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AGS- Booster and RHIC lattices with racetrack

Z. Parsa

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Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy
USDOE Office of Science (SC)

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MAY 1987

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ZOHREH PARSA

BROOKHAVEN NATIONAL LABORATORY

ACCELERATOR DEVELOPMENT DEPARTMENT

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WITH RACETRACK

Zohreh Parsa

Accelerator Development Department
Brookhaven National Laboratory
Upton, New York 11973

This note provides some information on the program RACETRACK, which is a computer code used for the simulation of nonlinear particle motion in accelerators. We have used this program (BNLDAG::DUA0:[PARSA1.RACETRACK]RACETRACK.EXE for RHIC, Booster and the 6GeV Light source lattices. We have included copies of the Booster and RHICH lattices in the RACETRACK input format for illustration. For the 6 GeV Light source lattice (and more information) and the source code see the "Guide to Accelerator Physics Program RACETRACK, ADD–AP–TN 6, that should be available soon, or BNLDAG::DUA0:[PARSA1.RACETRACK] Directory, for example;

RHIC.COM	assigns input, output and runs the program
RHIC.LAT	is the RHIC input lattice used with our VAX.VMS version as well as the modified CRAY version of the program RACETRACK.
RHIC.RACOUT	is the RACETRACK output for the above RHIC input.
BOOSTER.LAT	is the Booster input lattice
BOOSTER.racout	is the Booster output lattice
Racetrack.for;10	is the version without NCLO routine (corresponds to RACETRACK.EXE;2). This routine is included in the Guide as a matter of information, (special element may be needed to use this routine, otherwise it has to be deleated as is done in this version we used for the RHIC and the Booster.

Further, note the followings:

- This version allows a maximum number of 100 Elements, although this number can be changed e.g. we also have versions of this program with 300 different types of Elements that is being used for SSC lattice.
- Zero length drift elements are not allowed

- Elements not appearing in the BLOCK statements are treated as nonlinear elements with order 2 times the element lable. For example, Bending Magnet with lable number 3 would be treated as a sextupole with lable number (2x3=) 6

- DYNAPFOR is one of the versions of this program used for SSC on CRAY Computers. This version allows only one set of multipoles.

- FASTRAC is another modified version of RACETRACK that is about 100 times faster than the normal version, also used for SSC on CRAY computers. It includes some LIE Algebraic routines (from MARYLIE) and takes many sets of multipoles.

Following are sample RHIC and Booster input, output lattices, aailable in the [PARSA1.RACETRACK] DIRECTORY;

RHIC.lat input to the program RACETRACK:

```
FLEXIBILITY  /RHIC903s/ ONLY SEXTUPOLES [removed l=0 drifts,zp]
PRINTOUT OF INPUT PARAMETERS
NEXT
SINGLE ELEMENTS
DB1I*  0                          1.83928112
DB2I*  0                          2.23928112
DB2O*  0                          2.25676598
DB1O*  0                          1.85676598
D89I*  0                         21.25667145
D78I*  0                          4.46159327
I672*  0                          1.1
I671*  0                          2.69802471
I562*  0                          2.09387266
I561*  0                          1.22223031
D45I*  0                          8.89728854
D34I*  0                         43.32501632
D23I*  0                          5.66153023
D12I*  0                          1.24908084
D013*  0                          1.0
D012*  0                          5.30089689
D011*  0                          10.0
D12O*  0                          1.24908084
D23O*  0                          5.66153023
D34O*  0                         43.32501632
D45O*  0                          8.88065128
O561*  0                          1.23892191
O562*  0                          2.11056425
O671*  0                          2.71545523
O672*  0                          1.11748486
D78O*  0                          4.46159327
D89O*  0                         21.25667145
QF  *  2          -.0803343040   0.62
QD  *  2           .0802058750   0.62
Q9I *  2          -.0813499890   0.4143845
Q9O *  2          +.0808351560   0.4143845
Q8I *  2           .0813499890   0.70839435
Q8O *  2          -.0812847100   0.70839435
Q7I *  2          -.0813499890   0.80186184
Q7O *  2          +.0812268320   0.80186184
```

```
Q6I  *  2                .0813499890  0.59578475
Q6O  *  2               -.0813846840  0.59578475
Q5I  *  2               -.0683305230  0.62654244
Q5O  *  2               +.0685966910  0.62654244
Q4I  *  2                .0813499890  0.41633416
Q4O  *  2               -.0815714230  0.41633416
Q3I  *  2               -.0683305230  0.56125882
Q3O  *  2               +.0683106720  0.56125882
Q2I  *  2                .0683305230  1.21042801
Q2O  *  2               -.0683409560  1.21042801
Q1I  *  2               -.0683305230  0.75534810
Q1O  *  2               +.0683224480  0.75534810
B    *  1 -.004050477                 9.475
BS2  *  1 -.004050477                 9.475
BS1I*  1 -.003240677                  4.52261691
BS1O*  1 -.004959927                  4.52261691
BC1I*  1 -.005511640                  3.30018198
BC1O*  1 +.005511640                  3.30018198
BC2I*  1 +.003250156                  4.40030559
BC2O*  1 -.003250156                  4.40030559
SF   *  3 -.00000
SD   *  3  .00000
DSF1*  3 -.01990
DSF2*  3  .01990
DSD1*  3 -.02970
DSD2*  3  .02970
MB1  * 11  1.           1.
MB2  * 11  1.             1.
MC1  * 11  0.             0.
MC2  * 11  0.             0.
MF   * 11  0.             0.
MD   * 11  0.             0.
M9I  * 11  0.             0.
M9O  * 11  0.             0.
M8I  * 11  0.             0.
M8O  * 11  0.             0.
M7I  * 11  0.             0.
M7O  * 11  0.             0.
M6I  * 11  0.             0.
M6O  * 11  0.             0.
M5I  * 11  0.             0.
M5O  * 11  0.             0.
M4I  * 11  0.             0.
M4O  * 11  0.             0.
M3I  * 11  0.             0.
M3O  * 11  0.             0.
M2I  * 11  0.             0.
M2O  * 11  0.             0.
M1I  * 11  0.             0.
M1O  * 11  0.             0.
MS1A* 11  0.              0.
MS1B* 11  0.              0.
MS2A* 11  0.              0.
MS2B* 11  0.              0.
M2IA* 11  0.              0.
M2IB* 11  0.              0.
M2OA* 11  0.              0.
M1OB* 11  0.              0.
M1IA* 11  0.              0.
M1IB* 11  0.              0.
```

```
M10A* 11  0.            0.
M20B* 11  0.            0.
NEXT
BLOCK DEFINITIONS----------------------------------------------------------
  3  1  1  1
DB1I DB1I
DB2I DB2I
DB10 DB10
DB20 DB20
D89I D89I
D78I D78I
I672 I672
I671 I671
I562 I562
I561 I561
D45I D45I
D34I D34I
D23I D23I
D12I D12I
D013 D013
D012 D012
D011 D011
D120 D120
D230 D230
D340 D340
D450 D450
0561 0561
0562 0562
0671 0671
0672 0672
D780 D780
D890 D890
D120 D120
B    B
BS2  BS2
BS1I BS1I
BS10 BS10
BC1I BC1I
BC10 BC10
BC2I BC2I
BC20 BC20
QF   QF
QD   QD
Q9I  Q9I
Q8I  Q8I
Q7I  Q7I
Q6I  Q6I
Q5I  Q5I
Q4I  Q4I
Q3I  Q3I
Q2I  Q2I
Q1I  Q1I
Q90  Q90
Q80  Q80
Q70  Q70
Q60  Q60
Q50  Q50
Q40  Q40
Q30  Q30
Q20  Q20
```

```
Q10  Q10
NEXT
STRUCTURE INPUT----------------------------------------------------------

      3*( MF   QF   SF   DSF1 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
          MF   QF   SF   DSF2 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
        )
          M9I  Q9I  D89I Q8I  M8I  Q8I  D78I Q7I  M7I  Q7I
          I672 MS2A BS2  MS2B I671 Q6I  M6I  Q6I  I562
          MS1A BS1I MS1A I561 Q5I  M5I  Q5I  D45I Q4I
          M4I  Q4I  D34I Q3I  M3I  Q3I  D23I Q2I  M2I  Q2I
          D12I Q1I  M1I  Q1I  D013 M2IA BC2I M2IB D012
          M1IA BC1I M1IB D011      D011 M1OA BC1O M1OB
          D012 M2OA BC2O M2OB D013 Q1O  M1O  Q1O  D12O
          Q2O  M2O  Q2O  D23O Q3O  M3O  Q3O  D34O Q4O
          M4O  Q4O  D45O Q5O  M5O  Q5O  0561 MS1B BS1O MS1B
          0562 Q6O  M6O  Q6O  0671 MS2B BS2  MS2A 0672
          Q7O  M7O  Q7O  D78O Q8O  M8O  Q8O  D89O Q9O  M9O
      5*( QD        MC1  DB1O MB2  B    MB1  DB2O SF
          QF   MF   QF        MC2  DB1O MB1  B    MB2
          DB2O SD   DSD1 QD   MD   QD        MC1  DB1O
          MB2  B    MB1  DB2O SF   QF   MF   QF
          MC2  DB1O MB1  B    MB2  DB2O SD   DSD2 QD   MD
        )
          QD        MC1  DB1O MB2  B    MB1  DB2O SF
          QF   MF   QF        MC2  DB1O MB1  B    MB2
          DB2O SD   DSD1 QD   MD   QD        MC1  DB1O
          MB2  B    MB1  DB2O SF   QF   MF   QF
          MC2  DB1O MB1  B    MB2  DB2O SD   DSD2 QD   M9O
          Q9O  D89O Q8O  M8O  Q8O  D78O Q7O  M7O  Q7O  0672
          MS2A BS2  MS2B 0671 Q6O  M6O  Q6O  0562 MS1B BS1O
          MS1B 0561 Q5O  M5O  Q5O  D45O Q4O  M4O  Q4O  D34O
          Q3O  M3O  Q3O  D23O Q2O  M2O  Q2O  D12O Q1O  M1O
          Q1O  D013 M2OB BC2O M2OA D012 M1OB BC1O M1OA D011
               D011 M1IB BC1I M1IA D012 M2IB BC2I M2IA D013
          Q1I  M1I  Q1I  D12I Q2I  M2I  Q2I  D23I Q3I  M3I
          Q3I  D34I Q4I  M4I  Q4I  D45I Q5I  M5I  Q5I  I561
          MS1A BS1I MS1A I562 Q6I  M6I  Q6I  I671 MS2B BS2
          MS2A I672 Q7I  M7I  Q7I  D78I Q8I  M8I  Q8I  D89I
          Q9I  M9I
          QF   SF   DSF1 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
          MF   QF   SF   DSF2 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
      2*( MF   QF   SF   DSF1 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
          MF   QF   SF   DSF2 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
        )
NEXT
LINEAR OPTICS CALCULATION------------------------------------------------
ELEMENT          50
```

```
NEXT
CHROMATICITY CORRECTION-------------------------------------------------------
SF            0.0
SD            0.0
NEXT
ITERATION ERRORS OF CLOSED ORBIT, TUNE ADJUSTMENT AND CHROMATICITY CALC.
                  100 0.0001   0.00001
                   10 0.00001   0.0001
                   10 0.001       0.01
NEXT
TRACKING PARAMETERS-----------------------------------------------------------
         10
          2  10.00      0.0
          3  -.0100     +.0100
NEXT
INITIAL COORDINATES----RECTANGULAR--------------------------------------------
          1   0.       90.0        1.0
NEXT
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED---F10 ---> F15-------------------
              25.0       19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
NEXT
FLUCTUATION RANDOM STARTING NUMBER--------------------------------------------
        00000000000005623845
NEXT
ENDE==============================================================================
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED---F10 ---> F15-------------------
              25.0       19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
NEXT
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED---F10 ---> F15-------------------
              25.0       19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
     -0.00000         0.000462        0.              0.000131
      0.              0.000127        0.              0.000219
      0.000000        0.000219        0.              0.000057
      0.              0.000053        0.              0.000091
      0.0000          0.000083        0.              0.000023
      0.              0.000018        0.              0.000034
     -0.000           0.000028        0.              0.0000084
     -0.000           0.0000061       0.              0.0000011
```

```
NEXT
PRINTOUT OF INPUT PARAMETERS----------
NEXT
TUNE VARIATION----------
QF            .827
QD            .820
NEXT
ORBIT ADJUSTMENT----------
          1.00      1.00
MON=SPH
COR=DPH
COR=DPV
NEXT
INITIAL COORDINATES----------
SET         0.0       0.0       1.99      0.00      -.9       0.0
            0.0       0.0       0.7       0.00      0.0       -.1
NEXT
INITIAL COORDINATES----------
SET         0.0       0.0      29.105     0.00019   0.        0.0B
            0.0       0.0       8.315     0.00018   0.0       0.
NEXT
COMBINATION OF ELEMENTS
SPVL        2.2143    SPVS
NEXT
LIMITATION OF APERTURE----------
SPH    RE    28.        28.
SPV    EL    28.        28.
NEXT
COMBINATION OF ELEMENTS
SPH         3.0       SPHA
SPV         3.0       SPVA
NEXT
C----CELL QUADS FOR QX/QZ=.15/.08 WITHOUT ORBIT DIST
QF    2  2.878     .62        -.08034138
QD    2  2.878     1.8         .03427998
ITERATION ERRORS OF CLOSED ORBIT, TUNE ADJUSTMENT AND CHROMATICITY CALC.
                   50 0.00001   0.00001
                   10 0.000001  0.00001
                   10 0.0001    0.001
NEXT
TRACKING PARAMETERS----------
          1
          1  1.0         0.
          1 -.0000      .000
NEXT
```

Following shows the output generated for the RHIC.lat given above:

```
        OOOOOOOOOOOOOOOOOOOOO
        O                   O
        O R A C E T R A C K O
        O Version  Nov.1986 O
        O                   O
        OOOOOOOOOOOOOOOOOOOOO
```

/RHIC903s/ ONLY SEXTUPOLES [removed l=0 drifts,zp]
PROGRAM MODE : FLEXIBILITY

DATA BLOCK MULTIPOLE COEFFICIENTS
RADIUS IN MM 25.0000000
BENDING STRENGTH IN MRAD 19.4000000

	NORMAL		SKEW	
	MEAN	RMS-VALUE	MEAN	RMS-VALUE
1	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
2	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
3	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
4	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
5	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
6	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
7	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
8	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
9	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
10	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00

DATA BLOCK FLUCTUATIONS OF MULTIPOLES
RANDOM STARTING NUMBER= 5623845

*** RING PARAMETERS ***

SINGLE ELEMENTS:

NO	NAME	TYP	1/RHO	STRENGTH	LENGTH	X-POS	X-RMS	Z-POS	Z-RMS
1	DB1I	0	0.0000000	0.0000000	1.839281120	0.00	0.00	0.00	0.00
2	DB2I	0	0.0000000	0.0000000	2.239281120	0.00	0.00	0.00	0.00
3	DB2O	0	0.0000000	0.0000000	2.256765980	0.00	0.00	0.00	0.00
4	DB1O	0	0.0000000	0.0000000	1.856765980	0.00	0.00	0.00	0.00
5	D89I	0	0.0000000	0.0000000	21.256671450	0.00	0.00	0.00	0.00
6	D78I	0	0.0000000	0.0000000	4.461593270	0.00	0.00	0.00	0.00
7	I672	0	0.0000000	0.0000000	1.100000000	0.00	0.00	0.00	0.00
8	I671	0	0.0000000	0.0000000	2.698024710	0.00	0.00	0.00	0.00
9	I562	0	0.0000000	0.0000000	2.093872660	0.00	0.00	0.00	0.00
10	I561	0	0.0000000	0.0000000	1.222230310	0.00	0.00	0.00	0.00
11	D45I	0	0.0000000	0.0000000	8.897288540	0.00	0.00	0.00	0.00
12	D34I	0	0.0000000	0.0000000	43.325016320	0.00	0.00	0.00	0.00
13	D23I	0	0.0000000	0.0000000	5.661530230	0.00	0.00	0.00	0.00
14	D12I	0	0.0000000	0.0000000	1.249080840	0.00	0.00	0.00	0.00
15	D013	0	0.0000000	0.0000000	1.000000000	0.00	0.00	0.00	0.00
16	D012	0	0.0000000	0.0000000	5.300896890	0.00	0.00	0.00	0.00
17	D011	0	0.0000000	0.0000000	10.000000000	0.00	0.00	0.00	0.00
18	D12O	0	0.0000000	0.0000000	1.249080840	0.00	0.00	0.00	0.00
19	D23O	0	0.0000000	0.0000000	5.661530230	0.00	0.00	0.00	0.00
20	D34O	0	0.0000000	0.0000000	43.325016320	0.00	0.00	0.00	0.00

21	D450	0	0.0000000	0.0000000	8.880651280	0.00	0.00	0.00	0.00
22	O561	0	0.0000000	0.0000000	1.238921910	0.00	0.00	0.00	0.00
23	O562	0	0.0000000	0.0000000	2.110564250	0.00	0.00	0.00	0.00
24	O671	0	0.0000000	0.0000000	2.715455230	0.00	0.00	0.00	0.00
25	O672	0	0.0000000	0.0000000	1.117484860	0.00	0.00	0.00	0.00
26	D780	0	0.0000000	0.0000000	4.461593270	0.00	0.00	0.00	0.00
27	D890	0	0.0000000	0.0000000	21.256671450	0.00	0.00	0.00	0.00
28	QF	2	0.0000000	-0.0803343	0.620000000	0.00	0.00	0.00	0.00
29	QD	2	0.0000000	0.0802059	0.620000000	0.00	0.00	0.00	0.00
30	Q9I	2	0.0000000	-0.0813500	0.414384500	0.00	0.00	0.00	0.00
31	Q90	2	0.0000000	0.0808352	0.414384500	0.00	0.00	0.00	0.00
32	Q8I	2	0.0000000	0.0813500	0.708394350	0.00	0.00	0.00	0.00
33	Q80	2	0.0000000	-0.0812847	0.708394350	0.00	0.00	0.00	0.00
34	Q7I	2	0.0000000	-0.0813500	0.801861840	0.00	0.00	0.00	0.00
35	Q70	2	0.0000000	0.0812268	0.801861840	0.00	0.00	0.00	0.00
36	Q6I	2	0.0000000	0.0813500	0.595784750	0.00	0.00	0.00	0.00
37	Q60	2	0.0000000	-0.0813847	0.595784750	0.00	0.00	0.00	0.00
38	Q5I	2	0.0000000	-0.0683305	0.626542440	0.00	0.00	0.00	0.00
39	Q50	2	0.0000000	0.0685967	0.626542440	0.00	0.00	0.00	0.00
40	Q4I	2	0.0000000	0.0813500	0.416334160	0.00	0.00	0.00	0.00
41	Q40	2	0.0000000	-0.0815714	0.416334160	0.00	0.00	0.00	0.00
42	Q3I	2	0.0000000	-0.0683305	0.561258820	0.00	0.00	0.00	0.00
43	Q30	2	0.0000000	0.0683107	0.561258820	0.00	0.00	0.00	0.00
44	Q2I	2	0.0000000	0.0683305	1.210428010	0.00	0.00	0.00	0.00
45	Q20	2	0.0000000	-0.0683410	1.210428010	0.00	0.00	0.00	0.00
46	Q1I	2	0.0000000	-0.0683305	0.755348100	0.00	0.00	0.00	0.00
47	Q10	2	0.0000000	0.0683224	0.755348100	0.00	0.00	0.00	0.00
48	B	1	-0.0040505	0.0000000	9.475000000	0.00	0.00	0.00	0.00
49	BS2	1	-0.0040505	0.0000000	9.475000000	0.00	0.00	0.00	0.00
50	BS1I	1	-0.0032407	0.0000000	4.522616910	0.00	0.00	0.00	0.00
51	BS10	1	-0.0049599	0.0000000	4.522616910	0.00	0.00	0.00	0.00
52	BC1I	1	-0.0055116	0.0000000	3.300181980	0.00	0.00	0.00	0.00
53	BC10	1	0.0055116	0.0000000	3.300181980	0.00	0.00	0.00	0.00
54	BC2I	1	0.0032502	0.0000000	4.400305590	0.00	0.00	0.00	0.00
55	BC20	1	-0.0032502	0.0000000	4.400305590	0.00	0.00	0.00	0.00
56	SF	3	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
57	SD	3	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
58	DSF1	3	-0.0199000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
59	DSF2	3	0.0199000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
60	DSD1	3	-0.0297000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
61	DSD2	3	0.0297000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
62	MB1	11	1.0000000	1.0000000	0.000000000	0.00	0.00	0.00	0.00
63	MB2	11	1.0000000	1.0000000	0.000000000	0.00	0.00	0.00	0.00
64	MC1	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
65	MC2	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
66	MF	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
67	MD	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
68	M9I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
69	M90	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
70	M8I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
71	M80	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
72	M7I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
73	M70	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
74	M6I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
75	M60	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
76	M5I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
77	M50	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
78	M4I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
79	M40	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
80	M3I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00

I	81	M3O	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	82	M2I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	83	M2O	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	84	M1I	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	85	M1O	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	86	MS1A	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	87	MS1B	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	88	MS2A	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	89	MS2B	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	90	M2IA	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	91	M2IB	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	92	M2OA	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	93	M1OB	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	94	M1IA	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	95	M1IB	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	96	M1OA	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
I	97	M2OB	11	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00

RINGSTRUCTURE:

NO. OF SUPERPERIODS AND SYMMETRY 3 1 1 1
NUMBER OF DIFFERENT BLOCKS 56
BLOCKS PER PERIOD 706

BLOCKSTRUCTURE:
(BLOCKTYP—NO. OF SINGLE ELEMENTS—SINGLE ELEMENT TYPES)

1	DB1I	1	DB1I
2	DB2I	1	DB2I
3	DB1O	1	DB1O
4	DB2O	1	DB2O
5	D89I	1	D89I
6	D78I	1	D78I
7	I672	1	I672
8	I671	1	I671
9	I562	1	I562
10	I561	1	I561
11	D45I	1	D45I
12	D34I	1	D34I
13	D23I	1	D23I
14	D12I	1	D12I
15	D013	1	D013
16	D012	1	D012
17	D011	1	D011
18	D12O	1	D12O
19	D23O	1	D23O
20	D34O	1	D34O
21	D45O	1	D45O
22	O561	1	O561
23	O562	1	O562
24	O671	1	O671
25	O672	1	O672
26	D78O	1	D78O
27	D89O	1	D89O

28	D120	1	D120
29	B	1	B
30	BS2	1	BS2
31	BS1I	1	BS1I
32	BS10	1	BS10
33	BC1I	1	BC1I
34	BC10	1	BC10
35	BC2I	1	BC2I
36	BC20	1	BC20
37	QF	1	QF
38	QD	1	QD
39	Q9I	1	Q9I
40	Q8I	1	Q8I
41	Q7I	1	Q7I
42	Q6I	1	Q6I
43	Q5I	1	Q5I
44	Q4I	1	Q4I
45	Q3I	1	Q3I
46	Q2I	1	Q2I
47	Q1I	1	Q1I
48	Q90	1	Q90
49	Q80	1	Q80
50	Q70	1	Q70
51	Q60	1	Q60
52	Q50	1	Q50
53	Q40	1	Q40
54	Q30	1	Q30
55	Q20	1	Q20
56	Q10	1	Q10

BLOCKSTRUCTURE OF SUPERPERIODE:

1	MF	QF	SF	DSF1	DB2I	MB1	B	MB2	DB1I	MC1
11	QD	MD	QD	SD	DB2I	MB2	B	MB1	DB1I	MC2
21	QF	MF	QF	SF	DSF2	DB2I	MB1	B	MB2	DB1I
31	MC1	QD	MD	QD	SD	DB2I	MB2	B	MB1	DB1I
41	MC2	QF	MF	QF	SF	DSF1	DB2I	MB1	B	MB2
51	DB1I	MC1	QD	MD	QD	SD	DB2I	MB2	B	MB1
61	DB1I	MC2	QF	MF	QF	SF	DSF2	DB2I	MB1	B
71	MB2	DB1I	MC1	QD	MD	QD	SD	DB2I	MB2	B
81	MB1	DB1I	MC2	QF	MF	QF	SF	DSF1	DB2I	MB1
91	B	MB2	DB1I	MC1	QD	MD	QD	SD	DB2I	MB2
101	B	MB1	DB1I	MC2	QF	MF	QF	SF	DSF2	DB2I
111	MB1	B	MB2	DB1I	MC1	QD	MD	QD	SD	DB2I
121	MB2	B	MB1	DB1I	MC2	QF	M9I	Q9I	D89I	Q8I
131	M8I	Q8I	D78I	Q7I	M7I	Q7I	I672	MS2A	BS2	MS2B
141	I671	Q6I	M6I	Q6I	I562	MS1A	BS1I	MS1A	I561	Q5I
151	M5I	Q5I	D45I	Q4I	M4I	Q4I	D34I	Q3I	M3I	Q3I
161	D23I	Q2I	M2I	Q2I	D12I	Q1I	M1I	Q1I	D013	M2IA
171	BC2I	M2IB	D012	M1IA	BC1I	M1IB	D011	D011	M10A	BC10
181	M10B	D012	M20A	BC20	M20B	D013	Q10	M10	Q10	D120
191	Q20	M20	Q20	D230	Q30	M30	Q30	D340	Q40	M40
201	Q40	D450	Q50	M50	Q50	O561	MS1B	BS10	MS1B	O562
211	Q60	M60	Q60	O671	MS2B	BS2	MS2A	O672	Q70	M70
221	Q70	D780	Q80	M80	Q80	D890	Q90	M90	QD	MC1
231	DB10	MB2	B	MB1	DB20	SF	QF	MF	QF	MC2
241	DB10	MB1	B	MB2	DB20	SD	DSD1	QD	MD	QD
251	MC1	DB10	MB2	B	MB1	DB20	SF	QF	MF	QF

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261 MC2  DB10 MB1  B    MB2  DB20 SD   DSD2 QD   MD
271 QD   MC1  DB10 MB2  B    MB1  DB20 SF   QF   MF
281 QF   MC2  DB10 MB1  B    MB2  DB20 SD   DSD1 QD
291 MD   QD   MC1  DB10 MB2  B    MB1  DB20 SF   QF
301 MF   QF   MC2  DB10 MB1  B    MB2  DB20 SD   DSD2
311 QD   MD   QD   MC1  DB10 MB2  B    MB1  DB20 SF
321 QF   MF   QF   MC2  DB10 MB1  B    MB2  DB20 SD
331 DSD1 QD   MD   QD   MC1  DB10 MB2  B    MB1  DB20
341 SF   QF   MF   QF   MC2  DB10 MB1  B    MB2  DB20
351 SD   DSD2 QD   MD   QD   MC1  DB10 MB2  B    MB1
361 DB20 SF   QF   MF   QF   MC2  DB10 MB1  B    MB2
371 DB20 SD   DSD1 QD   MD   QD   MC1  DB10 MB2  B
381 MB1  DB20 SF   QF   MF   QF   MC2  DB10 MB1  B
391 MB2  DB20 SD   DSD2 QD   MD   QD   MC1  DB10 MB2
401 B    MB1  DB20 SF   QF   MF   QF   MC2  DB10 MB1
411 B    MB2  DB20 SD   DSD1 QD   MD   QD   MC1  DB10
421 MB2  B    MB1  DB20 SF   QF   MF   QF   MC2  DB10
431 MB1  B    MB2  DB20 SD   DSD2 QD   MD   QD   MC1
441 DB10 MB2  B    MB1  DB20 SF   QF   MF   QF   MC2
451 DB10 MB1  B    MB2  DB20 SD   DSD1 QD   MD   QD
461 MC1  DB10 MB2  B    MB1  DB20 SF   QF   MF   QF
471 MC2  DB10 MB1  B    MB2  DB20 SD   DSD2 QD   M90
481 Q90  D890 Q80  M80  Q80  D780 Q70  M70  Q70  0672
491 MS2A BS2  MS2B 0671 Q60  M60  Q60  0562 MS1B BS10
501 MS1B 0561 Q50  M50  Q50  D450 Q40  M40  Q40  D340
511 Q30  M30  Q30  D230 Q20  M20  Q20  D120 Q10  M10
521 Q10  D013 M20B BC20 M20A D012 M10B BC10 M10A D011
531 D011 M1IB BC1I M1IA D012 M2IB BC2I M2IA D013 Q1I
541 M1I  Q1I  D12I Q2I  M2I  Q2I  D23I Q3I  M3I  Q3I
551 D34I Q4I  M4I  Q4I  D45I Q5I  M5I  Q5I  I561 MS1A
561 BS1I MS1A I562 Q6I  M6I  Q6I  I671 MS2B BS2  MS2A
571 I672 Q7I  M7I  Q7I  D78I Q8I  M8I  Q8I  D89I Q9I
581 M9I  QF   SF   DSF1 DB2I MB1  B    MB2  DB1I MC1
591 QD   MD   QD   SD   DB2I MB2  B    MB1  DB1I MC2
601 QF   MF   QF   SF   DSF2 DB2I MB1  B    MB2  DB1I
611 MC1  QD   MD   QD   SD   DB2I MB2  B    MB1  DB1I
621 MC2  QF   MF   QF   SF   DSF1 DB2I MB1  B    MB2
631 DB1I MC1  QD   MD   QD   SD   DB2I MB2  B    MB1
641 DB1I MC2  QF   MF   QF   SF   DSF2 DB2I MB1  B
651 MB2  DB1I MC1  QD   MD   QD   SD   DB2I MB2  B
661 MB1  DB1I MC2  QF   MF   QF   SF   DSF1 DB2I MB1
671 B    MB2  DB1I MC1  QD   MD   QD   SD   DB2I MB2
681 B    MB1  DB1I MC2  QF   MF   QF   SF   DSF2 DB2I
691 MB1  B    MB2  DB1I MC1  QD   MD   QD   SD   DB2I
701 MB2  B    MB1  DB1I MC2  QF
```

*** TRACKING PARAMETERS ***

NUMBER OF REVOLUTIONS	10
TRACKING START AT ELEMENT NO.	1
INITIAL AMPLITUDE-H IN (MM)	10.000
COUPLING EPS-Z/EPS-X	1.000
NUMBER OF PARTICLES	1

——ENTRY ORBIT——/NO MONITORS SPECIFIED

DATA BLOCK CHROMATICITY CORRECTION

CHROMATICITIES	BEFORE	AFTER	CORRECTION
HORIZONTAL	-56.7834824	-0.0100583	
VERTICAL	-56.7726791	-0.0484288	

SEXTUP.STRENGTHS	0.0000000	-0.0839277	INDEX	SF
IN (M-2)	0.0000000	0.1699133		SD

DEFINITION: DXP=STRENGTH*(X*X-Z*Z) / DZP=-2*STRENGTH*X*Z

SEXTUPOLE SENSITIVITIES XI/M1 XI/M2 ZI/M1 ZI/M2 -0.82515180E+03-0.73388219E+02 0.14863908E+03 0.40754676E+03

DATA BLOCK CHROMATICITY CORRECTION

CHROMATICITIES	BEFORE	AFTER	CORRECTION
HORIZONTAL	-0.0100583	0.0000000	
VERTICAL	-0.0484288	0.0000000	

SEXTUP.STRENGTHS	-0.0839277	-0.0839513	INDEX	SF
IN (M-2)	0.1699133	0.1700407		SD

DEFINITION: DXP=STRENGTH*(X*X-Z*Z) / DZP=-2*STRENGTH*X*Z

SEXTUPOLE SENSITIVITIES XI/M1 XI/M2 ZI/M1 ZI/M2 -0.82515180E+03-0.73388219E+02 0.14901161E+03 0.40754676E+03

——ENTRY LINOPT——

RELATIVE ENERGY DEVIATION -0.0100000
FRACTIONAL TUNES -HORICONTAL -0.1647034
-VERTICAL -0.1827588

NR	TYP	L-TOTAL (M)	LENGTH (M)	BETAH (M)	ALFAH	PHIH (QE)	DISH (M)	DISPH (RAD)	CLOH (MM)	CLOPH (MRAD)	BETAV (M)	ALFAV	PHIV (QE)	DISV (M)	DISPV (RAD)	CLOV (MM)	CLOPV (MRAD)
0				27.34	0.01	0.00	1.41	-0.003	-14.5	0.013	9.15	0.02	0.00	0.00	0.000	0.0	0.000
1	QF	0.620	0.620	26.49	1.34	0.00	1.39	-0.075	-14.3	0.74	9.46	-0.52	0.01	0.00	0.000	0.0	0.00
2	SF	0.620	0.000	26.49	1.27	0.01	1.39	-0.071	-14.3	0.72	9.46	-0.50	0.01	0.00	0.000	0.0	0.00
3	DSF1	0.620	0.000	26.49	1.26	0.01	1.39	-0.071	-14.3	0.72	9.46	-0.49	0.01	0.00	0.000	0.0	0.00
4	DB2I	2.859	2.239	21.35	1.04	0.02	1.23	-0.071	-12.7	0.72	12.32	-0.79	0.04	0.00	0.000	0.0	0.00
5	MB1	2.859	0.000	21.35	1.04	0.02	1.23	-0.071	-12.7	0.72	12.32	-0.79	0.04	0.00	0.000	0.0	0.00
6	B	12.334	9.475	10.41	0.12	0.13	0.74	-0.032	-7.7	0.33	38.97	-2.02	0.11	0.00	0.000	0.0	0.00
7	MB2	12.334	0.000	10.41	0.12	0.13	0.74	-0.032	-7.7	0.33	38.97	-2.02	0.11	0.00	0.000	0.0	0.00
8	DB1I	14.174	1.839	10.31	-0.06	0.16	0.69	-0.032	-7.1	0.33	46.86	-2.27	0.12	0.00	0.000	0.0	0.00
9	QD	14.794	0.620	10.75	-0.66	0.17	0.68	0.003	-7.0	-0.02	48.21	0.10	0.12	0.00	0.000	0.0	0.00
10	QD	15.414	0.620	11.97	-1.33	0.18	0.69	0.037	-7.1	-0.38	46.61	2.45	0.12	0.00	0.000	0.0	0.00
11	SD	15.414	0.000	11.97	-1.30	0.18	0.69	0.035	-7.1	-0.37	46.61	2.34	0.13	0.00	0.000	0.0	0.00
12	DB2I	17.653	2.239	18.94	-1.81	0.20	0.77	0.035	-8.0	-0.37	36.84	2.03	0.13	0.00	0.000	0.0	0.00
13	MB2	17.653	0.000	18.94	-1.81	0.20	0.77	0.035	-8.0	-0.37	36.84	2.03	0.13	0.00	0.000	0.0	0.00
14	B	27.128	9.475	73.48	-3.95	0.24	1.29	0.074	-13.3	-0.76	10.84	0.71	0.21	0.00	0.000	0.0	0.00
15	MB1	27.128	0.000	73.48	-3.95	0.24	1.29	0.074	-13.3	-0.76	10.84	0.71	0.21	0.00	0.000	0.0	0.00
16	DB1I	28.967	1.839	88.77	-4.36	0.25	1.42	0.074	-14.7	-0.76	8.69	0.46	0.24	0.00	0.000	0.0	0.00
17	QF	29.587	0.620	91.41	0.14	0.25	1.45	0.001	-14.9	-0.01	8.44	-0.05	0.25	0.00	0.000	0.0	0.00
18	QF	30.207	0.620	88.42	4.63	0.25	1.43	-0.072	-14.7	0.74	8.81	-0.56	0.27	0.00	0.000	0.0	0.00
19	SF	30.207	0.000	88.42	4.41	0.25	1.43	-0.069	-14.7	0.72	8.81	-0.54	0.26	0.00	0.000	0.0	0.00
20	DSF2	30.207	0.000	88.42	4.46	0.25	1.43	-0.069	-14.7	0.72	8.81	-0.54	0.26	0.00	0.000	0.0	0.00
21	DB2I	32.446	2.239	69.62	3.93	0.25	1.27	-0.069	-13.1	0.72	11.98	-0.87	0.30	0.00	0.000	0.0	0.00
22	MB1	32.446	0.000	69.62	3.93	0.25	1.27	-0.069	-13.1	0.72	11.98	-0.87	0.30	0.00	0.000	0.0	0.00
23	B	41.921	9.475	16.33	1.69	0.30	0.80	-0.031	-8.1	0.34	41.66	-2.26	0.37	0.00	0.000	0.0	0.00

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 24 MB2      41.921   0.000   16.33    1.69   0.30   0.80 -0.031   -8.1   0.34   41.66   -2.26   0.37   0.00   0.000    0.0   0.00
 25 DB1I     43.761   1.839   10.90    1.26   0.32   0.74 -0.031   -7.5   0.34   50.46   -2.53   0.37   0.00   0.000    0.0   0.00
 26 QD       44.381   0.620    9.75    0.63   0.33   0.73  0.007   -7.4  -0.03   52.03    0.02   0.38   0.00   0.000    0.0   0.00
 27 QD       45.001   0.620    9.32    0.08   0.34   0.75  0.044   -7.5  -0.41   50.41    2.57   0.38   0.00   0.000    0.0   0.00
 28 SD       45.001   0.000    9.32    0.10   0.34   0.75  0.042   -7.5  -0.40   50.41    2.44   0.38   0.00   0.000    0.0   0.00
 29 DB2I     47.240   2.239    9.41   -0.14   0.38   0.84  0.042   -8.4  -0.40   40.18    2.13   0.39   0.00   0.000    0.0   0.00
 30 MB2      47.240   0.000    9.41   -0.14   0.38   0.84  0.042   -8.4  -0.40   40.18    2.13   0.39   0.00   0.000    0.0   0.00
 31 B        56.715   9.475   21.84   -1.17   0.49   1.43  0.081  -14.0  -0.79   12.16    0.83   0.46   0.00   0.000    0.0   0.00
 32 MB1      56.715   0.000   21.84   -1.17   0.49   1.43  0.081  -14.0  -0.79   12.16    0.83   0.46   0.00   0.000    0.0   0.00
 33 DB1I     58.554   1.839   26.51   -1.37   0.50   1.57  0.081  -15.4  -0.79    9.59    0.57   0.49   0.00   0.000    0.0   0.00
 34 QF       59.174   0.620   27.39   -0.04   0.51   1.60  0.000  -15.7   0.00    9.23    0.03   0.50   0.00   0.000    0.0   0.00
 35 QF       59.794   0.620   26.61    1.29   0.51   1.57 -0.081  -15.4   0.78    9.52   -0.51   0.51   0.00   0.000    0.0   0.00
 36 SF       59.794   0.000   26.61    1.22   0.51   1.57 -0.077  -15.4   0.76    9.52   -0.49   0.51   0.00   0.000    0.0   0.00
 37 DSF1     59.794   0.000   26.61    1.20   0.52   1.57 -0.076  -15.4   0.76    9.52   -0.48   0.50   0.00   0.000    0.0   0.00
 38 DB2I     62.034   2.239   21.70    0.99   0.53   1.40 -0.076  -13.7   0.76   12.34   -0.77   0.54   0.00   0.000    0.0   0.00
 39 MB1      62.034   0.000   21.70    0.99   0.53   1.40 -0.076  -13.7   0.76   12.34   -0.77   0.54   0.00   0.000    0.0   0.00
 40 B        71.509   9.475   11.08    0.13   0.64   0.87 -0.037   -8.4   0.37   38.59   -1.99   0.61   0.00   0.000    0.0   0.00
 41 MB2      71.509   0.000   11.08    0.13   0.64   0.87 -0.037   -8.4   0.37   38.59   -1.99   0.61   0.00   0.000    0.0   0.00
```

```
      TRACKING FOR CONSTANT ENERGY DEVIATION

            TUNE          CLO           CLOP          BET0          ALF0
        X  -0.1647034  -14.5217682   0.0126535   27.3358951   0.0126472
        Z  -0.1827588    0.0000000   0.0000000    9.1493728   0.0179607


      REL. ENERGY DEVIATION=  -0.01000

                          CPU-TIME SINCE LAST CALL=  368920.0MSEC.; TOTAL CPU-TIME=     368.920SEC. REAL TIME=     551.320SEC.
  INI =      1
   ---ENTRY ANFB---INIT.COORD.DISTR.=REC
   ---ITRA/  1/AMP/  10.000     5.785/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

      AMPLITUDE-X =          10.000          AMPLITUDE-Z =           5.785  MM
      EMITTANCE-X =           3.658          EMITTANCE-Z =           3.658  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
   1    -4.522   0.008027    5.785  -0.011357
                          CPU-TIME SINCE LAST CALL=   28640.0MSEC.; TOTAL CPU-TIME=     397.560SEC. REAL TIME=     589.570SEC.
      ********************************
      **** ALL PARTICLES STABLE ****
      ********************************

                          CPU-TIME SINCE LAST CALL=      10.0MSEC.; TOTAL CPU-TIME=     397.570SEC. REAL TIME=     589.578SEC.
  INI =      1
   ---ENTRY ANFB---INIT.COORD.DISTR.=REC
   ---ITRA/  1/AMP/  15.000     8.678/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

      AMPLITUDE-X =          15.000          AMPLITUDE-Z =           8.678  MM
      EMITTANCE-X =           8.231          EMITTANCE-Z =           8.231  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
   1     0.478   0.005714    8.678  -0.017035
                          CPU-TIME SINCE LAST CALL=   29150.0MSEC.; TOTAL CPU-TIME=     426.720SEC. REAL TIME=     627.930SEC.
      ********************************
      **** ALL PARTICLES STABLE ****
      ********************************
```

```
        TRACKING FOR CONSTANT ENERGY DEVIATION

                 TUNE          CLO           CLOP          BET0          ALF0
          X    -0.1726695    0.0000000     0.0000000    50.1580668    0.0000000
          Z    -0.1804024    0.0000000     0.0000000     8.4889710    0.0000690


        REL. ENERGY DEVIATION=   0.00000

                              CPU-TIME SINCE LAST CALL=   13050.0MSEC.; TOTAL CPU-TIME=     439.770SEC. REAL TIME=     646.461SEC.
    INI =       1
     ---ENTRY ANFB---INIT.COORD.DISTR.=REC
     ---ITRA/  1/AMP/  10.000     4.114/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

        AMPLITUDE-X =          10.000          AMPLITUDE-Z =           4.114  MM
        EMITTANCE-X =           1.994          EMITTANCE-Z =           1.994  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
    1    10.000   0.000000     4.114  -0.000033
                              CPU-TIME SINCE LAST CALL=   29010.0MSEC.; TOTAL CPU-TIME=     468.780SEC. REAL TIME=     683.879SEC.
        ******************************
        **** ALL PARTICLES STABLE ****
        ******************************

                              CPU-TIME SINCE LAST CALL=      10.0MSEC.; TOTAL CPU-TIME=     468.790SEC. REAL TIME=     683.898SEC.
    INI =       1
     ---ENTRY ANFB---INIT.COORD.DISTR.=REC
     ---ITRA/  1/AMP/  15.000     6.171/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

        AMPLITUDE-X =          15.000          AMPLITUDE-Z =           6.171  MM
        EMITTANCE-X =           4.486          EMITTANCE-Z =           4.486  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
    1    15.000   0.000000     6.171  -0.000050
                              CPU-TIME SINCE LAST CALL=   29020.0MSEC.; TOTAL CPU-TIME=     497.810SEC. REAL TIME=     720.500SEC.
        ******************************
        **** ALL PARTICLES STABLE ****
        ******************************
```

```
        TRACKING FOR CONSTANT ENERGY DEVIATION

                 TUNE          CLO           CLOP          BET0          ALF0
          X    -0.1544802   14.6999182    0.0325954    88.4356580   -0.0328517
          Z    -0.1748366    0.0000000    0.0000000     7.3340322   -0.0510295


        REL. ENERGY DEVIATION=   0.01000

                              CPU-TIME SINCE LAST CALL=   21700.0MSEC.; TOTAL CPU-TIME=     519.510SEC. REAL TIME=     755.129SEC.
    INI =       1
     ---ENTRY ANFB---INIT.COORD.DISTR.=REC
     ---ITRA/  1/AMP/  10.000     2.880/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

        AMPLITUDE-X =          10.000          AMPLITUDE-Z =           2.880  MM
        EMITTANCE-X =           1.131          EMITTANCE-Z =           1.131  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
    1    24.700   0.036310     2.880   0.020037
```

```
                              CPU-TIME SINCE LAST CALL=    29230.0MSEC.; TOTAL CPU-TIME=      548.740SEC. REAL TIME=      817.219SEC.
         ********************************
         **** ALL PARTICLES STABLE ****
         ********************************

                              CPU-TIME SINCE LAST CALL=       10.0MSEC.; TOTAL CPU-TIME=      548.750SEC. REAL TIME=      817.230SEC.
    INI =       1
     ---ENTRY ANFB---INIT.COORD.DISTR.=REC
     ---ITRA/  1/AMP/  15.000     4.320/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

         AMPLITUDE-X =          15.000          AMPLITUDE-Z =           4.320  MM
         EMITTANCE-X =           2.544          EMITTANCE-Z =           2.544  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
    1   29.700   0.038168    4.320   0.030056
                              CPU-TIME SINCE LAST CALL=    29620.0MSEC.; TOTAL CPU-TIME=      578.370SEC. REAL TIME=      885.340SEC.
         ********************************
         **** ALL PARTICLES STABLE ****
         ********************************
```

```
FLEXIBILITY  /RHIC903s/ ONLY SEXTUPOLES [removed l=0 drifts,zp]
PRINTOUT OF INPUT PARAMETERS----------
NEXT
SINGLE ELEMENTS----------
DB1I*  0                          1.83928112
DB2I*  0                          2.23928112
DB2O*  0                          2.25676598
DB1O*  0                          1.85676598
D89I*  0                         21.25667145
D78I*  0                          4.46159327
I672*  0                          1.1
I671*  0                          2.69802471
I562*  0                          2.09387266
I561*  0                          1.22223031
D45I*  0                          8.89728854
D34I*  0                         43.32501632
D23I*  0                          5.66153023
D12I*  0                          1.24908084
D013*  0                          1.0
D012*  0                          5.30089689
D011*  0                          10.0
D12O*  0                          1.24908084
D23O*  0                          5.66153023
D34O*  0                         43.32501632
D45O*  0                          8.88065128
O561*  0                          1.23892191
O562*  0                          2.11056425
O671*  0                          2.71545523
O672*  0                          1.11748486
D78O*  0                          4.46159327
D89O*  0                         21.25667145
QF  *  2          -.0803343040  0.62
QD  *  2           .0802058750  0.62
Q9I *  2          -.0813499890  0.4143845
Q9O *  2          +.0808351560  0.4143845
Q8I *  2           .0813499890  0.70839435
Q8O *  2          -.0812847100  0.70839435
Q7I *  2          -.0813499890  0.80186184
Q7O *  2          +.0812268320  0.80186184
```

```
Q6I  *  2                .0813499890  0.59578475
Q6O  *  2               -.0813846840  0.59578475
Q5I  *  2               -.0683305230  0.62654244
Q5O  *  2               +.0685966910  0.62654244
Q4I  *  2                .0813499890  0.41633416
Q4O  *  2               -.0815714230  0.41633416
Q3I  *  2               -.0683305230  0.56125882
Q3O  *  2               +.0683106720  0.56125882
Q2I  *  2                .0683305230  1.21042801
Q2O  *  2               -.0683409560  1.21042801
Q1I  *  2               -.0683305230  0.75534810
Q1O  *  2               +.0683224480  0.75534810
B    *  1 -.004050477                 9.475
BS2  *  1 -.004050477                 9.475
BS1I*  1 -.003240677                  4.52261691
BS1O*  1 -.004959927                  4.52261691
BC1I*  1 -.005511640                  3.30018198
BC1O*  1 +.005511640                  3.30018198
BC2I*  1 +.003250156                  4.40030559
BC2O*  1 -.003250156                  4.40030559
SF   *  3 -.00000
SD   *  3  .00000
DSF1*  3 -.01990
DSF2*  3  .01990
DSD1*  3 -.02970
DSD2*  3  .02970
MB1  * 11  1.          1.
MB2  * 11  1.            1.
MC1  * 11  0.            0.
MC2  * 11  0.            0.
MF   * 11  0.            0.
MD   * 11  0.            0.
M9I  * 11  0.            0.
M9O  * 11  0.            0.
M8I  * 11  0.            0.
M8O  * 11  0.            0.
M7I  * 11  0.            0.
M7O  * 11  0.            0.
M6I  * 11  0.            0.
M6O  * 11  0.            0.
M5I  * 11  0.            0.
M5O  * 11  0.            0.
M4I  * 11  0.            0.
M4O  * 11  0.            0.
M3I  * 11  0.            0.
M3O  * 11  0.            0.
M2I  * 11  0.            0.
M2O  * 11  0.            0.
M1I  * 11  0.            0.
M1O  * 11  0.            0.
MS1A* 11  0.             0.
MS1B* 11  0.             0.
MS2A* 11  0.             0.
MS2B* 11  0.             0.
M2IA* 11  0.             0.
M2IB* 11  0.             0.
M2OA* 11  0.             0.
M1OB* 11  0.             0.
M1IA* 11  0.             0.
M1IB* 11  0.             0.
```

```
M10A* 11  0.            0.
M20B* 11  0.            0.
NEXT
BLOCK DEFINITIONS-------------------------------------------------
  3   1   1   1
DB1I DB1I
DB2I DB2I
DB10 DB10
DB20 DB20
D89I D89I
D78I D78I
I672 I672
I671 I671
I562 I562
I561 I561
D45I D45I
D34I D34I
D23I D23I
D12I D12I
D013 D013
D012 D012
D011 D011
D120 D120
D230 D230
D340 D340
D450 D450
0561 0561
0562 0562
0671 0671
0672 0672
D780 D780
D890 D890
D120 D120
B    B
BS2  BS2
BS1I BS1I
BS10 BS10
BC1I BC1I
BC10 BC10
BC2I BC2I
BC20 BC20
QF   QF
QD   QD
Q9I  Q9I
Q8I  Q8I
Q7I  Q7I
Q6I  Q6I
Q5I  Q5I
Q4I  Q4I
Q3I  Q3I
Q2I  Q2I
Q1I  Q1I
Q90  Q90
Q80  Q80
Q70  Q70
Q60  Q60
Q50  Q50
Q40  Q40
Q30  Q30
Q20  Q20
```

```
Q10  Q10
NEXT
STRUCTURE INPUT----------------------------------------------------------

      3*( MF   QF   SF   DSF1 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
          MF   QF   SF   DSF2 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
        )
          M9I  Q9I  D89I Q8I  M8I  Q8I  D78I Q7I  M7I  Q7I
          I672 MS2A BS2  MS2B I671 Q6I  M6I  Q6I  I562
          MS1A BS1I MS1A I561 Q5I  M5I  Q5I  D45I Q4I
          M4I  Q4I  D34I Q3I  M3I  Q3I  D23I Q2I  M2I  Q2I
          D12I Q1I  M1I  Q1I  D013 M2IA BC2I M2IB D012
          M1IA BC1I M1IB D011      D011 M10A BC10 M10B
          D012 M20A BC20 M20B D013 Q10  M10  Q10  D120
          Q20  M20  Q20  D230 Q30  M30  Q30  D340 Q40
          M40  Q40  D450 Q50  M50  Q50  0561 MS1B BS10 MS1B
          0562 Q60  M60  Q60  0671 MS2B BS2  MS2A 0672
          Q70  M70  Q70  D780 Q80  M80  Q80  D890 Q90  M90
      5*( QD        MC1  DB10 MB2  B    MB1  DB20 SF
          QF   MF   QF        MC2  DB10 MB1  B    MB2
          DB20 SD   DSD1 QD   MD   QD        MC1  DB10
          MB2  B    MB1  DB20 SF   QF   MF   QF
          MC2  DB10 MB1  B    MB2  DB20 SD   DSD2 QD   MD
        )
          QD        MC1  DB10 MB2  B    MB1  DB20 SF
          QF   MF   QF        MC2  DB10 MB1  B    MB2
          DB20 SD   DSD1 QD   MD   QD        MC1  DB10
          MB2  B    MB1  DB20 SF   QF   MF   QF
          MC2  DB10 MB1  B    MB2  DB20 SD   DSD2 QD   M90
          Q90  D890 Q80  M80  Q80  D780 Q70  M70  Q70  0672
          MS2A BS2  MS2B 0671 Q60  M60  Q60  0562 MS1B BS10
          MS1B 0561 Q50  M50  Q50  D450 Q40  M40  Q40  D340
          Q30  M30  Q30  D230 Q20  M20  Q20  D120 Q10  M10
          Q10  D013 M20B BC20 M20A D012 M10B BC10 M10A D011
          D011 M1IB BC1I M1IA D012 M2IB BC2I M2IA D013
          Q1I  M1I  Q1I  D12I Q2I  M2I  Q2I  D23I Q3I  M3I
          Q3I  D34I Q4I  M4I  Q4I  D45I Q5I  M5I  Q5I  I561
          MS1A BS1I MS1A I562 Q6I  M6I  Q6I  I671 MS2B BS2
          MS2A I672 Q7I  M7I  Q7I  D78I Q8I  M8I  Q8I  D89I
          Q9I  M9I
          QF   SF   DSF1 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
          MF   QF   SF   DSF2 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
      2*( MF   QF   SF   DSF1 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
          MF   QF   SF   DSF2 DB2I MB1  B    MB2
          DB1I MC1       QD   MD   QD   SD   DB2I
          MB2  B    MB1  DB1I MC2       QF
        )
NEXT
LINEAR OPTICS CALCULATION------------------------------------------------
ELEMENT          50
```

```
NEXT
CHROMATICITY CORRECTION-------------------------------------------------------
SF          0.0
SD          0.0
NEXT
ITERATION ERRORS OF CLOSED ORBIT, TUNE ADJUSTMENT AND CHROMATICITY CALC.
                100 0.0001   0.00001
                 10 0.00001   0.0001
                 10 0.001       0.01
NEXT
TRACKING PARAMETERS-----------------------------------------------------------
        10
         2  10.00      0.0
         3  -.0100     +.0100
NEXT
INITIAL COORDINATES----RECTANGULAR--------------------------------------------
         1   0.       90.0        1.0
NEXT
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED---F10 ---> F15-------------------
              25.0       19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
NEXT
FLUCTUATION RANDOM STARTING NUMBER--------------------------------------------
          00000000000005623845
NEXT
ENDE==========================================================================
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED---F10 ---> F15-------------------
              25.0       19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
NEXT
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED---F10 ---> F15-------------------
              25.0       19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
     -0.00000         0.000462        0.              0.000131
      0.              0.000127        0.              0.000219
      0.000000        0.000219        0.              0.000057
      0.              0.000053        0.              0.000091
      0.0000          0.000083        0.              0.000023
      0.              0.000018        0.              0.000034
     -0.000           0.000028        0.              0.0000084
     -0.000           0.0000061       0.              0.0000011
```

```
NEXT
PRINTOUT OF INPUT PARAMETERS----------
NEXT
TUNE VARIATION----------
QF            .827
QD            .820
NEXT
ORBIT ADJUSTMENT----------
          1.00      1.00
MON=SPH
COR=DPH
COR=DPV
NEXT
INITIAL COORDINATES----------
SET       0.0       0.0       1.99      0.00      -.9       0.0
          0.0       0.0       0.7       0.00      0.0       -.1
NEXT
INITIAL COORDINATES----------
SET       0.0       0.0       29.105    0.00019   0.        0.0B
          0.0       0.0       8.315     0.00018   0.0       0.
NEXT
COMBINATION OF ELEMENTS
SPVL      2.2143    SPVS
NEXT
LIMITATION OF APERTURE----------
SPH   RE    28.       28.
SPV   EL    28.       28.
NEXT
COMBINATION OF ELEMENTS
SPH       3.0       SPHA
SPV       3.0       SPVA
NEXT
C---CELL QUADS FOR QX/QZ=.15/.08 WITHOUT ORBIT DIST
QF    2  2.878    .62       -.08034138
QD    2  2.878    1.8        .03427998
ITERATION ERRORS OF CLOSED ORBIT, TUNE ADJUSTMENT AND CHROMATICITY CALC.
                  50 0.00001   0.00001
                  10 0.000001  0.00001
                  10 0.0001    0.001
NEXT
TRACKING PARAMETERS----------
          1
          1  1.0        0.
          1 -.0000     .000
NEXT
```

BOOSTer.lat input to the program RACETRACK:

```
FLEXIBILITY  /AGS BOOSTER (Sector Dipoles)/ ONLY SEXTUPOLES
PRINTOUT OF INPUT PARAMETERS----------
NEXT
SINGLE ELEMENTS----------
D1      0                          0.3
D2      0                          0.7
D3      0                          1.0
D4      0                          3.7
QF   *  2           -.5583816500  0.251875
```

```
QD   *  2            +.5754637800  0.251875
B    *  3 -.072722042               2.400
SF   *  3 -.00000
SD   *  3  .00000
MB1  * 11  0.           1.
MF   * 11  0.             1.
MD   * 11  0.             1.
NEXT
BLOCK DEFINITIONS-------------------------------------------------------------
  1  1
D1   D1
D2   D2
D3   D3
D4   D4
B    B
QF   QF
QD   QD
NEXT
STRUCTURE INPUT---------------------------------------------------------------

      6*( MD   QD   D1   MB1  B    MB1  D2   SF   D1   QF
          MF   QF   D1   MB1  B    MB1  D2   SD   D1   QD
          MD   QD   D4   QF   MF   QF   D1   MB1  B    MB1
          D2   SD   D1   QD   MD   QD   D1   MB1  B    MB1
          D3   QF   MF   QF   D4   QD   MD   QD   D1   MB1
          B    MB1  D2   SF   D1   QF   MF   QF   D1   MB1
          B    MB1  D3   QD
        )
NEXT
LINEAR OPTICS CALCULATION-----------------------------------------------------
ELEMENT           00
NEXT
CHROMATICITY CORRECTION-------------------------------------------------------
SF           0.0
SD           0.0
NEXT
ITERATION ERRORS OF CLOSED ORBIT, TUNE ADJUSTMENT AND CHROMATICITY CALC.
                100 0.0001   0.00001
                 10 0.00001   0.0001
                 10 0.001        0.01
NEXT
TRACKING PARAMETERS-----------------------------------------------------------
        10
         2  10.00     0.0
         3  -.0100    +.0100
NEXT
INITIAL COORDINATES----RECTANGULAR--------------------------------------------
         1   0.       90.0       1.0
NEXT
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED---F10 ---> F15-------------------
           10.       174.5
      0.             0.00000        0.             0.000
      0.             0.0000         0.             0.000
      .000078        0.00000        0.             0.000
      0.             0.00000        0.             0.000
      -.00000024     0.0000         0.             0.00
      0.             0.0000         0.             0.000
      -.0000000016   0.00000        0.             0.000
      0.             0.00000        0.             0.000
      0.             0.0000         0.             0.000
```

```
      0.              0.00000         0.              0.000
NEXT
FLUCTUATION RANDOM STARTING NUMBER----------------------------------------
         00000000000005623845
NEXT
ENDE==========================================================================
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED--F10 ---> F15----------------------
              25.0       19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
NEXT
MULTIPOLE COEFFICIENTS--/FORMAT CHANGED--F10 ---> F15----------------------
              25.0       19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
     -0.00000         0.000462        0.              0.000131
      0.              0.000127        0.              0.000219
      0.000000        0.000219        0.              0.000057
      0.              0.000053        0.              0.000091
      0.0000          0.000083        0.              0.000023
      0.              0.000018        0.              0.000034
     -0.000           0.000028        0.              0.0000084
     -0.000           0.0000061       0.              0.0000011
NEXT
PRINTOUT OF INPUT PARAMETERS----------------------------------------------
NEXT
TUNE VARIATION------------------------------------------------------------
QF             .827
QD             .820
NEXT
ORBIT ADJUSTMENT----------------------------------------------------------
            1.00       1.00
MON=SPH
COR=DPH
COR=DPV
NEXT
INITIAL COORDINATES-------------------------------------------------------
SET         0.0        0.0        1.99       0.00      -.9        0.0
            0.0        0.0        0.7        0.00      0.0        -.1
NEXT
INITIAL COORDINATES-------------------------------------------------------
SET         0.0        0.0        29.105     0.00019   0.         0.0B
            0.0        0.0        8.315      0.00018   0.0        0.
NEXT
COMBINATION OF ELEMENTS
SPVL        2.2143   SPVS
NEXT
LIMITATION OF APERTURE----------------------------------------------------
SPH    RE     28.         28.
SPV    EL     28.         28.
NEXT
COMBINATION OF ELEMENTS
```

```
SPH         3.0       SPHA
SPV         3.0       SPVA
NEXT
C——CELL QUADS FOR QX/QZ=.15/.08 WITHOUT ORBIT DIST
QF    2  2.878     .62        -.08034138
QD    2  2.878     1.8         .03427998
ITERATION ERRORS OF CLOSED ORBIT, TUNE ADJUSTMENT AND CHROMATICITY CALC.
                  50 0.00001   0.00001
                  10 0.000001  0.00001
                  10 0.0001    0.001
NEXT
TRACKING PARAMETERS————————————————————————————————————————————————
          1
          1  1.0         0.
          1 -.0000      .000
NEXT
```

Following is the output for the booster.lat input given above:

```
          OOOOOOOOOOOOOOOOOOOO
          O                  O
          O R A C E T R A C K O
          O Version  Nov.1986 O
          O                  O
          OOOOOOOOOOOOOOOOOOOO

           /AGS BOOSTER (Sector Dipoles)/ ONLY SEXTUPOLES
          PROGRAM MODE : FLEXIBILITY
```

```
          DATA BLOCK MULTIPOLE COEFFICIENTS
          RADIUS IN MM                  10.0000000
          BENDING STRENGTH IN MRAD     174.5000000
```

	NORMAL		SKEW	
	MEAN	RMS-VALUE	MEAN	RMS-VALUE
1	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
2	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
3	0.78000000E-04	0.00000000E+00	0.00000000E+00	0.00000000E+00
4	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
5	-0.24000000E-06	0.00000000E+00	0.00000000E+00	0.00000000E+00
6	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
7	-0.16000000E-08	0.00000000E+00	0.00000000E+00	0.00000000E+00
8	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
9	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00
10	0.00000000E+00	0.00000000E+00	0.00000000E+00	0.00000000E+00

```
          DATA BLOCK FLUCTUATIONS OF MULTIPOLES
```

RANDOM STARTING NUMBER= 5623845

*** RING PARAMETERS ***

SINGLE ELEMENTS:

NO	NAME	TYP	1/RHO	STRENGTH	LENGTH	X-POS	X-RMS	Z-POS	Z-RMS
1	D1	0	0.0000000	0.0000000	0.300000000	0.00	0.00	0.00	0.00
2	D2	0	0.0000000	0.0000000	0.700000000	0.00	0.00	0.00	0.00
3	D3	0	0.0000000	0.0000000	1.000000000	0.00	0.00	0.00	0.00
4	D4	0	0.0000000	0.0000000	3.700000000	0.00	0.00	0.00	0.00
5	QF	2	0.0000000	-0.5583816	0.251875000	0.00	0.00	0.00	0.00
6	QD	2	0.0000000	0.5754638	0.251875000	0.00	0.00	0.00	0.00
7	B	3	-0.0727220	0.0000000	2.400000000	0.00	0.00	0.00	0.00
8	SF	3	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
9	SD	3	0.0000000	0.0000000	0.000000000	0.00	0.00	0.00	0.00
10	MB1	11	0.0000000	1.0000000	0.000000000	0.00	0.00	0.00	0.00
11	MF	11	0.0000000	1.0000000	0.000000000	0.00	0.00	0.00	0.00
12	MD	11	0.0000000	1.0000000	0.000000000	0.00	0.00	0.00	0.00

RINGSTRUCTURE:

NO. OF SUPERPERIODS AND SYMMETRY 1 1
NUMBER OF DIFFERENT BLOCKS 7
BLOCKS PER PERIOD 384

BLOCKSTRUCTURE:
(BLOCKTYP—NO. OF SINGLE ELEMENTS—SINGLE ELEMENT TYPES)

1 D1 1 D1
2 D2 1 D2
3 D3 1 D3
4 D4 1 D4
5 B 1 B
6 QF 1 QF
7 QD 1 QD

BLOCKSTRUCTURE OF SUPERPERIODE:

1 MD QD D1 MB1 B MB1 D2 SF D1 QF
11 MF QF D1 MB1 B MB1 D2 SD D1 QD
21 MD QD D4 QF MF QF D1 MB1 B MB1
31 D2 SD D1 QD MD QD D1 MB1 B MB1
41 D3 QF MF QF D4 QD MD QD D1 MB1
51 B MB1 D2 SF D1 QF MF QF D1 MB1
61 B MB1 D3 QD MD QD D1 MB1 B MB1
71 D2 SF D1 QF MF QF D1 MB1 B MB1

```
  81 D2   SD   D1   QD   MD   QD   D4   QF   MF   QF
  91 D1   MB1  B    MB1  D2   SD   D1   QD   MD   QD
 101 D1   MB1  B    MB1  D3   QF   MF   QF   D4   QD
 111 MD   QD   D1   MB1  B    MB1  D2   SF   D1   QF
 121 MF   QF   D1   MB1  B    MB1  D3   QD   MD   QD
 131 D1   MB1  B    MB1  D2   SF   D1   QF   MF   QF
 141 D1   MB1  B    MB1  D2   SD   D1   QD   MD   QD
 151 D4   QF   MF   QF   D1   MB1  B    MB1  D2   SD
 161 D1   QD   MD   QD   D1   MB1  B    MB1  D3   QF
 171 MF   QF   D4   QD   MD   QD   D1   MB1  B    MB1
 181 D2   SF   D1   QF   MF   QF   D1   MB1  B    MB1
 191 D3   QD   MD   QD   D1   MB1  B    MB1  D2   SF
 201 D1   QF   MF   QF   D1   MB1  B    MB1  D2   SD
 211 D1   QD   MD   QD   D4   QF   MF   QF   D1   MB1
 221 B    MB1  D2   SD   D1   QD   MD   QD   D1   MB1
 231 B    MB1  D3   QF   MF   QF   D4   QD   MD   QD
 241 D1   MB1  B    MB1  D2   SF   D1   QF   MF   QF
 251 D1   MB1  B    MB1  D3   QD   MD   QD   D1   MB1
 261 B    MB1  D2   SF   D1   QF   MF   QF   D1   MB1
 271 B    MB1  D2   SD   D1   QD   MD   QD   D4   QF
 281 MF   QF   D1   MB1  B    MB1  D2   SD   D1   QD
 291 MD   QD   D1   MB1  B    MB1  D3   QF   MF   QF
 301 D4   QD   MD   QD   D1   MB1  B    MB1  D2   SF
 311 D1   QF   MF   QF   D1   MB1  B    MB1  D3   QD
 321 MD   QD   D1   MB1  B    MB1  D2   SF   D1   QF
 331 MF   QF   D1   MB1  B    MB1  D2   SD   D1   QD
 341 MD   QD   D4   QF   MF   QF   D1   MB1  B    MB1
 351 D2   SD   D1   QD   MD   QD   D1   MB1  B    MB1
 361 D3   QF   MF   QF   D4   QD   MD   QD   D1   MB1
 371 B    MB1  D2   SF   D1   QF   MF   QF   D1   MB1
 381 B    MB1  D3   QD
```

*** TRACKING PARAMETERS ***

```
NUMBER OF REVOLUTIONS                    10
TRACKING START AT ELEMENT NO.             1
INITIAL AMPLITUDE-H IN (MM)              10.000
COUPLING  EPS-Z/EPS-X                     1.000
NUMBER OF PARTICLES                       1
```

——ENTRY ORBIT——/NO MONITORS SPECIFIED

```
DATA BLOCK CHROMATICITY CORRECTION
CHROMATICITIES     BEFORE       AFTER       CORRECTION
HORIZONTAL        -5.6460500    0.0275671
VERTICAL          -5.4482371    0.0614673

SEXTUP.STRENGTHS   0.0000000  -0.3498369    INDEX   SF
IN (M-2)           0.0000000   0.2616032            SD
DEFINITION: DXP=STRENGTH*(X*X-Z*Z) / DZP=-2*STRENGTH*X*Z
SEXTUPOLE SENSITIVITIES    XI/M1 XI/M2 ZI/M1 ZI/M2  -0.25331974E+02-0.12293458E+02 0.89406967E+01 0.32782555E+02
```

```
      DATA BLOCK CHROMATICITY CORRECTION
      CHROMATICITIES     BEFORE      AFTER      CORRECTION
      HORIZONTAL          0.0275671  -0.0003725
      VERTICAL            0.0614673   0.0000000

      SEXTUP.STRENGTHS   -0.3498369  -0.3475496   INDEX   SF
      IN (M-2)            0.2616032   0.2591325           SD
      DEFINITION: DXP=STRENGTH*(X*X-Z*Z) / DZP=-2*STRENGTH*X*Z
SEXTUPOLE SENSITIVITIES    XI/M1 XI/M2 ZI/M1 ZI/M2  -0.25331974E+02-0.12293458E+02 0.89406967E+01 0.33155084E+02
```

——ENTRY LINOPT——

```
      RELATIVE ENERGY DEVIATION    -0.0100000
      FRACTIONAL TUNES -HORICONTAL -0.1678175
                       -VERTICAL   -0.1773635
```

NR	TYP	L-TOTAL (M)	LENGTH (M)	BETAH (M)	ALFAH	PHIH (QE)	DISH (M)	DISPH (RAD)	CLOH (MM)	CLOPH (MRAD)	BETAV (M)	ALFAV	PHIV (QE)	DISV (M)	DISPV (RAD)	CLOV (MM)	CLOPV (MRAD)	
0				3.87	0.02	0.00	0.34	-0.005	-4.4	0.097	12.94	-0.03	0.00	0.00	0.000	0.0	0.000	
1	MD	0.000	0.000	3.87	0.02	0.00	0.34	-0.005	-4.4	0.10	12.94	-0.03	0.00	0.00	0.000	0.0	0.00	
2	QD	0.252	0.252	4.02	-0.62	0.01	0.35	0.046	-4.5	-0.55	12.49	1.80	0.00	0.00	0.000	0.0	0.00	
4	MB1	0.552	0.000	4.42	-0.73	0.02	0.36	0.046	-4.6	-0.55	11.44	1.70	0.01	0.00	0.000	0.0	0.00	
5	B	2.952	2.400	9.67	-1.44	0.08	0.68	0.216	-8.0	-2.24	5.25	0.88	0.06	0.00	0.000	0.0	0.00	
6	MB1	2.952	0.000	9.67	-1.44	0.08	0.68	0.216	-8.0	-2.24	5.25	0.88	0.06	0.00	0.000	0.0	0.00	
8	SF	3.652	0.000	11.84	-1.74	0.09	0.83	0.221	-9.6	-2.27	4.18	0.67	0.08	0.00	0.000	0.0	0.00	
10	QF	4.204	0.252	13.38	0.00	0.10	0.93	0.090	-10.6	-0.78	3.67	-0.03	0.10	0.00	0.000	0.0	0.00	
11	MF	4.204	0.000	13.38	0.00	0.10	0.93	0.090	-10.6	-0.78	3.67	-0.03	0.10	0.00	0.000	0.0	0.00	
12	QF	4.456	0.252	12.92	1.83	0.10	0.94	-0.045	-10.6	0.73	3.84	-0.64	0.11	0.00	0.000	0.0	0.00	
14	MB1	4.756	0.000	11.84	1.73	0.11	0.92	-0.045	-10.4	0.73	4.26	-0.75	0.12	0.00	0.000	0.0	0.00	
15	B	7.156	2.400	5.26	0.98	0.16	1.01	0.119	-10.6	-0.90	9.98	-1.63	0.18	0.00	0.000	0.0	0.00	
16	MB1	7.156	0.000	5.26	0.98	0.16	1.01	0.119	-10.6	-0.90	9.98	-1.63	0.18	0.00	0.000	0.0	0.00	
18	SD	7.856	0.000	4.07	0.74	0.18	1.10	0.113	-11.2	-0.87	12.44	-1.96	0.20	0.00	0.000	0.0	0.00	
20	QD	8.407	0.252	3.49	0.03	0.20	1.18	0.283	-11.9	-2.58	14.20	-0.07	0.20	0.00	0.000	0.0	0.00	
21	MD	8.407	0.000	3.49	0.03	0.20	1.18	0.283	-11.9	-2.58	14.20	-0.07	0.20	0.00	0.000	0.0	0.00	
22	QD	8.659	0.252	3.62	-0.57	0.21	1.28	0.464	-12.8	-4.38	13.72	1.94	0.21	0.00	0.000	0.0	0.00	
24	QF	12.611	0.252	13.30	-0.09	0.31	3.06	0.029	-29.6	-0.21	3.94	0.02	0.30	0.00	0.000	0.0	0.00	
25	MF	12.611	0.000	13.30	-0.09	0.31	3.06	0.029	-29.6	-0.21	3.94	0.02	0.30	0.00	0.000	0.0	0.00	
26	QF	12.863	0.252	12.88	1.74	0.31	3.01	-0.407	-29.1	3.98	4.09	-0.62	0.31	0.00	0.000	0.0	0.00	
28	MB1	13.163	0.000	11.87	1.65	0.32	2.89	-0.407	-27.9	3.98	4.49	-0.72	0.32	0.00	0.000	0.0	0.00	
29	B	15.563	2.400	5.54	0.96	0.36	2.08	-0.262	-20.1	2.52	9.92	-1.54	0.38	0.00	0.000	0.0	0.00	
30	MB1	15.563	0.000	5.54	0.96	0.36	2.08	-0.262	-20.1	2.52	9.92	-1.54	0.38	0.00	0.000	0.0	0.00	
32	SD	16.263	0.000	4.37	0.76	0.38	1.90	-0.281	-18.3	2.61	12.24	-1.89	0.39	0.00	0.000	0.0	0.00	
34	QD	16.815	0.252	3.78	0.02	0.40	1.78	-0.016	-17.2	0.07	13.93	-0.04	0.40	0.00	0.000	0.0	0.00	
35	MD	16.815	0.000	3.78	0.02	0.40	1.78	-0.016	-17.2	0.07	13.93	-0.04	0.40	0.00	0.000	0.0	0.00	
36	QD	17.067	0.252	3.93	-0.62	0.41	1.80	0.248	-17.5	-2.46	13.44	1.94	0.40	0.00	0.000	0.0	0.00	
38	MB1	17.367	0.000	4.33	-0.72	0.43	1.88	0.248	-18.3	-2.46	12.31	1.83	0.40	0.00	0.000	0.0	0.00	
39	B	19.767	2.400	9.61	-1.45	0.49	2.65	0.395	-26.0	-3.95	5.55	0.98	0.45	0.00	0.000	0.0	0.00	
40	MB1	19.767	0.000	9.61	-1.45	0.49	2.65	0.395	-26.0	-3.95	5.55	0.98	0.45	0.00	0.000	0.0	0.00	
42	QF	21.019	0.252	13.28	0.05	0.50	3.09	-0.047	-30.4	0.35	3.78	0.01	0.50	0.00	0.000	0.0	0.00	
43	MF	21.019	0.000	13.28	0.05	0.50	3.09	-0.047	-30.4	0.35	3.78	0.01	0.50	0.00	0.000	0.0	0.00	
44	QF	21.271	0.252	12.79	1.87	0.51	3.02	-0.487	-29.7	4.63	3.93	-0.61	0.51	0.00	0.000	0.0	0.00	
46	QD	25.223	0.252	3.63	-0.04	0.61	1.12	-0.314	-11.7	2.86	13.67	0.04	0.60	0.00	0.000	0.0	0.00	
47	MD	25.223	0.000	3.63	-0.04	0.61	1.12	-0.314	-11.7	2.86	13.67	0.04	0.60	0.00	0.000	0.0	0.00	
48	QD	25.474	0.252	3.81	-0.66	0.62	1.06	-0.152	-11.1	1.20	13.16	1.97	0.60	0.00	0.000	0.0	0.00	
50	MB1	25.774	0.000	4.24	-0.78	0.63	1.02	-0.152	-10.8	1.20	12.01	1.86	0.60	0.00	0.000	0.0	0.00	
51	B	28.174	2.400	9.91	-1.56	0.69	0.85	0.012	-9.9	-0.43	5.22	0.97	0.65	0.00	0.000	0.0	0.00	

52	MB1	28.174	0.000	9.91	-1.56	0.69	0.85	0.012	-9.9	-0.43	5.22	0.97	0.65	0.00	0.000	0.0	0.00
54	SF	28.874	0.000	12.27	-1.89	0.70	0.86	0.018	-10.2	-0.47	4.04	0.74	0.67	0.00	0.000	0.0	0.00
56	QF	29.426	0.252	13.98	-0.09	0.71	0.85	-0.105	-10.2	0.99	3.47	0.04	0.70	0.00	0.000	0.0	0.00
57	MF	29.426	0.000	13.98	-0.09	0.71	0.85	-0.105	-10.2	0.99	3.47	0.04	0.70	0.00	0.000	0.0	0.00
58	QF	29.678	0.252	13.53	1.84	0.71	0.81	-0.225	-9.8	2.42	3.59	-0.54	0.71	0.00	0.000	0.0	0.00
60	MB1	29.978	0.000	12.46	1.74	0.72	0.74	-0.225	-9.1	2.42	3.94	-0.64	0.72	0.00	0.000	0.0	0.00
61	B	32.378	2.400	5.74	1.03	0.76	0.41	-0.056	-5.3	0.75	9.09	-1.50	0.79	0.00	0.000	0.0	0.00
62	MB1	32.378	0.000	5.74	1.03	0.76	0.41	-0.056	-5.3	0.75	9.09	-1.50	0.79	0.00	0.000	0.0	0.00
64	QD	33.630	0.252	3.87	0.02	0.80	0.34	-0.005	-4.4	0.10	12.94	-0.03	0.80	0.00	0.000	0.0	0.00
65	MD	33.630	0.000	3.87	0.02	0.80	0.34	-0.005	-4.4	0.10	12.94	-0.03	0.80	0.00	0.000	0.0	0.00
66	QD	33.882	0.252	4.02	-0.62	0.82	0.35	0.046	-4.5	-0.55	12.49	1.80	0.81	0.00	0.000	0.0	0.00
68	MB1	34.182	0.000	4.42	-0.73	0.83	0.36	0.046	-4.6	-0.55	11.44	1.70	0.81	0.00	0.000	0.0	0.00
69	B	36.582	2.400	9.67	-1.44	0.89	0.68	0.216	-8.0	-2.24	5.25	0.88	0.86	0.00	0.000	0.0	0.00
70	MB1	36.582	0.000	9.67	-1.44	0.89	0.68	0.216	-8.0	-2.24	5.25	0.88	0.86	0.00	0.000	0.0	0.00
72	SF	37.282	0.000	11.84	-1.74	0.90	0.83	0.221	-9.6	-2.27	4.18	0.67	0.88	0.00	0.000	0.0	0.00
74	QF	37.834	0.252	13.38	0.00	0.91	0.93	0.090	-10.6	-0.78	3.67	-0.03	0.91	0.00	0.000	0.0	0.00
75	MF	37.834	0.000	13.38	0.00	0.91	0.93	0.090	-10.6	-0.78	3.67	-0.03	0.91	0.00	0.000	0.0	0.00
76	QF	38.086	0.252	12.92	1.83	0.91	0.94	-0.045	-10.6	0.73	3.84	-0.64	0.92	0.00	0.000	0.0	0.00
78	MB1	38.386	0.000	11.84	1.73	0.91	0.92	-0.045	-10.4	0.73	4.26	-0.75	0.93	0.00	0.000	0.0	0.00
79	B	40.786	2.400	5.26	0.98	0.96	1.01	0.119	-10.6	-0.90	9.98	-1.63	0.99	0.00	0.000	0.0	0.00
80	MB1	40.786	0.000	5.26	0.98	0.96	1.01	0.119	-10.6	-0.90	9.98	-1.63	0.99	0.00	0.000	0.0	0.00
82	SD	41.486	0.000	4.07	0.74	0.98	1.10	0.113	-11.2	-0.87	12.44	-1.96	1.00	0.00	0.000	0.0	0.00
84	QD	42.038	0.252	3.49	0.03	1.01	1.18	0.283	-11.9	-2.58	14.20	-0.07	1.01	0.00	0.000	0.0	0.00
85	MD	42.038	0.000	3.49	0.03	1.01	1.18	0.283	-11.9	-2.58	14.20	-0.07	1.01	0.00	0.000	0.0	0.00
86	QD	42.289	0.252	3.62	-0.57	1.02	1.28	0.464	-12.8	-4.38	13.72	1.94	1.01	0.00	0.000	0.0	0.00
88	QF	46.241	0.252	13.30	-0.09	1.11	3.06	0.029	-29.6	-0.21	3.94	0.02	1.10	0.00	0.000	0.0	0.00
89	MF	46.241	0.000	13.30	-0.09	1.11	3.06	0.029	-29.6	-0.21	3.94	0.02	1.10	0.00	0.000	0.0	0.00
90	QF	46.493	0.252	12.88	1.74	1.12	3.01	-0.407	-29.1	3.98	4.09	-0.62	1.11	0.00	0.000	0.0	0.00
92	MB1	46.793	0.000	11.87	1.65	1.12	2.89	-0.407	-27.9	3.98	4.49	-0.72	1.12	0.00	0.000	0.0	0.00
93	B	49.193	2.400	5.54	0.96	1.17	2.08	-0.262	-20.1	2.52	9.92	-1.54	1.18	0.00	0.000	0.0	0.00
94	MB1	49.193	0.000	5.54	0.96	1.17	2.08	-0.262	-20.1	2.52	9.92	-1.54	1.18	0.00	0.000	0.0	0.00
96	SD	49.893	0.000	4.37	0.76	1.19	1.90	-0.281	-18.3	2.61	12.24	-1.89	1.20	0.00	0.000	0.0	0.00
98	QD	50.445	0.252	3.78	0.02	1.21	1.78	-0.016	-17.2	0.07	13.93	-0.04	1.20	0.00	0.000	0.0	0.00
99	MD	50.445	0.000	3.78	0.02	1.21	1.78	-0.016	-17.2	0.07	13.93	-0.04	1.20	0.00	0.000	0.0	0.00
100	QD	50.697	0.252	3.93	-0.62	1.22	1.80	0.248	-17.5	-2.46	13.44	1.94	1.21	0.00	0.000	0.0	0.00
102	MB1	50.997	0.000	4.33	-0.72	1.23	1.88	0.248	-18.3	-2.46	12.31	1.83	1.21	0.00	0.000	0.0	0.00
103	B	53.397	2.400	9.61	-1.45	1.29	2.65	0.395	-26.0	-3.95	5.55	0.98	1.26	0.00	0.000	0.0	0.00
104	MB1	53.397	0.000	9.61	-1.45	1.29	2.65	0.395	-26.0	-3.95	5.55	0.98	1.26	0.00	0.000	0.0	0.00
106	QF	54.649	0.252	13.28	0.05	1.31	3.09	-0.047	-30.4	0.35	3.78	0.01	1.30	0.00	0.000	0.0	0.00
107	MF	54.649	0.000	13.28	0.05	1.31	3.09	-0.047	-30.4	0.35	3.78	0.01	1.30	0.00	0.000	0.0	0.00
108	QF	54.901	0.252	12.79	1.87	1.31	3.02	-0.487	-29.7	4.63	3.93	-0.61	1.31	0.00	0.000	0.0	0.00
110	QD	58.853	0.252	3.63	-0.04	1.41	1.12	-0.314	-11.7	2.86	13.67	0.04	1.40	0.00	0.000	0.0	0.00
111	MD	58.853	0.000	3.63	-0.04	1.41	1.12	-0.314	-11.7	2.86	13.67	0.04	1.40	0.00	0.000	0.0	0.00
112	QD	59.104	0.252	3.81	-0.66	1.42	1.06	-0.152	-11.1	1.20	13.16	1.97	1.40	0.00	0.000	0.0	0.00
114	MB1	59.404	0.000	4.24	-0.78	1.43	1.02	-0.152	-10.8	1.20	12.01	1.86	1.41	0.00	0.000	0.0	0.00
115	B	61.804	2.400	9.91	-1.56	1.49	0.85	0.012	-9.9	-0.43	5.22	0.97	1.46	0.00	0.000	0.0	0.00
116	MB1	61.804	0.000	9.91	-1.56	1.49	0.85	0.012	-9.9	-0.43	5.22	0.97	1.46	0.00	0.000	0.0	0.00
118	SF	62.504	0.000	12.27	-1.89	1.51	0.86	0.018	-10.2	-0.47	4.04	0.74	1.48	0.00	0.000	0.0	0.00
120	QF	63.056	0.252	13.98	-0.09	1.51	0.85	-0.105	-10.2	0.99	3.47	0.04	1.50	0.00	0.000	0.0	0.00
121	MF	63.056	0.000	13.98	-0.09	1.51	0.85	-0.105	-10.2	0.99	3.47	0.04	1.50	0.00	0.000	0.0	0.00
122	QF	63.308	0.252	13.53	1.84	1.52	0.81	-0.225	-9.8	2.42	3.59	-0.54	1.51	0.00	0.000	0.0	0.00
124	MB1	63.608	0.000	12.46	1.74	1.52	0.74	-0.225	-9.1	2.42	3.94	-0.64	1.53	0.00	0.000	0.0	0.00
125	B	66.008	2.400	5.74	1.03	1.57	0.41	-0.056	-5.3	0.75	9.09	-1.50	1.59	0.00	0.000	0.0	0.00
126	MB1	66.008	0.000	5.74	1.03	1.57	0.41	-0.056	-5.3	0.75	9.09	-1.50	1.59	0.00	0.000	0.0	0.00
128	QD	67.260	0.252	3.87	0.02	1.61	0.34	-0.005	-4.4	0.10	12.94	-0.03	1.61	0.00	0.000	0.0	0.00
129	MD	67.260	0.000	3.87	0.02	1.61	0.34	-0.005	-4.4	0.10	12.94	-0.03	1.61	0.00	0.000	0.0	0.00
130	QD	67.512	0.252	4.02	-0.62	1.62	0.35	0.046	-4.5	-0.55	12.49	1.80	1.61	0.00	0.000	0.0	0.00
132	MB1	67.812	0.000	4.42	-0.73	1.63	0.36	0.046	-4.6	-0.55	11.44	1.70	1.62	0.00	0.000	0.0	0.00
133	B	70.212	2.400	9.67	-1.44	1.69	0.68	0.216	-8.0	-2.24	5.25	0.88	1.67	0.00	0.000	0.0	0.00
134	MB1	70.212	0.000	9.67	-1.44	1.69	0.68	0.216	-8.0	-2.24	5.25	0.88	1.67	0.00	0.000	0.0	0.00

136	SF	70.912	0.000	11.84	-1.74	1.70	0.83	0.221	-9.6	-2.27	4.18	0.67	1.69	0.00	0.000	0.0	0.00
138	QF	71.464	0.252	13.38	0.00	1.71	0.93	0.090	-10.6	-0.78	3.67	-0.03	1.71	0.00	0.000	0.0	0.00
139	MF	71.464	0.000	13.38	0.00	1.71	0.93	0.090	-10.6	-0.78	3.67	-0.03	1.71	0.00	0.000	0.0	0.00
140	QF	71.716	0.252	12.92	1.83	1.71	0.94	-0.045	-10.6	0.73	3.84	-0.64	1.72	0.00	0.000	0.0	0.00
142	MB1	72.016	0.000	11.84	1.73	1.72	0.92	-0.045	-10.4	0.73	4.26	-0.75	1.73	0.00	0.000	0.0	0.00
143	B	74.416	2.400	5.26	0.98	1.77	1.01	0.119	-10.6	-0.90	9.98	-1.63	1.79	0.00	0.000	0.0	0.00
144	MB1	74.416	0.000	5.26	0.98	1.77	1.01	0.119	-10.6	-0.90	9.98	-1.63	1.79	0.00	0.000	0.0	0.00
146	SD	75.116	0.000	4.07	0.74	1.79	1.10	0.113	-11.2	-0.87	12.44	-1.96	1.80	0.00	0.000	0.0	0.00
148	QD	75.668	0.252	3.49	0.03	1.81	1.18	0.283	-11.9	-2.58	14.20	-0.07	1.81	0.00	0.000	0.0	0.00
149	MD	75.668	0.000	3.49	0.03	1.81	1.18	0.283	-11.9	-2.58	14.20	-0.07	1.81	0.00	0.000	0.0	0.00
150	QD	75.919	0.252	3.62	-0.57	1.82	1.28	0.464	-12.8	-4.38	13.72	1.94	1.81	0.00	0.000	0.0	0.00
152	QF	79.871	0.252	13.30	-0.09	1.92	3.06	0.029	-29.6	-0.21	3.94	0.02	1.91	0.00	0.000	0.0	0.00
153	MF	79.871	0.000	13.30	-0.09	1.92	3.06	0.029	-29.6	-0.21	3.94	0.02	1.91	0.00	0.000	0.0	0.00
154	QF	80.123	0.252	12.88	1.74	1.92	3.01	-0.407	-29.1	3.98	4.09	-0.62	1.92	0.00	0.000	0.0	0.00
156	MB1	80.423	0.000	11.87	1.65	1.93	2.89	-0.407	-27.9	3.98	4.49	-0.72	1.93	0.00	0.000	0.0	0.00
157	B	82.823	2.400	5.54	0.96	1.97	2.08	-0.262	-20.1	2.52	9.92	-1.54	1.99	0.00	0.000	0.0	0.00
158	MB1	82.823	0.000	5.54	0.96	1.97	2.08	-0.262	-20.1	2.52	9.92	-1.54	1.99	0.00	0.000	0.0	0.00
160	SD	83.523	0.000	4.37	0.76	1.99	1.90	-0.281	-18.3	2.61	12.24	-1.89	2.00	0.00	0.000	0.0	0.00
162	QD	84.075	0.252	3.78	0.02	2.01	1.78	-0.016	-17.2	0.07	13.93	-0.04	2.01	0.00	0.000	0.0	0.00
163	MD	84.075	0.000	3.78	0.02	2.01	1.78	-0.016	-17.2	0.07	13.93	-0.04	2.01	0.00	0.000	0.0	0.00
164	QD	84.327	0.252	3.93	-0.62	2.02	1.80	0.248	-17.5	-2.46	13.44	1.94	2.01	0.00	0.000	0.0	0.00
166	MB1	84.627	0.000	4.33	-0.72	2.04	1.88	0.248	-18.3	-2.46	12.31	1.83	2.01	0.00	0.000	0.0	0.00
167	B	87.027	2.400	9.61	-1.45	2.10	2.65	0.395	-26.0	-3.95	5.55	0.98	2.06	0.00	0.000	0.0	0.00
168	MB1	87.027	0.000	9.61	-1.45	2.10	2.65	0.395	-26.0	-3.95	5.55	0.98	2.06	0.00	0.000	0.0	0.00
170	QF	88.279	0.252	13.28	0.05	2.11	3.09	-0.047	-30.4	0.35	3.78	0.01	2.11	0.00	0.000	0.0	0.00
171	MF	88.279	0.000	13.28	0.05	2.11	3.09	-0.047	-30.4	0.35	3.78	0.01	2.11	0.00	0.000	0.0	0.00
172	QF	88.531	0.252	12.79	1.87	2.12	3.02	-0.487	-29.7	4.63	3.93	-0.61	2.12	0.00	0.000	0.0	0.00
174	QD	92.483	0.252	3.63	-0.04	2.22	1.12	-0.314	-11.7	2.86	13.67	0.04	2.20	0.00	0.000	0.0	0.00
175	MD	92.483	0.000	3.63	-0.04	2.22	1.12	-0.314	-11.7	2.86	13.67	0.04	2.20	0.00	0.000	0.0	0.00
176	QD	92.734	0.252	3.81	-0.66	2.23	1.06	-0.152	-11.1	1.20	13.16	1.97	2.21	0.00	0.000	0.0	0.00
178	MB1	93.034	0.000	4.24	-0.78	2.24	1.02	-0.152	-10.8	1.20	12.01	1.86	2.21	0.00	0.000	0.0	0.00
179	B	95.434	2.400	9.91	-1.56	2.30	0.85	0.012	-9.9	-0.43	5.22	0.97	2.26	0.00	0.000	0.0	0.00
180	MB1	95.434	0.000	9.91	-1.56	2.30	0.85	0.012	-9.9	-0.43	5.22	0.97	2.26	0.00	0.000	0.0	0.00
182	SF	96.134	0.000	12.27	-1.89	2.31	0.86	0.018	-10.2	-0.47	4.04	0.74	2.28	0.00	0.000	0.0	0.00
184	QF	96.686	0.252	13.98	-0.09	2.32	0.85	-0.105	-10.2	0.99	3.47	0.04	2.31	0.00	0.000	0.0	0.00
185	MF	96.686	0.000	13.98	-0.09	2.32	0.85	-0.105	-10.2	0.99	3.47	0.04	2.31	0.00	0.000	0.0	0.00
186	QF	96.938	0.252	13.53	1.84	2.32	0.81	-0.225	-9.8	2.42	3.59	-0.54	2.32	0.00	0.000	0.0	0.00
188	MB1	97.238	0.000	12.46	1.74	2.33	0.74	-0.225	-9.1	2.42	3.94	-0.64	2.33	0.00	0.000	0.0	0.00
189	B	99.638	2.400	5.74	1.03	2.37	0.41	-0.056	-5.3	0.75	9.09	-1.50	2.40	0.00	0.000	0.0	0.00
190	MB1	99.638	0.000	5.74	1.03	2.37	0.41	-0.056	-5.3	0.75	9.09	-1.50	2.40	0.00	0.000	0.0	0.00
192	QD	100.890	0.252	3.87	0.02	2.41	0.34	-0.005	-4.4	0.10	12.94	-0.03	2.41	0.00	0.000	0.0	0.00
193	MD	100.890	0.000	3.87	0.02	2.41	0.34	-0.005	-4.4	0.10	12.94	-0.03	2.41	0.00	0.000	0.0	0.00
194	QD	101.142	0.252	4.02	-0.62	2.43	0.35	0.046	-4.5	-0.55	12.49	1.80	2.42	0.00	0.000	0.0	0.00
196	MB1	101.442	0.000	4.42	-0.73	2.44	0.36	0.046	-4.6	-0.55	11.44	1.70	2.42	0.00	0.000	0.0	0.00
197	B	103.842	2.400	9.67	-1.44	2.50	0.68	0.216	-8.0	-2.24	5.25	0.88	2.47	0.00	0.000	0.0	0.00
198	MB1	103.842	0.000	9.67	-1.44	2.50	0.68	0.216	-8.0	-2.24	5.25	0.88	2.47	0.00	0.000	0.0	0.00
200	SF	104.542	0.000	11.84	-1.74	2.51	0.83	0.221	-9.6	-2.27	4.18	0.67	2.49	0.00	0.000	0.0	0.00
202	QF	105.094	0.252	13.38	0.00	2.52	0.93	0.090	-10.6	-0.78	3.67	-0.03	2.51	0.00	0.000	0.0	0.00
203	MF	105.094	0.000	13.38	0.00	2.52	0.93	0.090	-10.6	-0.78	3.67	-0.03	2.51	0.00	0.000	0.0	0.00
204	QF	105.346	0.252	12.92	1.83	2.52	0.94	-0.045	-10.6	0.73	3.84	-0.64	2.52	0.00	0.000	0.0	0.00
206	MB1	105.646	0.000	11.84	1.73	2.52	0.92	-0.045	-10.4	0.73	4.26	-0.75	2.54	0.00	0.000	0.0	0.00
207	B	108.046	2.400	5.26	0.98	2.57	1.01	0.119	-10.6	-0.90	9.98	-1.63	2.60	0.00	0.000	0.0	0.00
208	MB1	108.046	0.000	5.26	0.98	2.57	1.01	0.119	-10.6	-0.90	9.98	-1.63	2.60	0.00	0.000	0.0	0.00
210	SD	108.746	0.000	4.07	0.74	2.59	1.10	0.113	-11.2	-0.87	12.44	-1.96	2.61	0.00	0.000	0.0	0.00
212	QD	109.298	0.252	3.49	0.03	2.62	1.18	0.283	-11.9	-2.58	14.20	-0.07	2.62	0.00	0.000	0.0	0.00
213	MD	109.298	0.000	3.49	0.03	2.62	1.18	0.283	-11.9	-2.58	14.20	-0.07	2.62	0.00	0.000	0.0	0.00
214	QD	109.549	0.252	3.62	-0.57	2.63	1.28	0.464	-12.8	-4.38	13.72	1.94	2.62	0.00	0.000	0.0	0.00
216	QF	113.501	0.252	13.30	-0.09	2.72	3.06	0.029	-29.6	-0.21	3.94	0.02	2.71	0.00	0.000	0.0	0.00
217	MF	113.501	0.000	13.30	-0.09	2.72	3.06	0.029	-29.6	-0.21	3.94	0.02	2.71	0.00	0.000	0.0	0.00
218	QF	113.753	0.252	12.88	1.74	2.73	3.01	-0.407	-29.1	3.98	4.09	-0.62	2.72	0.00	0.000	0.0	0.00

220	MB1	114.053	0.000	11.87	1.65	2.73	2.89	-0.407	-27.9	3.98	4.49	-0.72	2.73	0.00	0.000	0.0	0.00
221	B	116.453	2.400	5.54	0.96	2.78	2.08	-0.262	-20.1	2.52	9.92	-1.54	2.79	0.00	0.000	0.0	0.00
222	MB1	116.453	0.000	5.54	0.96	2.78	2.08	-0.262	-20.1	2.52	9.92	-1.54	2.79	0.00	0.000	0.0	0.00
224	SD	117.153	0.000	4.37	0.76	2.80	1.90	-0.281	-18.3	2.61	12.24	-1.89	2.80	0.00	0.000	0.0	0.00
226	QD	117.705	0.252	3.78	0.02	2.82	1.78	-0.016	-17.2	0.07	13.93	-0.04	2.81	0.00	0.000	0.0	0.00
227	MD	117.705	0.000	3.78	0.02	2.82	1.78	-0.016	-17.2	0.07	13.93	-0.04	2.81	0.00	0.000	0.0	0.00
228	QD	117.957	0.252	3.93	-0.62	2.83	1.80	0.248	-17.5	-2.46	13.44	1.94	2.81	0.00	0.000	0.0	0.00
230	MB1	118.257	0.000	4.33	-0.72	2.84	1.88	0.248	-18.3	-2.46	12.31	1.83	2.82	0.00	0.000	0.0	0.00
231	B	120.657	2.400	9.61	-1.45	2.90	2.65	0.395	-26.0	-3.95	5.55	0.98	2.86	0.00	0.000	0.0	0.00
232	MB1	120.657	0.000	9.61	-1.45	2.90	2.65	0.395	-26.0	-3.95	5.55	0.98	2.86	0.00	0.000	0.0	0.00
234	QF	121.909	0.252	13.28	0.05	2.92	3.09	-0.047	-30.4	0.35	3.78	0.01	2.91	0.00	0.000	0.0	0.00
235	MF	121.909	0.000	13.28	0.05	2.92	3.09	-0.047	-30.4	0.35	3.78	0.01	2.91	0.00	0.000	0.0	0.00
236	QF	122.161	0.252	12.79	1.87	2.92	3.02	-0.487	-29.7	4.63	3.93	-0.61	2.92	0.00	0.000	0.0	0.00
238	QD	126.113	0.252	3.63	-0.04	3.02	1.12	-0.314	-11.7	2.86	13.67	0.04	3.01	0.00	0.000	0.0	0.00
239	MD	126.113	0.000	3.63	-0.04	3.02	1.12	-0.314	-11.7	2.86	13.67	0.04	3.01	0.00	0.000	0.0	0.00
240	QD	126.364	0.252	3.81	-0.66	3.03	1.06	-0.152	-11.1	1.20	13.16	1.97	3.01	0.00	0.000	0.0	0.00
242	MB1	126.664	0.000	4.24	-0.78	3.04	1.02	-0.152	-10.8	1.20	12.01	1.86	3.02	0.00	0.000	0.0	0.00
243	B	129.064	2.400	9.91	-1.56	3.10	0.85	0.012	-9.9	-0.43	5.22	0.97	3.06	0.00	0.000	0.0	0.00
244	MB1	129.064	0.000	9.91	-1.56	3.10	0.85	0.012	-9.9	-0.43	5.22	0.97	3.06	0.00	0.000	0.0	0.00
246	SF	129.764	0.000	12.27	-1.89	3.12	0.86	0.018	-10.2	-0.47	4.04	0.74	3.09	0.00	0.000	0.0	0.00
248	QF	130.316	0.252	13.98	-0.09	3.12	0.85	-0.105	-10.2	0.99	3.47	0.04	3.11	0.00	0.000	0.0	0.00
249	MF	130.316	0.000	13.98	-0.09	3.12	0.85	-0.105	-10.2	0.99	3.47	0.04	3.11	0.00	0.000	0.0	0.00
250	QF	130.568	0.252	13.53	1.84	3.13	0.81	-0.225	-9.8	2.42	3.59	-0.54	3.12	0.00	0.000	0.0	0.00
252	MB1	130.868	0.000	12.46	1.74	3.13	0.74	-0.225	-9.1	2.42	3.94	-0.64	3.13	0.00	0.000	0.0	0.00
253	B	133.268	2.400	5.74	1.03	3.18	0.41	-0.056	-5.3	0.75	9.09	-1.50	3.20	0.00	0.000	0.0	0.00
254	MB1	133.268	0.000	5.74	1.03	3.18	0.41	-0.056	-5.3	0.75	9.09	-1.50	3.20	0.00	0.000	0.0	0.00
256	QD	134.520	0.252	3.87	0.02	3.22	0.34	-0.005	-4.4	0.10	12.94	-0.03	3.22	0.00	0.000	0.0	0.00
257	MD	134.520	0.000	3.87	0.02	3.22	0.34	-0.005	-4.4	0.10	12.94	-0.03	3.22	0.00	0.000	0.0	0.00
258	QD	134.772	0.252	4.02	-0.62	3.23	0.35	0.046	-4.5	-0.55	12.49	1.80	3.22	0.00	0.000	0.0	0.00
260	MB1	135.072	0.000	4.42	-0.73	3.24	0.36	0.046	-4.6	-0.55	11.44	1.70	3.22	0.00	0.000	0.0	0.00
261	B	137.472	2.400	9.67	-1.44	3.30	0.68	0.216	-8.0	-2.24	5.25	0.88	3.27	0.00	0.000	0.0	0.00
262	MB1	137.472	0.000	9.67	-1.44	3.30	0.68	0.216	-8.0	-2.24	5.25	0.88	3.27	0.00	0.000	0.0	0.00
264	SF	138.172	0.000	11.84	-1.74	3.31	0.83	0.221	-9.6	-2.27	4.18	0.67	3.30	0.00	0.000	0.0	0.00
266	QF	138.724	0.252	13.38	0.00	3.32	0.93	0.090	-10.6	-0.78	3.67	-0.03	3.32	0.00	0.000	0.0	0.00
267	MF	138.724	0.000	13.38	0.00	3.32	0.93	0.090	-10.6	-0.78	3.67	-0.03	3.32	0.00	0.000	0.0	0.00
268	QF	138.976	0.252	12.92	1.83	3.32	0.94	-0.045	-10.6	0.73	3.84	-0.64	3.33	0.00	0.000	0.0	0.00
270	MB1	139.276	0.000	11.84	1.73	3.33	0.92	-0.045	-10.4	0.73	4.26	-0.75	3.34	0.00	0.000	0.0	0.00
271	B	141.676	2.400	5.26	0.98	3.38	1.01	0.119	-10.6	-0.90	9.98	-1.63	3.40	0.00	0.000	0.0	0.00
272	MB1	141.676	0.000	5.26	0.98	3.38	1.01	0.119	-10.6	-0.90	9.98	-1.63	3.40	0.00	0.000	0.0	0.00
274	SD	142.376	0.000	4.07	0.74	3.40	1.10	0.113	-11.2	-0.87	12.44	-1.96	3.41	0.00	0.000	0.0	0.00
276	QD	142.927	0.252	3.49	0.03	3.42	1.18	0.283	-11.9	-2.58	14.20	-0.07	3.42	0.00	0.000	0.0	0.00
277	MD	142.927	0.000	3.49	0.03	3.42	1.18	0.283	-11.9	-2.58	14.20	-0.07	3.42	0.00	0.000	0.0	0.00
278	QD	143.179	0.252	3.62	-0.57	3.43	1.28	0.464	-12.8	-4.38	13.72	1.94	3.42	0.00	0.000	0.0	0.00
280	QF	147.131	0.252	13.30	-0.09	3.53	3.06	0.029	-29.6	-0.21	3.94	0.02	3.51	0.00	0.000	0.0	0.00
281	MF	147.131	0.000	13.30	-0.09	3.53	3.06	0.029	-29.6	-0.21	3.94	0.02	3.51	0.00	0.000	0.0	0.00
282	QF	147.383	0.252	12.88	1.74	3.53	3.01	-0.407	-29.1	3.98	4.09	-0.62	3.52	0.00	0.000	0.0	0.00
284	MB1	147.683	0.000	11.87	1.65	3.54	2.89	-0.407	-27.9	3.98	4.49	-0.72	3.54	0.00	0.000	0.0	0.00
285	B	150.083	2.400	5.54	0.96	3.58	2.08	-0.262	-20.1	2.52	9.92	-1.54	3.59	0.00	0.000	0.0	0.00
286	MB1	150.083	0.000	5.54	0.96	3.58	2.08	-0.262	-20.1	2.52	9.92	-1.54	3.59	0.00	0.000	0.0	0.00
288	SD	150.783	0.000	4.37	0.76	3.60	1.90	-0.281	-18.3	2.61	12.24	-1.89	3.61	0.00	0.000	0.0	0.00
290	QD	151.335	0.252	3.78	0.02	3.62	1.78	-0.016	-17.2	0.07	13.93	-0.04	3.62	0.00	0.000	0.0	0.00
291	MD	151.335	0.000	3.78	0.02	3.62	1.78	-0.016	-17.2	0.07	13.93	-0.04	3.62	0.00	0.000	0.0	0.00
292	QD	151.587	0.252	3.93	-0.62	3.63	1.80	0.248	-17.5	-2.46	13.44	1.94	3.62	0.00	0.000	0.0	0.00
294	MB1	151.887	0.000	4.33	-0.72	3.65	1.88	0.248	-18.3	-2.46	12.31	1.83	3.62	0.00	0.000	0.0	0.00
295	B	154.287	2.400	9.61	-1.45	3.71	2.65	0.395	-26.0	-3.95	5.55	0.98	3.67	0.00	0.000	0.0	0.00
296	MB1	154.287	0.000	9.61	-1.45	3.71	2.65	0.395	-26.0	-3.95	5.55	0.98	3.67	0.00	0.000	0.0	0.00
298	QF	155.539	0.252	13.28	0.05	3.72	3.09	-0.047	-30.4	0.35	3.78	0.01	3.71	0.00	0.000	0.0	0.00
299	MF	155.539	0.000	13.28	0.05	3.72	3.09	-0.047	-30.4	0.35	3.78	0.01	3.71	0.00	0.000	0.0	0.00
300	QF	155.791	0.252	12.79	1.87	3.73	3.02	-0.487	-29.7	4.63	3.93	-0.61	3.72	0.00	0.000	0.0	0.00
302	QD	159.742	0.252	3.63	-0.04	3.83	1.12	-0.314	-11.7	2.86	13.67	0.04	3.81	0.00	0.000	0.0	0.00

303	MD	159.742	0.000	3.63	-0.04	3.83	1.12	-0.314	-11.7	2.86	13.67	0.04	3.81	0.00	0.000	0.0	0.00
304	QD	159.994	0.252	3.81	-0.66	3.84	1.06	-0.152	-11.1	1.20	13.16	1.97	3.82	0.00	0.000	0.0	0.00
306	MB1	160.294	0.000	4.24	-0.78	3.85	1.02	-0.152	-10.8	1.20	12.01	1.86	3.82	0.00	0.000	0.0	0.00
307	B	162.694	2.400	9.91	-1.56	3.91	0.85	0.012	-9.9	-0.43	5.22	0.97	3.87	0.00	0.000	0.0	0.00
308	MB1	162.694	0.000	9.91	-1.56	3.91	0.85	0.012	-9.9	-0.43	5.22	0.97	3.87	0.00	0.000	0.0	0.00
310	SF	163.394	0.000	12.27	-1.89	3.92	0.86	0.018	-10.2	-0.47	4.04	0.74	3.89	0.00	0.000	0.0	0.00
312	QF	163.946	0.252	13.98	-0.09	3.93	0.85	-0.105	-10.2	0.99	3.47	0.04	3.91	0.00	0.000	0.0	0.00
313	MF	163.946	0.000	13.98	-0.09	3.93	0.85	-0.105	-10.2	0.99	3.47	0.04	3.91	0.00	0.000	0.0	0.00
314	QF	164.198	0.252	13.53	1.84	3.93	0.81	-0.225	-9.8	2.42	3.59	-0.54	3.93	0.00	0.000	0.0	0.00
316	MB1	164.498	0.000	12.46	1.74	3.94	0.74	-0.225	-9.1	2.42	3.94	-0.64	3.94	0.00	0.000	0.0	0.00
317	B	166.898	2.400	5.74	1.03	3.98	0.41	-0.056	-5.3	0.75	9.09	-1.50	4.00	0.00	0.000	0.0	0.00
318	MB1	166.898	0.000	5.74	1.03	3.98	0.41	-0.056	-5.3	0.75	9.09	-1.50	4.00	0.00	0.000	0.0	0.00
320	QD	168.150	0.252	3.87	0.02	4.02	0.34	-0.005	-4.4	0.10	12.94	-0.03	4.02	0.00	0.000	0.0	0.00
321	MD	168.150	0.000	3.87	0.02	4.02	0.34	-0.005	-4.4	0.10	12.94	-0.03	4.02	0.00	0.000	0.0	0.00
322	QD	168.402	0.252	4.02	-0.62	4.04	0.35	0.046	-4.5	-0.55	12.49	1.80	4.03	0.00	0.000	0.0	0.00
324	MB1	168.702	0.000	4.42	-0.73	4.05	0.36	0.046	-4.6	-0.55	11.44	1.70	4.03	0.00	0.000	0.0	0.00
325	B	171.102	2.400	9.67	-1.44	4.11	0.68	0.216	-8.0	-2.24	5.25	0.88	4.08	0.00	0.000	0.0	0.00
326	MB1	171.102	0.000	9.67	-1.44	4.11	0.68	0.216	-8.0	-2.24	5.25	0.88	4.08	0.00	0.000	0.0	0.00
328	SF	171.802	0.000	11.84	-1.74	4.12	0.83	0.221	-9.6	-2.27	4.18	0.67	4.10	0.00	0.000	0.0	0.00
330	QF	172.354	0.252	13.38	0.00	4.13	0.93	0.090	-10.6	-0.78	3.67	-0.03	4.12	0.00	0.000	0.0	0.00
331	MF	172.354	0.000	13.38	0.00	4.13	0.93	0.090	-10.6	-0.78	3.67	-0.03	4.12	0.00	0.000	0.0	0.00
332	QF	172.606	0.252	12.92	1.83	4.13	0.94	-0.045	-10.6	0.73	3.84	-0.64	4.13	0.00	0.000	0.0	0.00
334	MB1	172.906	0.000	11.84	1.73	4.13	0.92	-0.045	-10.4	0.73	4.26	-0.75	4.15	0.00	0.000	0.0	0.00
335	B	175.306	2.400	5.26	0.98	4.18	1.01	0.119	-10.6	-0.90	9.98	-1.63	4.21	0.00	0.000	0.0	0.00
336	MB1	175.306	0.000	5.26	0.98	4.18	1.01	0.119	-10.6	-0.90	9.98	-1.63	4.21	0.00	0.000	0.0	0.00
338	SD	176.006	0.000	4.07	0.74	4.20	1.10	0.113	-11.2	-0.87	12.44	-1.96	4.22	0.00	0.000	0.0	0.00
340	QD	176.557	0.252	3.49	0.03	4.23	1.18	0.283	-11.9	-2.58	14.20	-0.07	4.22	0.00	0.000	0.0	0.00
341	MD	176.557	0.000	3.49	0.03	4.23	1.18	0.283	-11.9	-2.58	14.20	-0.07	4.22	0.00	0.000	0.0	0.00
342	QD	176.809	0.252	3.62	-0.57	4.24	1.28	0.464	-12.8	-4.38	13.72	1.94	4.23	0.00	0.000	0.0	0.00
344	QF	180.761	0.252	13.30	-0.09	4.33	3.06	0.029	-29.6	-0.21	3.94	0.02	4.32	0.00	0.000	0.0	0.00
345	MF	180.761	0.000	13.30	-0.09	4.33	3.06	0.029	-29.6	-0.21	3.94	0.02	4.32	0.00	0.000	0.0	0.00
346	QF	181.013	0.252	12.88	1.74	4.34	3.01	-0.407	-29.1	3.98	4.09	-0.62	4.33	0.00	0.000	0.0	0.00
348	MB1	181.313	0.000	11.87	1.65	4.34	2.89	-0.407	-27.9	3.98	4.49	-0.72	4.34	0.00	0.000	0.0	0.00
349	B	183.713	2.400	5.54	0.96	4.39	2.08	-0.262	-20.1	2.52	9.92	-1.54	4.40	0.00	0.000	0.0	0.00
350	MB1	183.713	0.000	5.54	0.96	4.39	2.08	-0.262	-20.1	2.52	9.92	-1.54	4.40	0.00	0.000	0.0	0.00
352	SD	184.413	0.000	4.37	0.76	4.41	1.90	-0.281	-18.3	2.61	12.24	-1.89	4.41	0.00	0.000	0.0	0.00
354	QD	184.965	0.252	3.78	0.02	4.43	1.78	-0.016	-17.2	0.07	13.93	-0.04	4.42	0.00	0.000	0.0	0.00
355	MD	184.965	0.000	3.78	0.02	4.43	1.78	-0.016	-17.2	0.07	13.93	-0.04	4.42	0.00	0.000	0.0	0.00
356	QD	185.217	0.252	3.93	-0.62	4.44	1.80	0.248	-17.5	-2.46	13.44	1.94	4.42	0.00	0.000	0.0	0.00
358	MB1	185.517	0.000	4.33	-0.72	4.45	1.88	0.248	-18.3	-2.46	12.31	1.83	4.43	0.00	0.000	0.0	0.00
359	B	187.917	2.400	9.61	-1.45	4.51	2.65	0.395	-26.0	-3.95	5.55	0.98	4.47	0.00	0.000	0.0	0.00
360	MB1	187.917	0.000	9.61	-1.45	4.51	2.65	0.395	-26.0	-3.95	5.55	0.98	4.47	0.00	0.000	0.0	0.00
362	QF	189.169	0.252	13.28	0.05	4.53	3.09	-0.047	-30.4	0.35	3.78	0.01	4.52	0.00	0.000	0.0	0.00
363	MF	189.169	0.000	13.28	0.05	4.53	3.09	-0.047	-30.4	0.35	3.78	0.01	4.52	0.00	0.000	0.0	0.00
364	QF	189.421	0.252	12.79	1.87	4.53	3.02	-0.487	-29.7	4.63	3.93	-0.61	4.53	0.00	0.000	0.0	0.00
366	QD	193.372	0.252	3.63	-0.04	4.63	1.12	-0.314	-11.7	2.86	13.67	0.04	4.62	0.00	0.000	0.0	0.00
367	MD	193.372	0.000	3.63	-0.04	4.63	1.12	-0.314	-11.7	2.86	13.67	0.04	4.62	0.00	0.000	0.0	0.00
368	QD	193.624	0.252	3.81	-0.66	4.64	1.06	-0.152	-11.1	1.20	13.16	1.97	4.62	0.00	0.000	0.0	0.00
370	MB1	193.924	0.000	4.24	-0.78	4.65	1.02	-0.152	-10.8	1.20	12.01	1.86	4.62	0.00	0.000	0.0	0.00
371	B	196.324	2.400	9.91	-1.56	4.71	0.85	0.012	-9.9	-0.43	5.22	0.97	4.67	0.00	0.000	0.0	0.00
372	MB1	196.324	0.000	9.91	-1.56	4.71	0.85	0.012	-9.9	-0.43	5.22	0.97	4.67	0.00	0.000	0.0	0.00
374	SF	197.024	0.000	12.27	-1.89	4.73	0.86	0.018	-10.2	-0.47	4.04	0.74	4.69	0.00	0.000	0.0	0.00
376	QF	197.576	0.252	13.98	-0.09	4.73	0.85	-0.105	-10.2	0.99	3.47	0.04	4.72	0.00	0.000	0.0	0.00
377	MF	197.576	0.000	13.98	-0.09	4.73	0.85	-0.105	-10.2	0.99	3.47	0.04	4.72	0.00	0.000	0.0	0.00
378	QF	197.828	0.252	13.53	1.84	4.74	0.81	-0.225	-9.8	2.42	3.59	-0.54	4.73	0.00	0.000	0.0	0.00
380	MB1	198.128	0.000	12.46	1.74	4.74	0.74	-0.225	-9.1	2.42	3.94	-0.64	4.74	0.00	0.000	0.0	0.00
381	B	200.528	2.400	5.74	1.03	4.79	0.41	-0.056	-5.3	0.75	9.09	-1.50	4.81	0.00	0.000	0.0	0.00
382	MB1	200.528	0.000	5.74	1.03	4.79	0.41	-0.056	-5.3	0.75	9.09	-1.50	4.81	0.00	0.000	0.0	0.00
384	QD	201.780	0.252	3.87	0.02	4.83	0.34	-0.005	-4.4	0.10	12.94	-0.03	4.83	0.00	0.000	0.0	0.00

```
        TRACKING FOR CONSTANT ENERGY DEVIATION

                 TUNE          CLO           CLOP          BET0          ALF0
          X    -0.1678175    -4.4122725     0.0971831     3.8691492     0.0228035
          Z    -0.1773635     0.0000000     0.0000000    12.9367391    -0.0337965


        REL. ENERGY DEVIATION=  -0.01000

                              CPU-TIME SINCE LAST CALL=  123620.0MSEC.; TOTAL CPU-TIME=     123.620SEC. REAL TIME=     267.371SEC.
   INI =       1
    ---ENTRY ANFB---INIT.COORD.DISTR.=REC
    ---ITRA/  1/AMP/  10.000    18.285/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

        AMPLITUDE-X =           10.000          AMPLITUDE-Z =           18.285  MM
        EMITTANCE-X =           25.845          EMITTANCE-Z =           25.845  PI*MRAD*MM
PART.   X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
    1     5.588   0.038246    18.285   0.047770
                              CPU-TIME SINCE LAST CALL=    9620.0MSEC.; TOTAL CPU-TIME=     133.240SEC. REAL TIME=     287.699SEC.
        ********************************
        **** ALL PARTICLES STABLE ****
        ********************************

                              CPU-TIME SINCE LAST CALL=      10.0MSEC.; TOTAL CPU-TIME=     133.250SEC. REAL TIME=     287.949SEC.
   INI =       1
    ---ENTRY ANFB---INIT.COORD.DISTR.=REC
    ---ITRA/  1/AMP/  15.000    27.428/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

        AMPLITUDE-X =           15.000          AMPLITUDE-Z =           27.428  MM
        EMITTANCE-X =           58.152          EMITTANCE-Z =           58.152  PI*MRAD*MM
PART.   X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
    1    10.588   0.008778    27.428   0.071654
                              CPU-TIME SINCE LAST CALL=    9190.0MSEC.; TOTAL CPU-TIME=     142.440SEC. REAL TIME=     314.969SEC.
        ********************************
        **** ALL PARTICLES STABLE ****
        ********************************
```

```
        TRACKING FOR CONSTANT ENERGY DEVIATION

                 TUNE          CLO           CLOP          BET0          ALF0
          X    -0.1779817     0.0000000     0.0000000     3.6398207     0.0087721
          Z    -0.1699993     0.0000000     0.0000000    13.6455933     0.0000000


        REL. ENERGY DEVIATION=   0.00000

                              CPU-TIME SINCE LAST CALL=    4400.0MSEC.; TOTAL CPU-TIME=     146.840SEC. REAL TIME=     329.828SEC.
   INI =       1
    ---ENTRY ANFB---INIT.COORD.DISTR.=REC
    ---ITRA/  1/AMP/  10.000    19.362/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

        AMPLITUDE-X =           10.000          AMPLITUDE-Z =           19.362  MM
        EMITTANCE-X =           27.474          EMITTANCE-Z =           27.474  PI*MRAD*MM
PART.   X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
    1    10.000  -0.024100    19.362   0.000000
```

```
                          CPU-TIME SINCE LAST CALL=    9410.0MSEC.; TOTAL CPU-TIME=     156.250SEC. REAL TIME=     353.480SEC.
      ********************************
      **** ALL PARTICLES STABLE ****
      ********************************

                          CPU-TIME SINCE LAST CALL=      10.0MSEC.; TOTAL CPU-TIME=     156.260SEC. REAL TIME=     353.488SEC.
  INI =       1
   ---ENTRY ANFB---INIT.COORD.DISTR.=REC
   ---ITRA/  1/AMP/  15.000    29.043/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

      AMPLITUDE-X =          15.000          AMPLITUDE-Z =          29.043  MM
      EMITTANCE-X =          61.816          EMITTANCE-Z =          61.816  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
   1    15.000  -0.036150   29.043   0.000000
                          CPU-TIME SINCE LAST CALL=    9470.0MSEC.; TOTAL CPU-TIME=     165.730SEC. REAL TIME=     370.031SEC.
      ********************************
      **** ALL PARTICLES STABLE ****
      ********************************
```

```
      TRACKING FOR CONSTANT ENERGY DEVIATION

            TUNE          CLO          CLOP          BET0          ALF0
      X   -0.1690690    6.2749172   -0.1979994    3.3597361   -0.0072168
      Z   -0.1775219    0.0000000    0.0000000   14.3880179    0.0279959

      REL. ENERGY DEVIATION=   0.01000

                          CPU-TIME SINCE LAST CALL=    6050.0MSEC.; TOTAL CPU-TIME=     171.780SEC. REAL TIME=     384.211SEC.
  INI =       1
   ---ENTRY ANFB---INIT.COORD.DISTR.=REC
   ---ITRA/  1/AMP/  10.000    20.694/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

      AMPLITUDE-X =          10.000          AMPLITUDE-Z =          20.694  MM
      EMITTANCE-X =          29.764          EMITTANCE-Z =          29.764  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
   1    16.275  -0.176519   20.694  -0.040266
                          CPU-TIME SINCE LAST CALL=    9780.0MSEC.; TOTAL CPU-TIME=     181.560SEC. REAL TIME=     403.590SEC.
      ********************************
      **** ALL PARTICLES STABLE ****
      ********************************

                          CPU-TIME SINCE LAST CALL=      10.0MSEC.; TOTAL CPU-TIME=     181.570SEC. REAL TIME=     403.602SEC.
  INI =       1
   ---ENTRY ANFB---INIT.COORD.DISTR.=REC
   ---ITRA/  1/AMP/  15.000    31.041/ITR,CHI0,CHID/  1     0.0    90.0/I4,PSI0,PSID/  0     0.0     0.0

      AMPLITUDE-X =          15.000          AMPLITUDE-Z =          31.041  MM
      EMITTANCE-X =          66.970          EMITTANCE-Z =          66.970  PI*MRAD*MM
PART.  X-(MM)  dX/dS(mrad)  Z-(mm)  dZ/dS(mrad)
   1    21.275  -0.165779   31.041  -0.060399
                          CPU-TIME SINCE LAST CALL=    9540.0MSEC.; TOTAL CPU-TIME=     191.110SEC. REAL TIME=     427.508SEC.
      ********************************
      **** ALL PARTICLES STABLE ****
      ********************************
```

```
FLEXIBILITY  /AGS BOOSTER (Sector Dipoles)/ ONLY SEXTUPOLES
PRINTOUT OF INPUT PARAMETERS
NEXT
SINGLE ELEMENTS
D1     0                              0.3
D2     0                              0.7
D3     0                              1.0
D4     0                              3.7
QF   * 2            -.5583816500  0.251875
QD   * 2            +.5754637800  0.251875
B    * 3 -.072722042              2.400
SF   * 3 -.00000
SD   * 3  .00000
MB1  * 11  0.          1.
MF   * 11  0.            1.
MD   * 11  0.            1.
NEXT
BLOCK DEFINITIONS
  1  1
D1   D1
D2   D2
D3   D3
D4   D4
B    B
QF   QF
QD   QD
NEXT
STRUCTURE INPUT

      6*( MD   QD   D1   MB1  B    MB1  D2   SF   D1   QF
          MF   QF   D1   MB1  B    MB1  D2   SD   D1   QD
          MD   QD   D4   QF   MF   QF   D1   MB1  B    MB1
          D2   SD   D1   QD   MD   QD   D1   MB1  B    MB1
          D3   QF   MF   QF   D4   QD   MD   QD   D1   MB1
          B    MB1  D2   SF   D1   QF   MF   QF   D1   MB1
          B    MB1  D3   QD
        )
NEXT
LINEAR OPTICS CALCULATION
ELEMENT          00
NEXT
CHROMATICITY CORRECTION
SF           0.0
SD           0.0
NEXT
ITERATION ERRORS OF CLOSED ORBIT, TUNE ADJUSTMENT AND CHROMATICITY CALC.
                100 0.0001   0.00001
                 10 0.00001   0.0001
                 10 0.001        0.01
NEXT
TRACKING PARAMETERS
        10
         2  10.00     0.0
         3  -.0100    +.0100
NEXT
INITIAL COORDINATES---RECTANGULAR
         1   0.      90.0       1.0
NEXT
```

```
MULTIPOLE COEFFICIENTS—/FORMAT CHANGED——F10 ——> F15————————————
          10.       174.5
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      .000078         0.00000         0.              0.000
      0.              0.00000         0.              0.000
      -.00000024      0.0000          0.              0.00
      0.              0.0000          0.              0.000
      -.0000000016    0.00000         0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
NEXT
FLUCTUATION RANDOM STARTING NUMBER———————————————————————————
         00000000000005623845
NEXT
ENDE=========================================================
MULTIPOLE COEFFICIENTS—/FORMAT CHANGED——F10 ——> F15————————————
          25.0      19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
NEXT
MULTIPOLE COEFFICIENTS—/FORMAT CHANGED——F10 ——> F15————————————
          25.0      19.4
      0.              0.00000         0.              0.000
      0.              0.0000          0.              0.000
     -0.00000         0.000462        0.              0.000131
      0.              0.000127        0.              0.000219
      0.000000        0.000219        0.              0.000057
      0.              0.000053        0.              0.000091
      0.0000          0.000083        0.              0.000023
      0.              0.000018        0.              0.000034
     -0.000           0.000028        0.              0.0000084
     -0.000           0.0000061       0.              0.0000011
NEXT
PRINTOUT OF INPUT PARAMETERS—————————————————————————————————
NEXT
TUNE VARIATION———————————————————————————————————————————————
QF          .827
QD          .820
NEXT
ORBIT ADJUSTMENT—————————————————————————————————————————————
        1.00      1.00
MON=SPH
COR=DPH
COR=DPV
NEXT
INITIAL COORDINATES——————————————————————————————————————————
SET       0.0       0.0       1.99      0.00      -.9       0.0
          0.0       0.0       0.7       0.00      0.0       -.1
NEXT
INITIAL COORDINATES——————————————————————————————————————————
```

```
SET         0.0         0.0         29.105     0.00019  0.         0.0B
            0.0         0.0         8.315      0.00018  0.0        0.
NEXT
COMBINATION OF ELEMENTS
SPVL        2.2143   SPVS
NEXT
LIMITATION OF APERTURE----------------------------------------------------
SPH   RE    28.         28.
SPV   EL    28.         28.
NEXT
COMBINATION OF ELEMENTS
SPH         3.0       SPHA
SPV         3.0       SPVA
NEXT
C---CELL QUADS FOR QX/QZ=.15/.08 WITHOUT ORBIT DIST
QF   2  2.878     .62       -.08034138
QD   2  2.878     1.8        .03427998
ITERATION ERRORS OF CLOSED ORBIT, TUNE ADJUSTMENT AND CHROMATICITY CALC.
                  50 0.00001   0.00001
                  10 0.000001  0.00001
                  10 0.0001    0.001
NEXT
TRACKING PARAMETERS-------------------------------------------------------
          1
          1  1.0         0.
          1 -.0000      .000
NEXT
```

****

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