.0011	-0.0047	1.1 1.5	913
4378154	166.0522	65.1652	0.0004	-0.0022	0.3 0.6	914
4384917	160.3224	45.6249	0.0092	-0.0098	1.8 0.5	915
4386239	163.0919	53.1775	0.0077	-0.0071	2.5 1.8	916
4387364	164.2584	52.3632	0.0016	-0.0099	2.6 0.9	917
4389470	166.1389	51.3795	0.0011	-0.0034	1.2 1.3	918
4392156	158.6774	43.5999	0.0093	-0.0101	1.2 0.3	919
4399002	164.8897	44.0763	0.0056	-0.0023	0.5 2.4	920
4399045	165.2244	43.5654	-0.0089	-0.0012	0.5 3.2	921
4400190	173.2516	134.5157	0.0092	-0.0030	1.9 1.2	922
4408465	180.3050	130.3570	-0.0030	-0.0102	1.3 0.8	923
4409758	180.8878	127.1117	-0.0020	-0.0039	1.1 1.0	924
4411893	173.0346	117.8743	-0.0065	-0.0023	1.0 2.0	925
4417830	178.2168	117.5560	0.0019	0.0046	6.1 1.4	926
4421723	171.7739	109.1917	-0.0077	-0.0081	2.1 3.0	927
4422923	172.6224	107.1378	-0.0011	-0.0004	5.3 2.2	928
4423720	173.7153	109.3278	-0.0156	-0.0028	2.1 5.1	929
4428308	178.4474	111.9335	0.0008	0.0004	0.6 4.1	930
4428449	178.7761	110.7896	-0.0001	0.0038	1.4 6.0	931
4430742	170.3690	99.5865	-0.0084	-0.0029	1.6 3.0	932
4432400	172.1061	102.5544	-0.0022	-0.0085	1.7 1.8	933
4432270	172.9526	104.4533	-0.0074	-0.0049	1.5 0.6	934
4432487	172.8272	101.7969	0.0004	-0.0030	1.8 1.8	935
4433921	172.9176	97.4591	-0.0027	0.0076	1.2 1.4	936
4440123	169.9152	95.5562	0.0026	0.0014	2.2 1.2	937
4441582	171.1383	91.5751	0.0038	0.0038	1.7 2.2	938
4444373	173.9987	93.0922	-0.0046	-0.0085	5.3 2.1	939
4447562	176.6226	90.8598	-0.0053	0.0067	7.7 2.2	940
4449490	178.8674	91.8234	-0.0088	-0.0035	2.6 0.7	941
4450677	169.2772	80.1019	-0.0061	0.0051	2.5 3.8	942
4450988	169.1598	76.9464	0.0052	-0.0056	9.9 1.7	943
4463052	171.6335	76.1696	0.0069	-0.0019	1.2 1.9	944
4468394	176.4637	72.3052	0.0041	-0.0004	3.0 3.1	945
4469917	176.2166	65.5978	-0.0017	-0.0102	0.6 2.1	946
4476250	173.6150	63.5441	-0.0042	-0.0055	1.0 3.0	947
4476629	172.8861	58.3144	0.0021	-0.0069	1.5 0.6	948
4477677	174.2517	58.2873	-0.0073	-0.0086	1.5 6.1	949

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
4310096	30.1351	-1.7991	0.30910	-0.10599	0.94511	877
4315933	34.2711	-10.3056	0.35267	-0.19274	0.91569	878
4322071	31.8338	-11.0259	0.32706	-0.20104	0.92337	879
4323306	32.0674	-14.4382	0.32959	-0.23608	0.91413	880
4323306	32.0803	-14.4435	0.32972	-0.23613	0.91407	881
4325126	34.1860	-12.6029	0.35181	-0.21645	0.91070	882
4334692	33.9073	-26.8631	0.34927	-0.36222	0.86418	883
4334892	33.8272	-28.8050	0.34850	-0.38191	0.85597	884
4336729	35.1537	-28.5955	0.36244	-0.37927	0.85134	885
4343013	32.1415	-30.8293	0.33086	-0.40298	0.85331	886
4346822	35.0399	-38.8290	0.36170	-0.48212	0.79796	887
4348390	37.6582	-33.7797	0.38901	-0.43046	0.81448	888
4351260	30.6524	-42.4542	0.31575	-0.51991	0.79372	889
4351330	30.4040	-43.4469	0.31319	-0.52986	0.78814	890
4351684	30.8811	-46.8870	0.31841	-0.56372	0.76213	891
4351779	30.6917	-48.4633	0.31651	-0.57932	0.75114	892
4352619	31.1689	-47.4295	0.32147	-0.56896	0.75693	893
4352727	31.1933	-48.2441	0.32178	-0.57697	0.75071	894
4353015	32.1058	-41.0380	0.33095	-0.50529	0.79696	895
4354624	33.1382	-47.0540	0.34216	-0.56448	0.75119	896
4355676	34.5753	-47.2814	0.35730	-0.56611	0.74287	897
4358204	36.7672	-43.1659	0.38012	-0.52449	0.76185	898
4358448	37.0997	-45.5358	0.38376	-0.54777	0.74342	899
4358682	37.4873	-46.9987	0.38794	-0.56201	0.73052	900
4359855	38.1340	-49.4223	0.39491	-0.58549	0.70799	901
4361029	30.2608	-51.4877	0.31218	-0.60917	0.72901	902
4362076	31.6949	-51.2422	0.32725	-0.60620	0.72486	903
4364412	32.9754	-54.9298	0.34100	-0.64162	0.68705	904
4365124	34.0684	-52.0916	0.35229	-0.61350	0.70676	905
4365775	34.5011	-58.4441	0.35735	-0.67491	0.64560	906
4367904	35.6779	-60.5430	0.36994	-0.69446	0.61715	907
4371044	30.3237	-61.2555	0.31360	-0.70381	0.63742	908
4371838	30.1534	-70.1566	0.31272	-0.78803	0.53030	909
4372678	31.5688	-68.1122	0.32740	-0.76824	0.55011	910
4372795	31.7436	-68.8286	0.32932	-0.77485	0.53959	911
4374769	33.3443	-69.3173	0.34626	-0.77855	0.52341	912
4377076	36.3114	-61.8378	0.37674	-0.70649	0.59912	913
4378154	37.0404	-62.7196	0.38452	-0.71447	0.58454	914
4384917	32.6017	-82.6141	0.34054	-0.89728	0.28095	915
4386239	34.8712	-74.8884	0.36312	-0.82862	0.42606	916
4387364	36.0888	-75.6257	0.37611	-0.83434	0.40300	917
4389470	38.0303	-76.4856	0.39679	-0.84040	0.36916	918
4392156	31.0924	-84.7445	0.32507	-0.91579	0.23592	919
4399002	37.2620	-83.8629	0.39035	-0.90195	0.18471	920
4399045	37.6296	-84.3514	0.39443	-0.90491	0.15985	921
4400190	39.6822	7.0303	0.40942	-0.01000	0.91229	922
4408465	46.9950	3.3364	0.48640	-0.04514	0.87257	923
4409758	47.7894	0.1324	0.49478	-0.07820	0.86549	924
4411893	40.5561	-9.6083	0.41875	-0.18295	0.88948	925
4417830	45.7495	-9.5880	0.47341	-0.18020	0.86221	926
4421723	39.8667	-18.3643	0.41169	-0.27324	0.86940	927
4422923	40.8482	-20.3608	0.42207	-0.29319	0.85784	928
4423720	41.7955	-18.1017	0.43198	-0.26966	0.86063	929
4428308	46.3481	-15.1897	0.47984	-0.23753	0.84459	930
4428449	46.7512	-16.3110	0.48411	-0.24880	0.83889	931
4430742	39.0938	-28.0515	0.40387	-0.37211	0.83572	932
4432400	40.6331	-24.9733	0.41996	-0.34022	0.84136	933
4432270	41.3536	-23.0210	0.42747	-0.32005	0.84548	934
4432487	41.4026	-25.6829	0.42808	-0.34705	0.83445	935
4433921	41.7770	-30.0103	0.43219	-0.39062	0.81279	936
4440123	38.9049	-32.1074	0.40205	-0.41310	0.81713	937
4441582	40.3866	-36.0046	0.41783	-0.45150	0.78840	938
4444373	43.1423	-34.3022	0.44677	-0.43306	0.78285	939
4447562	45.9076	-36.3610	0.47602	-0.45213	0.75431	940
4449490	48.0850	-35.2518	0.49892	-0.43976	0.74679	941
4450677	39.2808	-47.5876	0.40686	-0.56691	0.71629	942
4450988	39.3703	-50.7475	0.40803	-0.59782	0.69001	943
4463052	41.8903	-51.3620	0.43464	-0.60243	0.66945	944
4468394	46.9647	-54.9071	0.48850	-0.63351	0.60003	945
4469917	47.1576	-61.6238	0.49124	-0.69729	0.52199	946
4476250	44.6954	-63.8453	0.46547	-0.72005	0.51465	947
4476629	44.3106	-69.1172	0.46209	-0.76911	0.44153	948
4477677	45.6753	-69.0551	0.47653	-0.76734	0.42907	949

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
4481168	168.1602	53.6419	-0.0043	-0.0105	1.4 1.1	950
4481352	167.9433	52.0901	-0.0057	-0.0058	0.7 1.6	951
4484392	171.0542	51.5249	0.0041	-0.0017	0.6 3.6	952
4486191	173.1941	53.5407	-0.0008	0.0011	0.4 0.7	953
4487106	173.2218	52.9241	0.0135	-0.0008	2.2 9.9	954
4487533	173.1100	48.4498	0.0056	-0.0032	0.4 1.3	955
4488630	173.9058	47.3450	-0.0042	-0.0088	1.6 2.8	956
4489621	174.7255	46.9165	-0.0064	-0.0019	0.5 1.2	957
4503097	185.5291	133.3894	-0.0040	-0.0084	0.8 1.3	958
4503123	184.8209	132.9006	0.0030	0.0049	8.7 0.7	959
4503973	184.7448	125.2002	-0.0067	-0.0119	0.6 0.5	960
4505794	186.9352	126.7640	-0.0056	0.0085	1.7 1.9	961
4506645	187.4662	127.5936	-0.0085	-0.0151	4.8 3.0	962
4508353	189.6923	130.2992	0.0073	-0.0016	1.9 1.4	963
4511103	182.0762	123.5751	0.0006	-0.0038	3.4 2.2	964
4511378	182.6488	121.1516	-0.0006	-0.0020	1.8 0.8	965
4512946	182.8833	115.4347	-0.0038	0.0034	1.1 1.1	966
4513427	183.9824	120.0658	-0.0047	-0.0100	3.5 2.2	967
4514420	184.9030	120.6772	-0.0168	0.0079	3.0 1.3	968
4514534	184.9278	119.2402	0.0034	0.0036	0.9 2.0	969
4514857	184.8999	116.0824	0.0011	0.0007	1.6 3.0	970
4516734	186.7360	117.1293	-0.0112	-0.0067	0.7 2.3	971
4518033	189.0820	123.7318	-0.0164	-0.0007	0.5 3.1	972
4518604	188.3755	117.8427	-0.0046	-0.0032	4.8 1.9	973
4519169	190.1891	122.0153	0.0003	0.0090	1.6 2.5	974
4519393	190.3273	120.5959	-0.0076	0.0046	1.3 1.4	975
4520460	180.8650	111.3724	0.0007	0.0035	0.4 1.6	976
4521185	182.1824	113.6383	-0.0101	-0.0070	0.9 9.9	977
4523043	183.8051	114.6162	-0.0023	0.0009	2.6 6.1	978
4525083	186.0793	114.3546	0.0045	0.0025	2.2 0.8	979
4530156	180.2916	103.9484	0.0032	0.0048	1.1 0.9	980
4532438	181.8060	100.5886	0.0059	0.0049	0.6 1.4	981
4533157	183.1439	103.5295	-0.0068	-0.0035	1.1 5.3	982
4533569	182.9354	99.3596	-0.0005	0.0037	1.2 2.0	983
4534270	184.2254	103.0714	-0.0056	-0.0102	0.7 1.0	984
4536575	185.8426	99.4283	0.0016	-0.0165	1.4 1.0	985
4537324	186.5208	101.3446	-0.0049	0.0022	0.7 1.5	986
4541583	180.5963	90.2920	0.0008	-0.0027	1.8 2.5	987
4543368	182.3535	91.5572	-0.0002	-0.0069	1.2 1.7	988
4550697	178.9005	78.8726	-0.0037	-0.0118	1.3 0.9	989
4551445	179.5517	81.0533	0.0118	-0.0025	0.6 0.8	990
4552189	181.0759	83.5479	-0.0007	-0.0038	1.7 7.7	991
4554173	182.8556	83.8240	-0.0054	-0.0107	2.3 1.5	992
4560258	178.0449	72.6992	0.0031	-0.0009	2.6 2.2	993
4561818	178.1788	66.2552	-0.0049	-0.0096	1.4 0.8	994
4563007	180.5774	74.4544	0.0031	-0.0009	1.0 1.2	995
4563230	180.7347	73.0529	0.0045	-0.0017	1.9 4.9	996
4564116	181.5162	73.4526	-0.0017	-0.0001	2.1 5.3	997
4565134	182.6294	73.4071	-0.0049	-0.0067	2.4 1.8	998
4565716	181.9686	66.9314	-0.0090	-0.0040	1.1 3.6	999
4571765	177.8933	56.7688	-0.0104	-0.0140	0.4 0.8	1000
4571861	177.7666	56.0720	-0.0025	-0.0057	1.0 3.4	1001
4573155	180.1754	63.0766	-0.0013	-0.0081	1.0 1.2	1002
4575074	182.2769	63.9194	-0.0085	-0.0035	0.5 0.3	1003
4577036	183.7855	63.3430	-0.0021	-0.0097	1.0 2.2	1004
4577577	183.7139	57.6446	0.0002	-0.0042	2.0 4.8	1005
4578686	184.6206	56.2518	-0.0050	-0.0110	1.8 2.9	1006
4578791	184.5924	55.6601	-0.0173	0.0022	2.9 0.3	1007
4579988	185.1038	51.6463	0.0023	0.0024	1.0 3.4	1008
4580417	175.7224	48.4589	-0.0053	0.0033	0.6 0.6	1009
4580538	175.7106	46.9385	-0.0032	0.0027	0.3 0.6	1010
4581420	176.8450	49.0660	-0.0069	-0.0050	2.7 2.1	1011
4584393	180.2344	48.7142	0.0073	-0.0014	0.6 1.9	1012
4585001	180.7517	53.0954	-0.0133	-0.0076	2.2 7.5	1013
4587074	183.1910	51.7805	-0.0006	-0.0065	0.3 0.6	1014
4600402	191.0727	129.3004	0.0021	0.0017	2.8 3.3	1015
4600575	191.5780	127.9819	0.0006	0.0082	0.8 0.6	1016
4602950	193.0721	124.3608	0.0023	0.0019	2.3 1.2	1017
4603806	193.6018	124.6592	-0.0059	-0.0032	0.6 2.2	1018
4609103	199.6373	130.8243	0.0021	0.0032	1.9 2.1	1019
4610158	191.0035	122.0016	-0.0066	0.0014	3.0 4.2	1020
4610411	190.4594	119.7893	-0.0025	0.0087	1.0 1.1	1021
4611993	191.8207	114.5442	-0.0038	0.0061	1.8 0.4	1022

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
4481168	39.8996	-74.0935	0.41617	-0.81770	0.39770	950
4481352	39.7848	-75.6579	0.41522	-0.83163	0.36875	951
4484392	42.9270	-76.0194	0.44860	-0.83174	0.32706	952
4486191	44.9308	-73.8660	0.46945	-0.81098	0.34919	953
4487106	44.9988	-74.4802	0.47029	-0.81624	0.33552	954
4487533	45.1804	-78.9572	0.47326	-0.85319	0.21929	955
4488630	46.0471	-80.0089	0.48286	-0.85966	0.16685	956
4489621	46.8933	-80.3834	0.49208	-0.86051	0.13181	957
4503097	52.0107	6.7068	0.53926	-0.00682	0.84211	958
4503123	51.3358	6.1722	0.53214	-0.01286	0.84656	959
4503973	51.7644	-1.5253	0.53669	-0.09314	0.83862	960
4505794	53.8483	0.1799	0.55866	-0.07402	0.82609	961
4506645	54.3239	1.0433	0.56367	-0.06469	0.82346	962
4508353	56.3687	3.8915	0.58524	-0.03346	0.81017	963
4511103	49.2073	-3.3230	0.50975	-0.11339	0.85282	964
4511378	49.9377	-5.7066	0.51748	-0.13770	0.84454	965
4512946	50.5463	-11.4024	0.52399	-0.19620	0.82882	966
4513427	51.3399	-6.7042	0.53228	-0.14719	0.83368	967
4514420	52.2188	-6.0333	0.54154	-0.13969	0.82899	968
4514534	52.3377	-7.4673	0.54281	-0.15447	0.82553	969
4514857	52.5167	-10.6237	0.54476	-0.18695	0.81749	970
4516734	54.2808	-9.4579	0.56335	-0.17377	0.80774	971
4518033	56.1898	-2.7090	0.58339	-0.10253	0.80569	972
4518604	55.8705	-8.6382	0.58011	-0.16422	0.79781	973
4519169	57.4073	-4.3515	0.59627	-0.11873	0.79396	974
4519393	57.6383	-5.7604	0.59873	-0.13318	0.78980	975
4520460	48.7979	-15.5924	0.50566	-0.24028	0.82859	976
4521185	49.9644	-13.2427	0.51790	-0.21548	0.82786	977
4523043	51.5200	-12.1599	0.53428	-0.20340	0.82047	978
4525083	53.8071	-12.2727	0.55841	-0.20309	0.80432	979
4530156	48.7121	-23.0462	0.50499	-0.31640	0.80305	980
4532438	50.4438	-26.3037	0.52337	-0.34836	0.77764	981
4533157	51.5865	-23.2784	0.53531	-0.31699	0.78292	982
4533569	51.6517	-27.4578	0.53616	-0.35924	0.76385	983
4534270	52.6960	-23.6655	0.54703	-0.32019	0.77346	984
4536575	54.5489	-27.1993	0.56673	-0.35467	0.74366	985
4537324	55.1003	-25.2407	0.57247	-0.33449	0.74859	986
4541583	49.9111	-36.6688	0.51826	-0.45274	0.72556	987
4543368	51.5821	-35.2902	0.53582	-0.43789	0.72191	988
4550697	48.9667	-48.1873	0.50907	-0.56699	0.64759	989
4551445	49.4738	-45.9663	0.51425	-0.54492	0.66227	990
4552189	50.8317	-43.3748	0.52840	-0.51853	0.67225	991
4554173	52.5899	-42.9827	0.54695	-0.51340	0.66126	992
4560258	48.5171	-54.4103	0.50486	-0.62760	0.59265	993
4561818	49.0730	-60.8389	0.51142	-0.68833	0.51444	994
4563007	50.9300	-52.4915	0.53018	-0.60729	0.59169	995
4563230	51.1788	-53.8813	0.53295	-0.62046	0.57532	996
4564116	51.9327	-53.4310	0.54088	-0.61553	0.57321	997
4565134	53.0467	-53.4037	0.55267	-0.61433	0.56317	998
4565716	52.8115	-59.9160	0.55090	-0.67631	0.48899	999
4571765	49.4097	-70.3344	0.51635	-0.77505	0.36425	1000
4571861	49.3289	-71.0387	0.51562	-0.78135	0.35159	1001
4573155	51.2742	-63.8840	0.53512	-0.71470	0.45039	1002
4575074	53.3166	-62.9048	0.55665	-0.70359	0.44170	1003
4577036	54.8602	-63.3822	0.57311	-0.70629	0.41558	1004
4577577	55.1620	-69.0794	0.57733	-0.75668	0.30679	1005
4578686	56.1584	-70.4116	0.58827	-0.76640	0.25800	1006
4578791	56.1690	-71.0045	0.58854	-0.77127	0.24241	1007
4579988	56.9424	-74.9809	0.59835	-0.79807	0.07118	1008
4580417	47.7874	-78.7775	0.50107	-0.84742	0.17553	1009
4580538	47.8752	-80.2972	0.50262	-0.85760	0.10911	1010
4581420	48.8680	-78.0977	0.51242	-0.84035	0.17676	1011
4584393	52.2742	-78.2279	0.54923	-0.83251	0.07264	1012
4585001	52.5035	-73.8174	0.55006	-0.80056	0.23779	1013
4587074	55.0244	-74.9717	0.57749	-0.80415	0.14088	1014
4600402	57.8119	2.9839	0.60049	-0.04193	0.79853	1015
4600575	58.4027	1.6997	0.60673	-0.05494	0.79301	1016
4602950	60.1312	-1.8202	0.62502	-0.09035	0.77536	1017
4603806	60.6404	-1.4874	0.63040	-0.08648	0.77144	1018
4609103	66.2607	5.0654	0.68984	-0.01305	0.72385	1019
4610158	58.2211	-4.3120	0.60486	-0.11772	0.78758	1020
4610411	57.8229	-6.5576	0.60069	-0.14130	0.78690	1021
4611993	59.5254	-11.7084	0.61878	-0.19318	0.76144	1022

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
4613546	193.4620	117.9029	-0.0046	0.0050	0.9 2.3	1023
4621573	191.2689	108.7495	0.0020	0.0020	1.2 1.7	1024
4621955	190.7836	104.6206	-0.0060	0.0052	0.9 1.7	1025
4622556	192.0064	108.3275	-0.0060	0.0024	1.3 0.9	1026
4626604	195.2319	107.0989	0.0019	0.0041	3.4 2.5	1027
4629640	198.4606	106.9997	-0.0004	0.0058	1.5 1.2	1028
4632132	191.4590	102.8537	0.0041	-0.0139	3.0 0.7	1029
4650120	187.9953	83.4129	-0.0033	-0.0036	4.9 2.5	1030
4654256	191.9791	81.1249	-0.0165	-0.0026	1.4 1.4	1031
4656268	193.9260	80.5976	0.0025	-0.0003	1.9 2.6	1032
4660420	187.0782	69.9878	-0.0105	-0.0096	3.4 2.5	1033
4661370	188.5346	70.7689	-0.0027	-0.0141	0.9 0.4	1034
4662322	188.9369	70.4243	0.0015	-0.0048	1.1 1.5	1035
4666272	193.1721	70.6923	-0.0013	-0.0069	0.6 0.5	1036
4667308	193.3702	68.8877	0.0026	-0.0091	3.4 3.0	1037
4672538	187.8453	56.2641	0.0041	-0.0008	1.3 1.3	1038
4672651	188.0432	55.8668	0.0072	-0.0027	9.9 3.0	1039
4672791	188.2127	54.2804	0.0080	0.0047	1.0 0.7	1040
4676079	192.3679	60.9571	0.0017	-0.0104	0.8 2.0	1041
4677319	192.3699	56.5798	0.0053	-0.0083	2.9 1.8	1042
4770006	195.3663	60.0392	0.0017	0.0059	1.1 2.6	1043
4679211	194.3473	58.2728	0.0030	-0.0046	0.4 0.7	1044
4700261	201.1475	129.8378	-0.0041	0.0027	1.7 0.8	1045
4701033	201.8333	131.4676	-0.0092	0.0056	3.6 0.5	1046
4701518	201.3157	126.2393	-0.0078	0.0004	0.7 0.6	1047
4703305	203.2290	128.1735	-0.0054	-0.0014	9.9 0.8	1048
4702612	202.2804	125.7018	-0.0028	-0.0006	3.1 0.7	1049
4703383	204.0179	128.2418	0.0002	0.0065	1.8 2.3	1050
4703417	203.2850	126.9412	0.0036	0.0004	2.0 2.0	1051
4704136	204.5910	129.7773	0.0013	0.0023	1.2 0.7	1052
4709934	208.7597	121.4874	-0.0058	0.0020	2.4 0.6	1053
4712892	202.1830	114.0677	0.0064	-0.0062	3.3 5.3	1054
4714877	203.8809	113.2223	0.0049	0.0023	1.7 3.5	1055
4715067	205.2082	120.8753	-0.0054	-0.0057	1.2 1.0	1056
4715261	205.1045	119.4951	-0.0079	0.0127	0.3 0.1	1057
4715859	204.6050	112.9737	0.0085	-0.0014	7.1 4.6	1058
4716240	205.9057	119.4323	-0.0059	-0.0022	1.1 1.3	1059
4716458	205.8177	116.6986	-0.0024	-0.0059	1.2 4.3	1060
4716687	205.9207	114.8847	0.0039	-0.0035	0.8 1.4	1061
4717247	206.8036	118.6433	-0.0023	-0.0052	0.8 0.8	1062
4718132	207.7307	119.9367	-0.0009	0.0027	1.4 4.0	1063
4721394	200.9488	109.1387	0.0002	-0.0054	2.9 0.7	1064
4722185	201.8800	110.8215	0.0077	-0.0004	1.9 1.8	1065
4723471	202.5556	108.1367	0.0017	0.0085	1.3 1.2	1066
4723616	201.8436	105.7628	-0.0001	-0.0033	0.5 0.3	1067
4731204	199.4934	100.3979	-0.0039	-0.0069	2.2 1.8	1068
4740148	198.2701	91.1289	0.0011	-0.0091	2.5 3.1	1069
4741323	198.8569	89.4516	-0.0050	0.0017	6.2 0.5	1070
4751552	198.2362	77.1677	-0.0034	-0.0098	0.9 1.7	1071
4757272	204.1952	78.9972	-0.0117	-0.0235	0.2 0.1	1072
4758951	204.2340	71.0027	-0.0001	-0.0068	0.7 0.9	1073
4762616	197.7610	64.3259	-0.0014	-0.0112	0.2 1.1	1074
4763441	199.1851	66.9186	0.0064	0.0025	0.2 0.2	1075
4764408	199.6123	65.8707	0.0037	-0.0206	0.2 0.2	1076
4801419	210.6688	125.4289	0.0003	0.0068	2.6 1.6	1077
4802252	212.1751	127.7633	0.0060	-0.0019	4.9 2.1	1078
4805104	214.5656	127.9654	0.0077	-0.0155	2.2 4.2	1079
4806156	215.8972	127.4750	-0.0061	0.0004	1.5 0.1	1080
4806928	215.1356	119.7451	-0.0071	0.0043	0.5 1.9	1081
4810042	209.7308	120.5020	-0.0090	0.0144	1.1 0.7	1082
4818384	217.2765	115.6353	0.0020	-0.0097	2.0 1.5	1083
4828134	216.2549	108.0057	-0.0155	0.0147	0.5 0.2	1084
4828722	215.7732	102.1593	-0.0001	-0.0034	1.0 0.3	1085
4845536	211.6902	83.9198	0.0016	-0.0099	2.7 1.1	1086
4848349	214.5865	84.4780	-0.0044	-0.0105	1.1 0.8	1087
4852366	208.4767	75.8624	0.0030	0.0061	2.7 2.0	1088
4902055	221.4695	127.1450	0.0027	-0.0077	7.0 1.0	1089
4903549	221.9947	121.6872	-0.0080	-0.0009	1.6 5.5	1090
4907405	225.2518	121.8124	-0.0125	-0.0003	1.2 0.2	1091
4910720	218.3474	111.8216	0.0034	0.0032	0.8 0.4	1092
4913213	221.2282	115.6644	-0.0165	-0.0086	3.1 3.7	1093
4915620	222.9061	111.2645	-0.0015	-0.0052	0.5 1.9	1094
4915813	222.6480	109.0110	0.0050	-0.0034	4.4 1.0	1095

## POSITIONS ON THE DISK

15b

Ref	x'	y'	$\xi$	$\eta$	$\zeta$	Ser
4613546	60.9436	-8.2461	0.63369	-0.15636	0.75762	1023
4621573	59.3544	-17.5333	0.61713	-0.25300	0.74508	1024
4621955	59.1405	-21.6897	0.61502	-0.29548	0.73106	1025
4622556	60.1181	-17.9067	0.62522	-0.25621	0.73720	1026
4626604	63.4181	-18.9235	0.66016	-0.26379	0.70328	1027
4629640	66.6473	-18.8117	0.69436	-0.25966	0.67115	1028
4632132	59.9304	-23.4106	0.62344	-0.31230	0.71680	1029
4650120	57.7470	-43.0578	0.60150	-0.50998	0.61492	1030
4654256	61.8733	-45.0834	0.64540	-0.52581	0.55407	1031
4656268	63.8512	-45.4831	0.66643	-0.52756	0.52684	1032
4660420	57.7113	-56.5291	0.60245	-0.63957	0.47750	1033
4661370	59.1138	-55.6538	0.61723	-0.62980	0.47156	1034
4662322	59.5379	-55.9717	0.62178	-0.63231	0.46214	1035
4666272	63.7477	-55.4275	0.66650	-0.62197	0.41101	1036
4667308	64.0637	-57.2173	0.67014	-0.63800	0.37930	1037
4672538	59.3762	-70.1888	0.62274	-0.75826	0.19297	1038
4672651	59.5998	-70.5728	0.62527	-0.76067	0.17442	1039
4672791	59.8730	-72.1465	0.62887	-0.77083	0.10171	1040
4676079	63.5829	-65.2053	0.66659	-0.70897	0.23028	1041
4677319	63.8717	-69.5780	0.67144	-0.73925	0.05170	1042
4770006	66.6358	-65.9265	0.69993	-0.70580	0.10931	1043
4679211	65.7345	-67.7576	0.69098	-0.72056	0.05781	1044
4700261	67.8327	4.1785	0.70649	-0.02085	0.70741	1045
4701033	68.4105	5.8514	0.71262	-0.00269	0.70155	1046
4701518	68.2364	0.5946	0.71078	-0.05801	0.70102	1047
4703305	70.0194	2.6518	0.72968	-0.03465	0.68291	1048
4702612	69.2345	0.1207	0.72137	-0.06195	0.68978	1049
4703383	70.8024	2.7715	0.73799	-0.03257	0.67403	1050
4703417	70.1561	1.4245	0.73113	-0.04737	0.68059	1051
4704136	71.2738	4.3429	0.74299	-0.01556	0.66912	1052
4709934	75.9779	-3.6663	0.79304	-0.09370	0.60192	1053
4712892	69.8997	-11.5079	0.72861	-0.18173	0.66038	1054
4714877	71.6498	-12.2416	0.74721	-0.18736	0.63763	1055
4715067	72.4731	-4.5097	0.75579	-0.10668	0.64607	1056
4715261	72.4600	-5.8953	0.75567	-0.12105	0.64367	1057
4715859	72.3888	-12.4427	0.75507	-0.18858	0.62794	1058
4716240	73.2639	-5.9058	0.76421	-0.12024	0.63366	1059
4716458	73.3552	-8.6424	0.76523	-0.14840	0.62641	1060
4716687	73.5768	-10.4477	0.76764	-0.16672	0.61882	1061
4717247	74.2118	-6.6353	0.77430	-0.12666	0.62002	1062
4718132	75.0525	-5.2827	0.78321	-0.11163	0.61165	1063
4721394	68.9907	-16.5125	0.71912	-0.23389	0.65433	1064
4722185	69.8099	-14.7706	0.72776	-0.21525	0.65118	1065
4723471	70.6602	-17.4086	0.73688	-0.24123	0.63152	1066
4723616	70.1050	-19.8265	0.73108	-0.26640	0.62814	1067
4731204	68.1107	-25.3394	0.71017	-0.32419	0.62495	1068
4740148	67.4971	-34.6789	0.70424	-0.41795	0.57391	1069
4741323	68.1927	-36.3161	0.71175	-0.43329	0.55288	1070
4751552	68.3781	-48.6281	0.71495	-0.55190	0.42925	1071
4757272	74.2061	-46.4113	0.77698	-0.52159	0.35249	1072
4758951	74.7686	-54.3951	0.78465	-0.59099	0.18725	1073
4762616	68.7452	-61.4878	0.72128	-0.66611	0.18988	1074
4763441	69.9968	-58.8048	0.73407	-0.64088	0.22451	1075
4764408	70.4918	-59.8237	0.73972	-0.64784	0.18198	1076
4801419	77.6252	0.3957	0.81054	-0.04920	0.58362	1077
4802252	78.9757	2.8261	0.82493	-0.02184	0.56481	1078
4805104	81.3485	3.1841	0.85026	-0.01447	0.52616	1079
4806156	82.7098	2.7811	0.86483	-0.01646	0.50180	1080
4806928	82.4561	-4.9906	0.86218	-0.09795	0.49703	1081
4810042	77.0118	-4.5874	0.80406	-0.10191	0.58575	1082
4818384	84.8623	-8.9564	0.88808	-0.13447	0.43958	1083
4828134	84.3425	-16.6450	0.88283	-0.21360	0.41831	1084
4828722	84.2448	-22.5169	0.88217	-0.27240	0.38416	1085
4845536	81.3646	-41.0044	0.85330	-0.45560	0.25360	1086
4848349	84.2189	-40.2576	0.88437	-0.43911	0.15833	1087
4852366	78.6850	-49.2634	0.82597	-0.53574	0.17539	1088
4902055	88.2933	2.8153	0.92485	-0.00482	0.38031	1089
4903549	89.1752	-2.6027	0.93442	-0.05929	0.35120	1090
4907405	92.4180	-2.2650	0.96980	-0.04541	0.23962	1091
4910720	86.1811	-12.6964	0.90241	-0.16990	0.39597	1092
4913213	88.8047	-8.6694	0.93058	-0.12271	0.34492	1093
4915620	90.7678	-12.9552	0.95217	-0.16015	0.26024	1094
4915813	90.6578	-15.2233	0.95114	-0.18303	0.24868	1095

## POSITIONS ON THE DISK

Ref	x	y	$\delta x$	$\delta y$	weights	Ser
4918230	225.8654	113.8666	-0.0077	0.0007	2.5 1.1	1096
4922717	219.2268	100.5478	0.0125	0.0005	0.9 0.5	1097
4927216	223.9650	103.3403	-0.0032	-0.0079	1.0 0.6	1098
4931766	217.9858	90.0648	-0.0043	-0.0109	1.6 0.2	1099

Ref	$x'$	$y'$	$\xi$	$\eta$	$\zeta$	Ser
4918230	93.5511	-10.1626	0.98285	-0.11965	0.14033	1096
4922717	87.7976	-23.9013	0.92073	-0.27702	0.27479	1097
4927216	92.3440	-20.8023	0.97082	-0.22642	0.07897	1098
4931766	87.2458	-34.4546	0.91647	-0.37590	0.13706	1099

## LIMB PROFILE POSITIONS

1

x	y	$\delta r$	P	x'	y'	Ser
163.7009	40.2373	-0.0055	202.5193	36.3270	-87.7756	1100
164.0789	40.3512	0.0090	202.7572	36.6968	-87.6371	1101
165.4899	40.8881	-0.0273	203.6674	38.0700	-87.0087	1102
165.6649	40.9210	0.0015	203.7734	38.2425	-86.9643	1103
166.2659	41.0990	0.0421	204.1505	38.8307	-86.7474	1104
167.3009	41.5109	0.0231	204.8220	39.8368	-86.2683	1105
167.5481	41.5379	0.0870	204.9668	40.0818	-86.2251	1106
167.9071	41.7009	0.0658	205.2040	40.4294	-86.0389	1107
168.4981	42.0158	-0.0091	205.6053	40.9987	-85.6857	1108
169.1731	42.2907	-0.0103	206.0449	41.6544	-85.3670	1109
170.2088	42.7392	-0.0259	206.7256	42.6588	-84.8513	1110
170.4278	42.8002	0.0037	206.8615	42.8734	-84.7761	1111
170.9518	43.0782	-0.0446	207.2182	43.3782	-84.4643	1112
171.2268	43.1851	-0.0328	207.3960	43.6457	-84.3394	1113
171.5667	43.3611	-0.0569	207.6266	43.9735	-84.1415	1114
171.6857	43.3901	-0.0352	207.6993	44.0904	-84.1047	1115
171.9437	43.4650	0.0014	207.8598	44.3430	-84.0130	1116
172.1297	43.4990	0.0465	207.9705	44.5264	-83.9669	1117
172.5227	43.6771	0.0462	208.2306	44.9070	-83.7634	1118
172.9157	43.8750	0.0298	208.4957	45.2863	-83.5400	1119
173.1877	43.9790	0.0497	208.6708	45.5510	-83.4183	1120
173.6827	44.2230	0.0385	209.0034	46.0290	-83.1423	1121
173.8657	44.2839	0.0615	209.1189	46.2077	-83.0694	1122
174.1887	44.4539	0.0470	209.3387	46.5190	-82.8786	1123
174.6157	44.7148	-0.0028	209.6389	46.9281	-82.5900	1124
174.9027	44.9078	-0.0507	209.8456	47.2019	-82.3785	1125
175.1057	44.9858	-0.0312	209.9763	47.3994	-82.2873	1126
175.3687	45.1488	-0.0608	210.1621	47.6512	-82.1074	1127
175.5827	45.2307	-0.0387	210.2997	47.8594	-82.0115	1128
176.4227	45.5776	0.0306	210.8462	48.6751	-81.6101	1129
176.6067	45.7406	-0.0306	210.9899	48.8481	-81.4353	1130
176.8357	45.8156	0.0079	211.1333	49.0718	-81.3454	1131
177.1727	46.0396	-0.0353	211.3760	49.3934	-81.0997	1132
177.4817	46.1685	-0.0057	211.5772	49.6934	-80.9507	1133
177.6312	46.2596	-0.0164	211.6826	49.8367	-80.8499	1134
178.0602	46.4196	0.0443	211.9563	50.2544	-80.6621	1135
178.6772	46.7915	0.0106	212.3902	50.8459	-80.2503	1136
179.5372	47.1754	0.0904	212.9558	51.6791	-79.8106	1137
179.7822	47.3464	0.0610	213.1350	51.9125	-79.6238	1138
180.5199	47.7660	0.0609	213.6465	52.6213	-79.1565	1139
180.6729	47.9340	-0.0083	213.7771	52.7630	-78.9787	1140
181.0319	48.1149	0.0154	214.0191	53.1095	-78.7745	1141
181.3169	48.2489	0.0438	214.2082	53.3852	-78.6220	1142
181.9659	48.6928	-0.0069	214.6814	54.0039	-78.1362	1143
182.2129	48.8198	0.0115	214.8485	54.2421	-77.9932	1144
182.9139	49.2697	-0.0084	215.3508	54.9123	-77.4980	1145
183.8669	49.9116	-0.0492	216.0436	55.8215	-76.7945	1146
184.4189	50.2276	-0.0194	216.4269	56.3517	-76.4428	1147
184.5039	50.2986	-0.0332	216.4932	56.4319	-76.3664	1148
185.7219	51.0595	-0.0040	217.3594	57.5978	-75.5267	1149
185.8229	51.1124	0.0078	217.4278	57.6951	-75.4672	1150
186.7159	51.7204	0.0029	218.0793	58.5467	-74.8016	1151
188.2949	52.7748	0.0410	219.2240	60.0536	-73.6451	1152
188.4409	52.9108	0.0151	219.3433	60.1904	-73.4998	1153
189.1959	53.4597	0.0124	219.9063	60.9081	-72.9021	1154
189.8889	53.8797	0.0854	220.3928	61.5723	-72.4373	1155
190.3989	54.3226	0.0365	220.7989	62.0523	-71.9615	1156
190.6459	54.4786	0.0612	220.9744	62.2886	-71.7896	1157
190.9439	54.7216	0.0486	221.2061	62.5701	-71.5274	1158
191.1939	54.8876	0.0693	221.3865	62.8088	-71.3452	1159
191.4299	55.1566	0.0009	221.5984	63.0267	-71.0611	1160
191.7499	55.3805	0.0210	221.8336	63.3315	-70.8165	1161
192.4929	55.9225	0.0569	222.3877	64.0376	-70.2266	1162
193.0963	56.4175	0.0499	222.8581	64.6074	-69.6926	1163
193.9403	57.1905	-0.0111	223.5474	65.3992	-68.8654	1164
194.7580	57.8693	-0.0037	224.1885	66.1709	-68.1338	1165
195.8490	58.8373	-0.0221	225.0683	67.1964	-67.0956	1166
196.4920	59.4202	-0.0317	225.5920	67.8001	-66.4713	1167
197.0720	59.9112	-0.0078	226.0503	68.3468	-65.9430	1168
197.4440	60.1991	0.0306	226.3330	68.6993	-65.6310	1169
197.7142	60.5091	-0.0141	226.5796	68.9487	-65.3037	1170
198.0422	60.7631	0.0234	226.8288	69.2594	-65.0286	1171
198.2643	60.9891	0.0103	227.0197	69.4662	-64.7883	1172

## LIMB PROFILE POSITIONS

x	y	$\delta r$	P	x'	y'	Ser
198.9433	61.5820	0.0479	227.5629	70.1051	-64.1516	1173
200.6071	63.2730	0.0083	228.9933	71.6550	-62.3538	1174
200.8841	63.6270	-0.0434	229.2628	71.9083	-61.9821	1175
202.2451	64.9819	-0.0032	230.4213	73.1780	-60.5396	1176
202.6413	65.4790	-0.0543	230.8037	73.5409	-60.0172	1177
202.7773	65.5730	-0.0186	230.9011	73.6705	-59.9144	1178
203.6964	66.6399	-0.0606	231.7506	74.5179	-58.7886	1179
204.6872	67.6727	-0.0051	232.6137	75.4392	-57.6921	1180
205.4862	68.5937	-0.0018	233.3493	76.1764	-56.7199	1181
205.6072	68.7987	-0.0424	233.4909	76.2838	-56.5072	1182
206.5192	69.9457	-0.0769	234.3753	77.1189	-55.3018	1183
207.5420	71.1708	-0.0507	235.3386	78.0595	-54.0112	1184
208.0310	71.8188	-0.0670	235.8286	78.5051	-53.3319	1185
209.1828	73.4074	-0.1153	237.0133	79.5507	-51.6697	1186
209.5209	73.8524	-0.1091	237.3508	79.8590	-51.2031	1187
209.6149	73.9234	-0.0755	237.4189	79.9481	-51.1261	1188
210.0339	74.4084	-0.0234	237.8045	80.3346	-50.6142	1189
210.9129	75.6164	-0.0096	238.7060	81.1328	-49.3501	1190
211.5839	76.5783	-0.0058	239.4137	81.7396	-48.3453	1191
211.8520	76.9973	-0.0198	239.7137	81.9796	-47.9092	1192
212.6110	78.1132	-0.0063	240.5281	82.6642	-46.7449	1193
213.1900	78.9742	0.0117	241.1540	83.1857	-45.8470	1194
213.8470	80.0232	0.0077	241.9007	83.7727	-44.7562	1195
214.0791	80.4381	-0.0132	242.1873	83.9772	-44.3265	1196
214.3051	80.7631	0.0100	242.4257	84.1814	-43.9871	1197
215.1041	82.0861	0.0167	243.3581	84.8923	-42.6133	1198
215.3221	82.3641	0.0647	243.5692	85.0917	-42.3213	1199
216.0161	83.5246	0.0903	244.3843	85.7083	-41.1167	1200
216.1951	83.9376	0.0446	244.6543	85.8599	-40.6925	1201
217.4561	86.2826	0.0426	246.2602	86.9650	-38.2676	1202
218.2746	88.0373	-0.0223	247.4278	87.6670	-36.4611	1203
219.1967	89.8243	0.0323	248.6407	88.4702	-34.6158	1204
219.9717	91.4383	0.0655	249.7203	89.1380	-32.9528	1205
221.0495	93.7988	0.1233	251.2843	90.0592	-30.5244	1206
221.7516	95.5828	0.1091	252.4398	90.6430	-28.6963	1207
221.9846	96.2828	0.0744	252.8841	90.8297	-27.9818	1208
222.1536	96.7438	0.0692	253.1801	90.9682	-27.5103	1209
222.3266	97.0458	0.1256	253.3871	91.1211	-27.1973	1210
222.5655	97.7130	0.1198	253.8142	91.3158	-26.5152	1211
222.9455	98.8310	0.1028	254.5259	91.6219	-25.3735	1212
223.4105	100.1740	0.1099	255.3826	91.9981	-24.0015	1213
223.4366	100.4260	0.0554	255.5318	92.0075	-23.7481	1214
223.9646	102.2830	-0.0045	256.6961	92.4129	-21.8585	1215
224.4155	103.5394	0.0671	257.5002	92.7806	-20.5739	1216
224.4285	103.7624	0.0174	257.6316	92.7790	-20.3503	1217
224.7035	104.5464	0.0674	258.1319	93.0021	-19.5491	1218
225.0156	105.6804	0.0696	258.8412	93.2393	-18.3959	1219
225.2866	106.4964	0.1252	259.3584	93.4563	-17.5630	1220
225.4616	107.0194	0.1662	259.6898	93.5967	-17.0291	1221
225.6405	107.8199	0.1486	260.1839	93.7229	-16.2178	1222
225.8765	108.6999	0.1758	260.7325	93.9008	-15.3233	1223
225.9605	109.3299	0.1177	261.1139	93.9434	-14.6885	1224
226.1446	110.4159	0.0658	261.7773	94.0559	-13.5916	1225
226.2286	111.0299	0.0225	262.1503	94.0995	-12.9727	1226
226.4126	111.7659	0.0576	262.6074	94.2350	-12.2254	1227
226.4116	112.0149	0.0088	262.7548	94.2176	-11.9768	1228
226.6214	113.5838	-0.0717	263.7092	94.3243	-10.3957	1229
226.7935	115.0098	-0.1403	264.5761	94.4025	-8.9600	1230
226.9015	115.8948	-0.1708	265.1147	94.4524	-8.0688	1231
226.9605	116.0458	-0.1350	265.2103	94.5014	-7.9141	1232
227.1425	116.8938	-0.0771	265.7331	94.6275	-7.0551	1233
227.2284	118.1351	-0.1572	266.4835	94.6319	-5.8094	1234
227.2975	119.3991	-0.2404	267.2475	94.6180	-4.5422	1235
227.4255	120.4911	-0.2306	267.9127	94.6742	-3.4430	1236
227.5097	121.1654	-0.2131	268.3236	94.7141	-2.7639	1237
227.4915	121.4041	-0.2535	268.4664	94.6803	-2.5266	1238
227.6786	123.6148	-0.2451	269.8090	94.7222	-0.3059	1239
227.7546	125.3698	-0.2737	270.8720	94.6831	1.4523	1240
227.8915	128.0088	-0.2328	272.4710	94.6468	4.0975	1241
227.9285	129.0378	-0.2132	273.0938	94.6163	5.1279	1242
227.9416	130.8008	-0.2041	274.1603	94.5138	6.8900	1243
227.9236	132.1938	-0.2019	275.0029	94.4046	8.2804	1244
227.9825	133.4268	-0.1080	275.7470	94.3826	9.5160	1245

## LIMB PROFILE POSITIONS

3

x	y	$\delta r$	P	x'	y'	Ser
227.9835	133.9528	-0.0873	276.0645	94.3491	10.0415	1246
227.9215	134.3768	-0.1311	276.3221	94.2595	10.4610	1247
227.9315	134.6608	-0.1080	276.4933	94.2508	10.7454	1248
227.9265	135.1778	-0.0868	276.8054	94.2120	11.2615	1249
227.9125	135.5838	-0.0783	277.0507	94.1714	11.6662	1250
227.9265	135.7708	-0.0533	277.1630	94.1731	11.8539	1251
227.9125	136.1438	-0.0444	277.3883	94.1347	12.2256	1252
227.8745	136.3888	-0.0664	277.5375	94.0807	12.4679	1253
227.8665	136.5738	-0.0620	277.6493	94.0606	12.6522	1254
227.8195	137.3688	-0.0515	278.1302	93.9616	13.4433	1255
227.8044	137.9158	-0.0231	278.4601	93.9107	13.9887	1256
227.6754	139.0108	-0.0554	279.1256	93.7102	15.0742	1257
227.5955	139.9988	-0.0372	279.7241	93.5656	16.0560	1258
227.5045	140.6758	-0.0548	280.1364	93.4305	16.7264	1259
227.2565	142.3475	-0.1001	281.1569	93.0735	18.3802	1260
226.9855	144.2255	-0.1077	282.3034	92.6798	20.2386	1261
226.5545	146.9295	-0.0918	283.9578	92.0725	22.9117	1262
226.3235	148.3791	-0.0508	284.8441	91.7469	24.3447	1263
226.0225	149.9181	-0.0369	285.7910	91.3457	25.8625	1264
225.8595	150.7571	-0.0173	286.3068	91.1280	26.6900	1265
225.6245	151.6661	-0.0443	286.8734	90.8339	27.5827	1266
225.4805	152.1281	-0.0783	287.1650	90.6599	28.0348	1267
225.4275	152.3071	-0.0881	287.2776	90.5953	28.2102	1268
225.3914	152.5081	-0.0759	287.4008	90.5461	28.4087	1269
225.3215	152.7081	-0.0965	287.5282	90.4631	28.6039	1270
225.1445	153.4441	-0.0899	287.9855	90.2382	29.3276	1271
225.0725	153.7721	-0.0784	288.1882	90.1449	29.6506	1272
224.8685	154.6241	-0.0593	288.7172	89.8854	30.4884	1273
224.6825	155.3741	-0.0420	289.1837	89.6507	31.2255	1274
224.4305	156.3291	-0.0254	289.7800	89.3366	32.1630	1275
224.2855	156.8691	-0.0139	290.1174	89.1565	32.6930	1276
224.2365	157.1651	0.0231	290.2971	89.0882	32.9855	1277
224.1304	157.5052	0.0189	290.5121	88.9599	33.3183	1278
224.0244	157.9462	0.0457	290.7853	88.8252	33.7520	1279
223.9094	158.2712	0.0317	290.9931	88.6891	34.0691	1280
223.7514	158.8342	0.0496	291.3457	88.4945	34.6212	1281
223.3744	159.7902	-0.0150	291.9645	88.0556	35.5516	1282
223.2374	160.3092	0.0188	292.2879	87.8849	36.0612	1283
222.8984	161.2292	-0.0049	292.8794	87.4863	36.9581	1284
222.4443	162.6845	0.0556	293.7985	86.9376	38.3823	1285
221.8463	163.9885	-0.0480	294.6620	86.2553	39.6459	1286
221.6553	164.6805	0.0235	295.0932	86.0193	40.3247	1287
221.3613	165.3685	0.0032	295.5445	85.6808	40.9928	1288
221.1734	165.9055	0.0299	295.8875	85.4580	41.5170	1289
220.5804	167.3084	0.0220	296.8065	84.7742	42.8798	1290
220.4593	167.6660	0.0514	297.0335	84.6299	43.2291	1291
220.3743	167.8790	0.0579	297.1718	84.5311	43.4363	1292
220.0923	168.5580	0.0721	297.6151	84.2051	44.0962	1293
219.8083	169.0550	0.0153	297.9587	83.8891	44.5741	1294
219.6893	169.4000	0.0491	298.1779	83.7477	44.9110	1295
219.3793	170.0240	0.0277	298.5980	83.3974	45.5141	1296
219.0914	170.6069	0.0137	298.9903	83.0718	46.0777	1297
218.6954	171.4699	0.0286	299.5631	82.6200	46.9140	1298
218.3124	172.2369	0.0220	300.0803	82.1875	47.6552	1299
218.1344	172.5039	-0.0185	300.2724	81.9923	47.9103	1300
218.0643	172.7865	0.0455	300.4438	81.9038	48.1880	1301
217.4247	173.9932	0.0264	301.2677	81.1864	49.3518	1302
217.3287	174.2062	0.0401	301.4084	81.0766	49.5583	1303
217.1717	174.5102	0.0429	301.6148	80.9000	49.8517	1304
216.7778	175.2102	0.0254	302.0992	80.4609	50.5253	1305
216.4818	175.7452	0.0212	302.4681	80.1304	51.0404	1306
216.3048	176.0482	0.0123	302.6797	79.9339	51.3315	1307
215.8418	176.8392	-0.0055	303.2327	79.4199	52.0915	1308
215.7918	176.9622	0.0116	303.3122	79.3620	52.2111	1309
215.6838	177.1332	0.0023	303.4341	79.2430	52.3749	1310
215.4537	177.5483	0.0094	303.7204	78.9861	52.7745	1311
215.3737	177.7223	0.0273	303.8355	78.8949	52.9431	1312
215.3087	177.8313	0.0258	303.9121	78.8228	53.0478	1313
213.8988	180.2382	0.0582	305.5946	77.2578	55.3602	1314
213.8358	180.4402	0.1115	305.7181	77.1817	55.5579	1315
213.7358	180.5352	0.0771	305.7986	77.0757	55.6463	1316
213.6238	180.7552	0.0994	305.9469	76.9495	55.8587	1317
213.5348	180.8722	0.0866	306.0351	76.8530	55.9698	1318

## LIMB PROFILE POSITIONS

x	y	$\delta r$	P	x'	y'	Ser
213.2978	181.2852	0.1082	306.3219	76.5894	56.3669	1319
212.9799	181.8252	0.1333	306.6993	76.2366	56.8855	1320
212.6059	182.3892	0.1289	307.1071	75.8264	57.4246	1321
211.9766	183.2286	0.0710	307.7385	75.1432	58.2220	1322
211.9046	183.4216	0.1195	307.8592	75.0587	58.4101	1323
211.6766	183.6996	0.0874	308.0751	74.8130	58.6729	1324
211.2366	184.3486	0.0936	308.5477	74.3313	59.2925	1325
211.0767	184.6026	0.1077	308.7285	74.1549	59.5358	1326
210.7747	184.9846	0.0807	309.0216	73.8285	59.8977	1327
210.5157	185.3986	0.1098	309.3154	73.5428	60.2944	1328
210.3377	185.5825	0.0724	309.4681	73.3531	60.4666	1329
210.1957	185.8205	0.0966	309.6346	73.1958	60.6950	1330
210.0717	185.9795	0.0897	309.7560	73.0616	60.8458	1331
210.0177	186.0995	0.1167	309.8337	72.9999	60.9621	1332
209.8237	186.2915	0.0734	309.9961	72.7937	61.1412	1333
209.6827	186.4905	0.0778	310.1431	72.6399	61.3308	1334
209.3027	186.9805	0.0649	310.5169	72.2285	61.7955	1335
208.9326	187.5891	0.1357	310.9442	71.8192	62.3793	1336
208.8456	187.6941	0.1300	311.0263	71.7255	62.4785	1337
208.7217	187.8811	0.1450	311.1612	71.5895	62.6572	1338
208.5547	188.0610	0.1221	311.3085	71.4110	62.8261	1339
208.3687	188.3810	0.1706	311.5296	71.2044	63.1336	1340
207.9367	188.8780	0.1362	311.9257	70.7407	63.6019	1341
207.7427	189.0480	0.0892	312.0785	70.5359	63.7591	1342
207.4638	189.3699	0.0711	312.3351	70.2364	64.0624	1343
207.3728	189.5329	0.1019	312.4461	70.1349	64.2193	1344
207.0448	189.8959	0.0743	312.7405	69.7837	64.5605	1345
206.9148	190.0759	0.0869	312.8742	69.6422	64.7318	1346
206.7818	190.2189	0.0742	312.9917	69.5000	64.8660	1347
206.6528	190.4119	0.0968	313.1310	69.3586	65.0504	1348
206.4068	190.7939	0.1503	313.4029	69.0881	65.4159	1349
206.1388	191.0408	0.1024	313.6206	68.8044	65.6452	1350
205.9768	191.2818	0.1332	313.7946	68.6269	65.8753	1351
205.6018	191.6928	0.1124	314.1296	68.2257	66.2614	1352
205.5098	191.8468	0.1423	314.2362	68.1238	66.4092	1353
205.3188	192.0318	0.1177	314.3957	67.9210	66.5816	1354
205.1598	192.2468	0.1376	314.5564	67.7482	66.7860	1355
204.8148	192.6610	0.1489	314.8811	67.3767	67.1772	1356
204.5298	192.9319	0.1134	315.1171	67.0745	67.4293	1357
204.3528	193.1739	0.1411	315.2970	66.8820	67.6595	1358
203.5029	194.1339	0.1509	316.0694	65.9707	68.5630	1359
203.1259	194.4599	0.0931	316.3677	65.5731	68.8640	1360
202.3337	195.3798	0.1413	317.0987	64.7221	69.7312	1361
202.2277	195.5158	0.1579	317.2021	64.6074	69.8601	1362
202.0647	195.6077	0.1030	317.3099	64.4386	69.9414	1363
201.7777	195.8937	0.0932	317.5541	64.1334	70.2084	1364
201.6717	195.9677	0.0680	317.6305	64.0228	70.2754	1365
201.1937	196.4327	0.0484	318.0324	63.5152	70.7087	1366
201.1447	196.4957	0.0574	318.0802	63.4622	70.7684	1367
200.9937	196.6117	0.0307	318.1939	63.3039	70.8744	1368
200.6717	196.8807	-0.0097	318.4458	62.9649	71.1221	1369
200.4747	197.0877	-0.0036	318.6182	62.7547	71.3160	1370
200.2977	197.2037	-0.0469	318.7432	62.5704	71.4203	1371
200.2147	197.3367	-0.0114	318.8354	62.4788	71.5478	1372
200.0677	197.3987	-0.0711	318.9247	62.3280	71.6001	1373
199.6817	197.8084	-0.0507	319.2643	61.9159	71.9842	1374
199.1327	198.3294	-0.0603	319.7212	61.3338	72.4688	1375
199.0237	198.4794	-0.0280	319.8314	61.2152	72.6115	1376
198.7028	198.7773	-0.0347	320.0957	60.8753	72.8883	1377
198.3478	199.1123	-0.0359	320.3903	60.4990	73.1997	1378
197.8118	199.6223	-0.0299	320.8368	59.9306	73.6742	1379
196.8736	200.4733	-0.0364	321.6012	58.9384	74.4630	1380
196.7426	200.5543	-0.0641	321.6927	58.8023	74.5354	1381
196.4286	200.9583	0.0271	321.9966	58.4625	74.9185	1382
196.1826	201.1653	0.0184	322.1904	58.2034	75.1092	1383
195.9696	201.4812	0.1145	322.4128	57.9701	75.4110	1384
195.6916	201.6212	0.0366	322.5944	57.6834	75.5327	1385
195.4946	201.8282	0.0634	322.7660	57.4732	75.7266	1386
195.2726	201.9872	0.0383	322.9299	57.2412	75.8709	1387
195.0906	202.1122	0.0143	323.0623	57.0514	75.9839	1388
194.6246	202.4992	0.0061	323.4276	56.5609	76.3401	1389
194.4985	202.5543	-0.0333	323.5072	56.4314	76.3869	1390
194.2835	202.7813	0.0017	323.6946	56.2019	76.5996	1391

x	y	$\delta r$	P	x'	y'	Ser
193.8505	202.9912	-0.1149	323.9764	55.7560	76.7811	1392
193.7985	203.0702	-0.0874	324.0311	55.6989	76.8566	1393
193.2306	203.4862	-0.1274	324.4556	55.1047	77.2351	1394
193.1506	203.5932	-0.0951	324.5339	55.0179	77.3367	1395
192.8536	203.7932	-0.1272	324.7493	54.7083	77.5171	1396
192.5946	203.9822	-0.1426	324.9428	54.4374	77.6890	1397
192.5296	204.0442	-0.1349	324.9969	54.3685	77.7467	1398
192.3857	204.1801	-0.1187	325.1160	54.2159	77.8731	1399
192.2717	204.2401	-0.1429	325.1925	54.0982	77.9255	1400
191.8427	204.5331	-0.1795	325.5056	53.6508	78.1902	1401
191.5797	204.7991	-0.1325	325.7299	53.3709	78.4388	1402
190.9967	205.1780	-0.1902	326.1486	52.7641	78.7793	1403
190.4377	205.6060	-0.1892	326.5742	52.1782	79.1704	1404
189.6007	206.2280	-0.1932	327.2045	51.3020	79.7370	1405
188.1677	207.2569	-0.2026	328.2710	49.8042	80.6714	1406
187.2068	207.9665	-0.1744	328.9929	48.7986	81.3175	1407
186.2738	208.5965	-0.1815	329.6732	47.8260	81.8859	1408
185.5478	209.0915	-0.1738	330.2043	47.0690	82.3330	1409
184.7508	209.6095	-0.1773	330.7787	46.2395	82.7984	1410
184.4108	209.9124	-0.1068	331.0506	45.8803	83.0789	1411
184.0298	210.1254	-0.1322	331.3138	45.4860	83.2668	1412
183.7108	210.3504	-0.1124	331.5493	45.1529	83.4707	1413
183.2158	210.6314	-0.1365	331.8928	44.6404	83.7191	1414
182.9508	210.8914	-0.0546	332.1115	44.3589	83.9615	1415
182.7248	211.0374	-0.0484	332.2738	44.1237	84.0926	1416
182.5718	211.1274	-0.0512	332.3809	43.9651	84.1725	1417
182.4298	211.2624	-0.0096	332.4965	43.8145	84.2981	1418
182.2618	211.3284	-0.0401	332.6038	43.6425	84.3531	1419
182.0608	211.5084	0.0105	332.7637	43.4301	84.5198	1420
181.8668	211.5964	-0.0136	332.8914	43.2307	84.5950	1421
181.2038	212.0543	0.0433	333.3762	42.5389	85.0092	1422
180.9328	212.1783	0.0138	333.5550	42.2603	85.1154	1423
180.7018	212.2493	-0.0407	333.6971	42.0251	85.1712	1424
180.0427	212.5830	-0.0787	334.1424	41.3453	85.4616	1425
179.5497	212.9160	-0.0306	334.5003	40.8314	85.7620	1426
179.3187	213.0170	-0.0550	334.6517	40.5942	85.8478	1427
178.7197	213.3730	-0.0323	335.0720	39.9730	86.1644	1428
178.5717	213.4260	-0.0567	335.1657	39.8218	86.2076	1429
177.9147	213.7130	-0.1161	335.5971	39.1473	86.4514	1430
177.8307	213.7510	-0.1221	335.6526	39.0609	86.4839	1431
177.6637	213.8480	-0.1149	335.7692	38.8879	86.5699	1432
177.3749	213.9988	-0.1165	335.9660	38.5897	86.7018	1433
176.9949	214.2598	-0.0613	336.2423	38.1933	86.9377	1434
176.8609	214.3038	-0.0841	336.3263	38.0567	86.9729	1435
176.2908	214.6468	-0.0395	336.7270	37.4653	87.2783	1436
176.1778	214.7488	0.0002	336.8157	37.3458	87.3728	1437
175.9448	214.8808	0.0129	336.9770	37.1046	87.4895	1438
175.7538	214.9398	-0.0202	337.0959	36.9100	87.5359	1439
175.2728	215.2388	0.0332	337.4360	36.4103	87.8032	1440
174.6698	215.5558	0.0528	337.8466	35.7877	88.0805	1441
174.2378	215.7228	0.0155	338.1250	35.3455	88.2191	1442
173.4668	216.0827	0.0108	338.6381	34.5524	88.5284	1443
173.2168	216.1807	-0.0061	338.7998	34.2964	88.6100	1444
172.5118	216.5297	0.0166	339.2740	33.5698	88.9126	1445
172.0506	216.7746	0.0501	339.5883	33.0935	89.1271	1446
171.6146	216.9646	0.0463	339.8750	32.6458	89.2884	1447
171.0636	217.2226	0.0614	340.2416	32.0790	89.5102	1448
170.3316	217.4696	-0.0007	340.7059	31.3321	89.7091	1449
169.7285	217.7913	0.0621	341.1164	30.7091	89.9912	1450
169.3725	217.8903	0.0173	341.3375	30.3472	90.0668	1451
168.0975	218.4363	0.0466	342.1736	29.0388	90.5290	1452
167.9715	218.5723	0.1270	342.2743	28.9042	90.6566	1453
167.8155	218.5743	0.0719	342.3622	28.7483	90.6484	1454
167.6205	218.5683	-0.0047	342.4704	28.5541	90.6297	1455
167.3864	218.7202	0.0525	342.6351	28.3105	90.7662	1456
167.1844	218.7242	-0.0163	342.7497	28.1086	90.7570	1457
166.9954	218.8902	0.0714	342.8919	27.9091	90.9104	1458
166.7444	218.9152	0.0057	343.0387	27.6569	90.9190	1459
166.1494	219.1252	-0.0060	343.4192	27.0493	91.0899	1460
164.8104	219.6851	0.0656	344.2933	25.6760	91.5619	1461
164.6064	219.7201	0.0309	344.4163	25.4701	91.5836	1462
164.2844	219.8471	0.0449	344.6248	25.1404	91.6894	1463
164.0594	219.8851	0.0074	344.7605	24.9133	91.7127	1464

## LIMB PROFILE POSITIONS

x	y	$\delta r$	P	x'	y'	Ser
163.3824	220.1301	0.0217	345.1946	24.2215	91.9132	1465
163.2124	220.2281	0.0608	345.3105	24.0454	92.0000	1466
162.8034	220.3211	0.0207	345.5622	23.6311	92.0662	1467
162.1492	220.5380	0.0253	345.9778	22.9639	92.2402	1468
160.9982	220.8720	0.0000	346.7003	21.7932	92.4986	1469
160.5442	221.0499	0.0385	346.9935	21.3284	92.6468	1470
160.1382	221.1669	0.0346	347.2482	20.9155	92.7372	1471
159.6662	221.3039	0.0333	347.5445	20.4354	92.8432	1472
159.4302	221.3429	0.0052	347.6877	20.1972	92.8667	1473
159.1322	221.4549	0.0311	347.8791	19.8925	92.9592	1474
158.2152	221.7059	0.0268	348.4523	18.9607	93.1500	1475
157.8632	221.8029	0.0283	348.6724	18.6030	93.2239	1476
157.5632	221.8569	0.0029	348.8556	18.3000	93.2583	1477
157.1430	221.9938	0.0284	349.1216	17.8717	93.3676	1478
156.7740	222.0678	0.0077	349.3482	17.4985	93.4174	1479
156.3470	222.1968	0.0276	349.6169	17.0639	93.5184	1480
156.1190	222.2148	-0.0103	349.7529	16.8351	93.5215	1481
155.8650	222.3077	0.0190	349.9151	16.5755	93.5978	1482
155.2280	222.4247	-0.0174	350.3050	15.9320	93.6731	1483
154.3910	222.6707	0.0315	350.8303	15.0804	93.8642	1484
153.9820	222.7047	-0.0258	351.0754	14.6700	93.8714	1485
153.2670	222.8877	-0.0011	351.5203	13.9443	94.0075	1486
153.0270	222.9157	-0.0242	351.6654	13.7029	94.0198	1487
152.3546	223.0473	-0.0335	352.0787	13.0232	94.1075	1488
152.0576	223.1503	0.0079	352.2666	12.7200	94.1910	1489
151.7656	223.1923	-0.0086	352.4443	12.4258	94.2139	1490
151.1216	223.3643	0.0364	352.8453	11.7717	94.3436	1491
150.6346	223.4433	0.0232	353.1426	11.2804	94.3907	1492
150.0256	223.5683	0.0362	353.5174	10.6644	94.4758	1493
149.7156	223.6183	0.0309	353.7067	10.3517	94.5055	1494
148.5016	223.8653	0.0708	354.4530	9.1237	94.6730	1495
147.4115	223.9371	-0.0279	355.1090	8.0309	94.6736	1496
146.3045	224.1621	0.0352	355.7892	6.9113	94.8261	1497
145.5905	224.2541	0.0303	356.2231	6.1926	94.8714	1498
145.1005	224.2991	0.0121	356.5196	5.7005	94.8843	1499
144.1455	224.4091	0.0061	357.0993	4.7401	94.9318	1500
143.5345	224.5401	0.0677	357.4742	4.1216	95.0228	1501
142.5935	224.5510	-0.0195	358.0391	3.1817	94.9723	1502
141.9064	224.6198	-0.0168	358.4556	2.4914	94.9962	1503
141.3424	224.6638	-0.0233	358.7968	1.9255	95.0033	1504
140.6914	224.7418	0.0006	359.1920	1.2706	95.0387	1505
139.7924	224.7938	-0.0146	359.7350	0.3699	95.0319	1506
139.4744	224.8578	0.0277	359.9289	0.0483	95.0751	1507
138.5084	224.8928	0.0033	0.5116	-0.9182	95.0470	1508
137.5664	224.8957	-0.0422	1.0791	-1.8586	94.9884	1509
137.2563	224.9495	-0.0023	1.2674	-2.1717	95.0219	1510
136.6843	224.9165	-0.0583	1.6114	-2.7404	94.9516	1511
136.0533	224.9485	-0.0477	1.9925	-3.3724	94.9424	1512
134.4193	225.0155	-0.0165	2.9789	-5.0077	94.9026	1513
134.1043	224.9995	-0.0362	3.1688	-5.3211	94.8660	1514
132.9353	225.0294	-0.0107	3.8740	-6.4898	94.8197	1515
132.6633	225.0064	-0.0327	4.0381	-6.7598	94.7789	1516
132.3443	225.0093	-0.0277	4.2305	-7.0784	94.7610	1517
131.9773	225.0203	-0.0128	4.4518	-7.4455	94.7480	1518
131.6933	225.0373	0.0081	4.6229	-7.7301	94.7464	1519
131.5393	225.0243	-0.0024	4.7159	-7.8829	94.7234	1520
131.3443	225.0303	0.0071	4.8334	-8.0779	94.7166	1521
130.2623	224.9593	-0.0372	5.4869	-9.1533	94.5751	1522
129.5483	224.9543	-0.0178	5.9174	-9.8656	94.5234	1523
129.2743	224.9313	-0.0300	6.0831	-10.1376	94.4825	1524
128.9093	224.9423	-0.0034	6.3028	-10.5026	94.4697	1525
128.2173	224.8732	-0.0390	6.7217	-11.1888	94.3556	1526
128.0463	224.8762	-0.0269	6.8246	-11.3597	94.3474	1527
127.7663	224.8612	-0.0265	6.9937	-11.6382	94.3141	1528
127.5623	224.8782	0.0023	7.1160	-11.8429	94.3178	1529
126.1303	224.7861	0.0054	7.9813	-13.2662	94.1323	1530
125.5523	224.7211	-0.0150	8.3318	-13.8389	94.0296	1531
125.1953	224.6861	-0.0207	8.5482	-14.1930	93.9713	1532
124.8263	224.6821	0.0069	8.7701	-14.5610	93.9432	1533
124.4023	224.6241	-0.0128	9.0279	-14.9804	93.8576	1534
122.4793	224.4629	0.0233	10.1914	-16.8893	93.5710	1535
121.4593	224.2649	-0.0534	10.8163	-17.8944	93.3066	1536
120.6593	224.2269	0.0107	11.2979	-18.6905	93.2164	1537
118.5643	223.9358	0.0210	12.5731	-20.7625	92.7889	1538
RADIUS	95.0374	H =	0.0696	K =	.0101	