

## Booster survey and linear lattice parameters with program MAD

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**Brookhaven National Laboratory**

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*BOOSTER SURVEY and  
LINEAR LATTICE PARAMETERS  
with PROGRAM MAD*

*AD*

*Booster Technical Note  
No. 99*

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November 1987*

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BOOSTER SURVEY  
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WITH  
PROGRAM MAD

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ABSTRACT

This note describes the coordinates of AGS Booster in the Booster centered frame of reference, with program MAD. The results agree with and confirm our earlier calculation. The linear lattice parameters for  $\Delta(P)/P = -.01$  to  $.01$  in increments of  $.002$  are also included.

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## I. INTRODUCTION

This note includes the results of the Booster Survey obtained with program MAD [1] (versions [2] 4.03 and 6 produced same results).

In Table I, we present the definition of the ring elements inputed into program MAD, (with lengths in meters).

In Table II, linear lattice parameters with  $\Delta(P)/P = 0$  are summarized and in Table III, the results of the MAD program Survey (for the Booster is given. This table (III), show the coordinates of an on axis point of the downstream end of that element when viewed in clockwise direction.

Table IV, gives the lattice functions for the Booster, calculated with program MAD6, for  $\Delta(P)/P = -.01$  to  $+.01$  in increments of  $.002$ .

## II. BOOSTER SURVEY WITH MAD

Coordinates of the AGS Booster in the Booster centered reference system, was generated with program MAD. The values listed in Table III correspond to the coordinates of an on - axis point of the downstream end of that element when viewed in a clockwise direction. Assuming the magnets have sharp edges where the field becomes zero. These coordinates (given in Table III) agrees with and confirm our previous results [ 3 ], we obtained using a CDC - version of the Geometry program [ 4 ].

In the present calculation (shown in Table I) we used thick lens sextupoles of length  $.1$  m; whereas in reference [ 3 ] thin lens sextupoles of zero length were assumed.

Figures 1 and 2 are also included showing the conventions used in program MAD (e.g. coordinates and angles given in Table III), and in the layout of the Booster lattice (e.g relative positions of magnets and Booster superperiods) respectively.

The transformation from the Booster centered reference system to the AGS and BNL grids are discussed and tabulated in subsequent note [ 5 ].

## III. COORDINATE SYSTEM CONVENTIONS

Figure 1 shows the Global reference coordinates as follows:

X (displacement of lthe local origin in the X direction),  
 Y (displacement of lthe local origin in the Y direction),  
 Z (displacement of lthe local origin in the Z direction).

Where X is the East (E) and -Z is the North (N) direction.

$\Theta$  (THETA in Table III) is the azimuth angle (i.e. the rotation angle about the global Y axis, between the projection of the reference orbit onto the (Z,X) plane, and the global Z axis).

$\phi$  (PHI) is the elevation angle and  $\Psi$  (PSI) is the roll angle about the local s axis (see Figure 1 (c)). For more detail of MAD conventions see the MAD program manual [1].

#### IV. CONCLUSION

The coordinates of the Booster were generated using program MAD. The result obtained agreed with and confirms our previous calculation given in the Booster Design Manual. The transformations from the Booster centered reference system to AGS and BNL grids and the coordinates of the apex of the dipoles and centers of the quadrupoles and sextupoles are generated and given in the subsequent note [ 5 ].

#### V. REFERENCES

1. F. C. Iselin, CERN, Geneva, Switzerland, Principal author of program MAD (versions 4 and 6).
2. Available in BNL DAG::DUA0:[PARSA1.MAD] DIRECTORY.
3. Z. Parsa, Booster Technical Note No. 27 and Booster Design Manual.
4. Originally was designed for ISABEL (E. Courant). Now modified for the Booster (I refer to it as) BSTGEO.FOR (VAX version), and a version we use for the RHIC coordinate calculation, (will be referred to as) GEOMETRY.FOR (also VAX version).
5. Z. Parsa, AGS Booster Geometry and Coordinates, Booster Technical Note; November 1987, (NO. 100).
6. E. Courant, Z. Parsa, Booster Lattice, Booster Technical Note No. 1; January 1986.

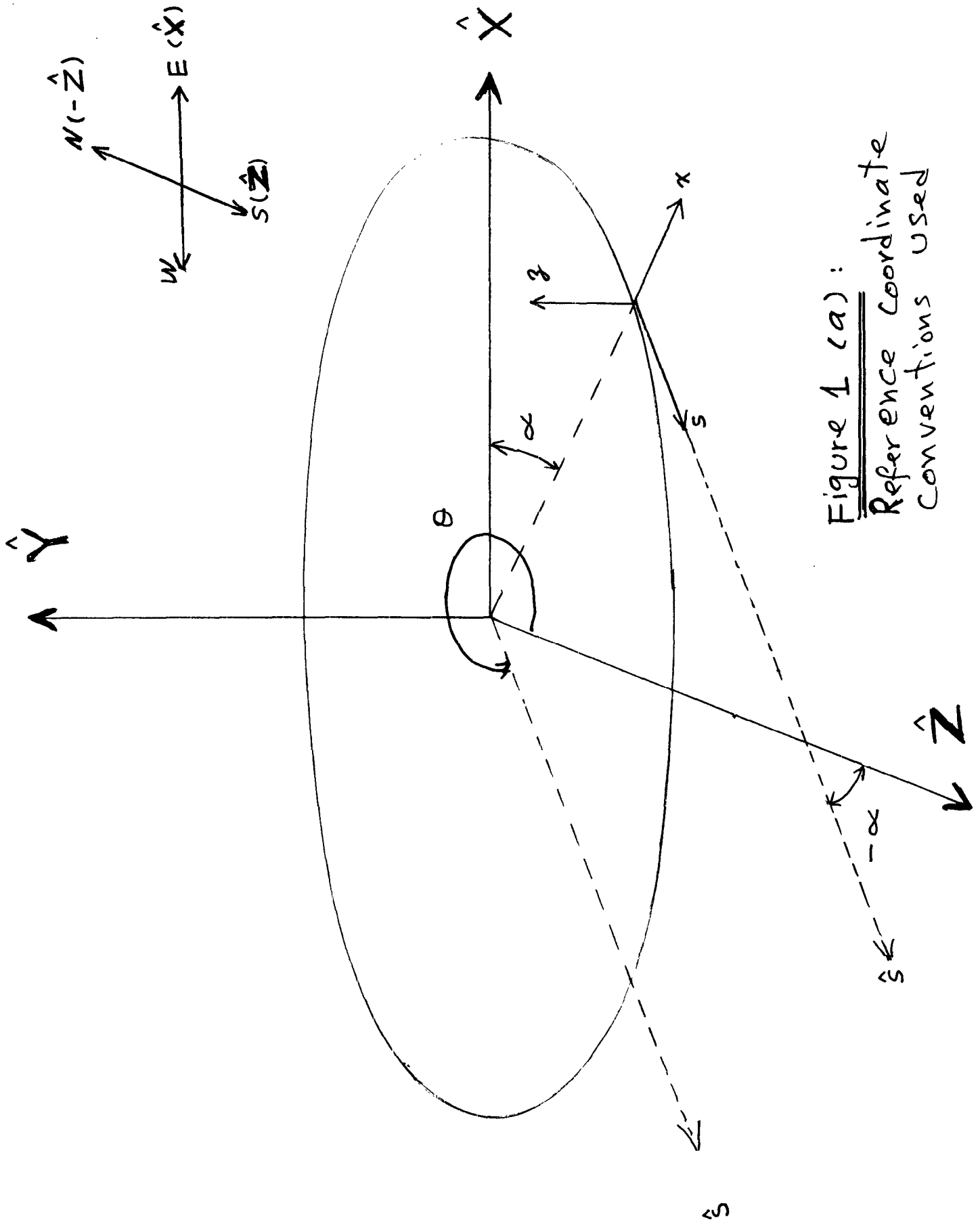
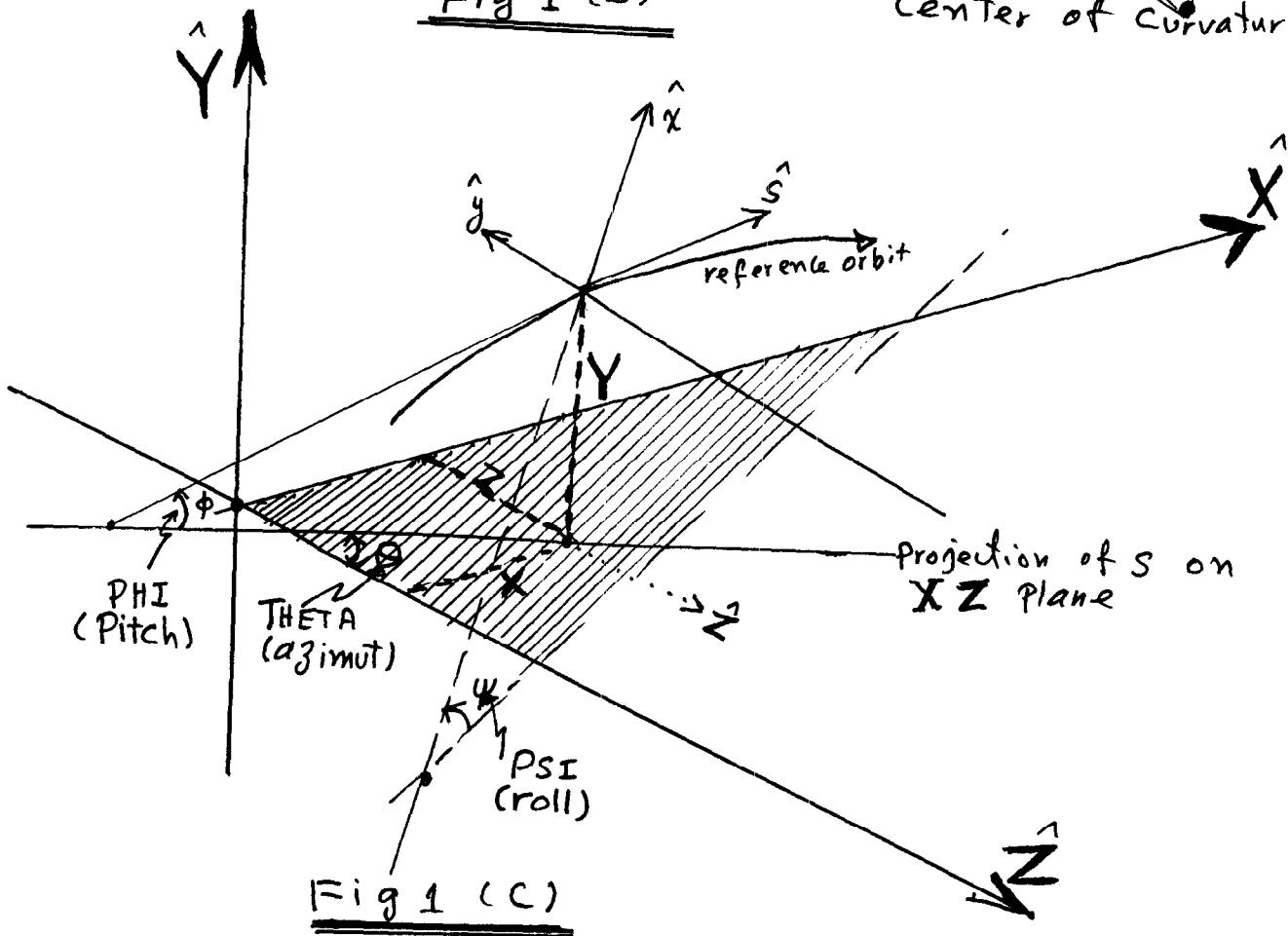
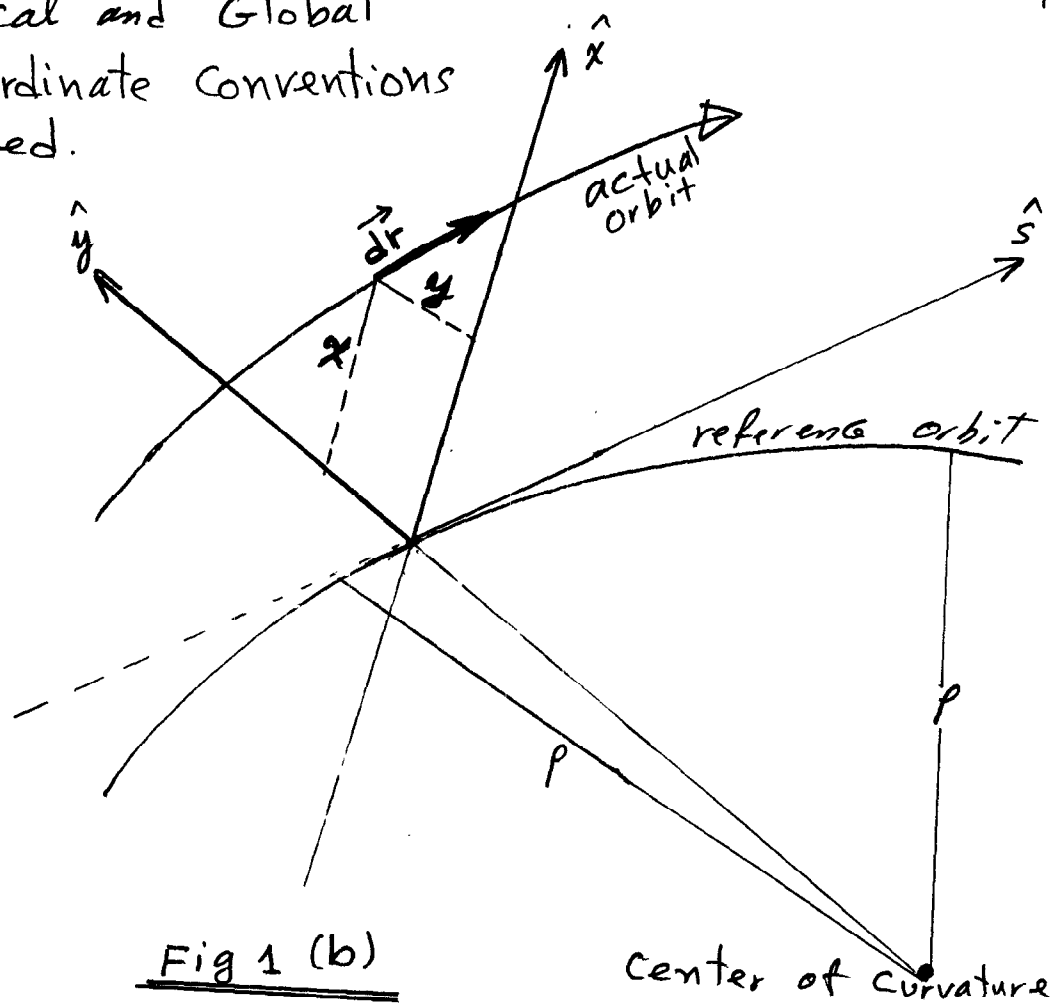


Figure 1 (a):  
Reference Coordinate  
Conventions Used



Figure 1 (b and c):  
Local and Global  
Coordinate Conventions  
Used.



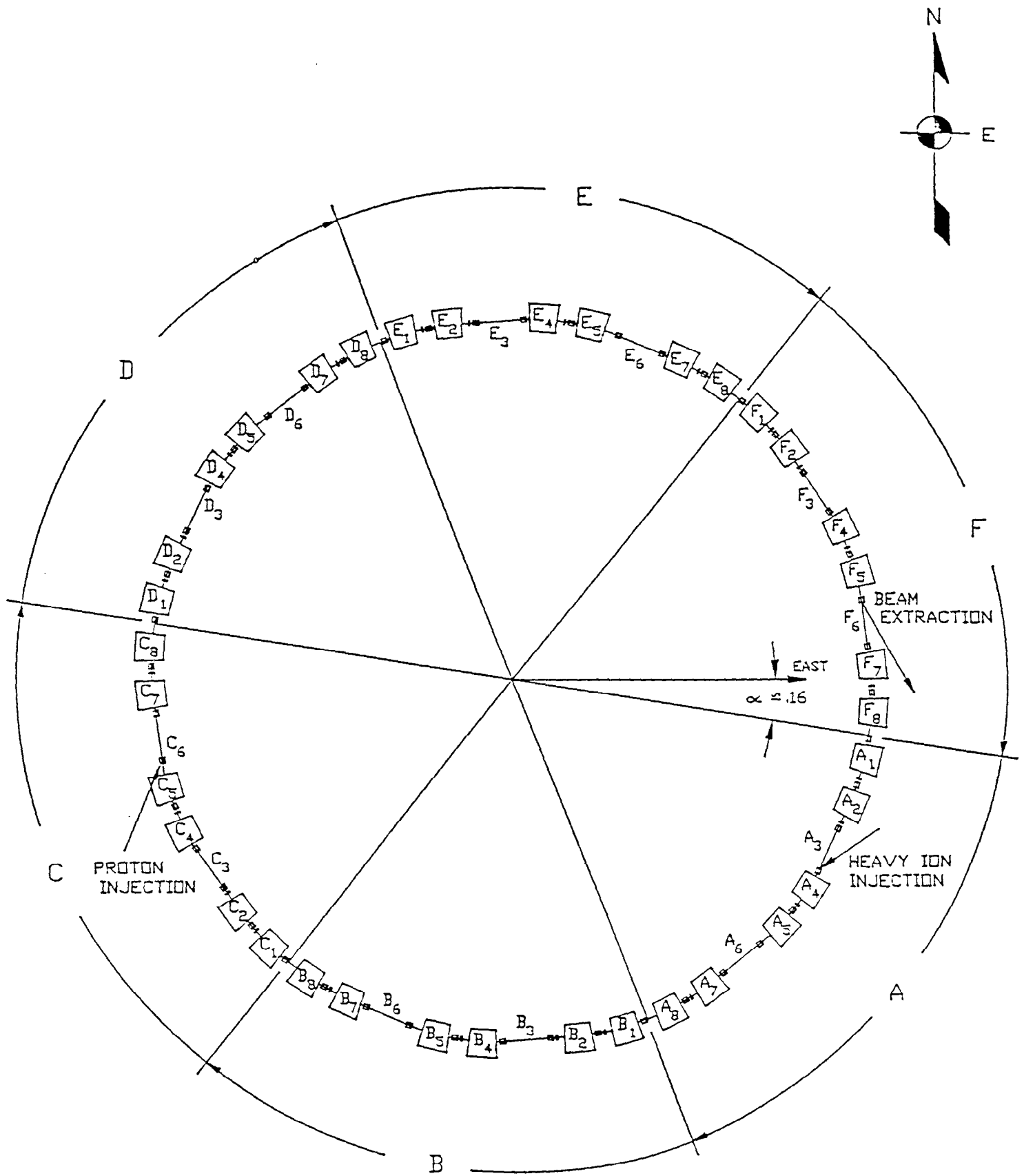


Fig.2 Layout of the AGS Booster showing the relative position of magnets (e.g. Dipole Apex locations) and labelling convention of the Booster Superperiods. (A to F, with the Beam in the Clockwise direction).

TABLE I

DEFINITION AND MAGNITUDE OF THE ELEMENTS AND PARAMETERS

TABLE I  
-----

AGS BOOSTER LATTICE FOR SURVEY ZOHREH PARSA 19-NOV-8 08:07:18  
 INPUT STREAM TO PROGRAM MAD (SHOWING THE DEFINITION AND MAGNITUDE OF THE ELEMENTS AND  
 PARAMETER DEFINITIONS

BR := 2.14962  
 TH := .174532925199  
 SF := 1.36066306  
 SD := -8.105988  
 SV := .11164764  
 GF := .558211184119  
 GD := -.575416218362  
 LQ := .251875

DRIFT SPACES

S2H : DRIFT,L=.25  
 S1 : DRIFT,L=.1  
 S3 : DRIFT,L=.3  
 S3H : DRIFT,L=.35  
 S5H : DRIFT,L=.55  
 S1Ø : DRIFT,L=1.  
 S32H : DRIFT,L=3.25  
 S37 : DRIFT,L=3.7

BENDING MAGNET WITH EDDY CURRENT SEXTUPOLES

BEND : SBEND,L=2.4,ANGLE=TH,K2=SV

QUADRUPOLES

QF : QUADRUPOLE,L=LQ,K1=GF  
 QD : QUADRUPOLE,L=LQ,K1=GD

SEXTUPOLES (CHROMATICITY CORRECTING AND EDDY CURRENT)

SXF : SEXTUPOLE,L=.1,K2=SF  
 SXD : SEXTUPOLE,L=.1,K2=SD

THE KICKERS

CT : DRIFT,L=.1

HALF CELLS

HCDF : LINE=(QD,S3,BEND,S5H,CT,SXF,S2H,QF)  
 HCDFD : LINE=(QF,S3,BEND,S5H,CT,SXD,S2H,QD)  
 HCDFL : LINE=(QD,S3,BEND,S5H,CT,S3H,QF)  
 HCDFLM : LINE=(QD,S3,BEND,S1Ø,QF)  
 HCDFDL : LINE=(QF,S3,BEND,S5H,CT,S3H,QD)  
 HCDFDLM : LINE=(QF,S3,BEND,S1Ø,QD)  
 HCDFDO : LINE=(QD,S32H,CT,S3H,QF)  
 HCDFDFO : LINE=(QF,S32H,CT,S3H,QD)  
 HCDFDOM : LINE=(QD,S37,QF)  
 HCDFDLM : LINE=(QF,S37,QD)

SUPERPERIODS

B4SA : LINE=(HCDF,HCDF,HCDFD,HCDFD,HCDFDLM,HCDFD,HCDF,HCDFDL)  
 B4SC : LINE=(HCDF,HCDF,HCDFD,HCDFD,HCDFDLM,HCDFD,HCDF,HCDFDL)  
 B4SF : LINE=(HCDF,HCDF,HCDFD,HCDFD,HCDFDLM,HCDFD,HCDF,HCDFDL)  
 B4S : LINE=(HCDF,HCDF,HCDFD,HCDFD,HCDFDLM,HCDFD,HCDF,HCDFDL)

TABLE II

LATTICE PARAMETERS FOR  $\Delta(P)/P = 0$

TABLE II

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING" ZOHREH PARSA  
 DELTA(P)/P = 0.000000  
 "MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10:18:00

POS. NO.	ELEMENT SEQUENCE	ELEM. NO.	DIST I [M]	H O R I Z O N T A L			V E R T I C A L			DPY [1]
				MUX [2PI]	ALFAX [1]	BETAX [M]	MUX [2PI]	ALFAY [1]	BETAY [M]	
BEGIN	RING	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
55	QD	9	33.882	0.814	0.000	0.540-0.015	13.644	0.000	0.000	0.000
56	S3	7	34.182	0.826	0.000	0.546 0.064	13.157	1.912	0.000	0.000
57	BEND	7	36.582	0.888	0.000	0.565 0.064	12.041	1.806	0.000	0.000
58	S5H	6	37.132	0.897	0.000	0.918 0.229	5.413	0.956	0.000	0.000
59	CT	8	37.232	0.898	0.000	1.045 0.229	4.467	0.762	0.000	0.000
60	SXF	3	37.332	0.900	0.000	1.068 0.229	4.319	0.727	0.000	0.000
61	S2H	5	37.582	0.903	0.000	1.090 0.229	4.177	0.691	0.000	0.000
62	QF	9	37.834	0.906	0.000	1.148 0.229	3.853	0.603	0.000	0.000
63	QF	10	38.086	0.909	0.000	1.185 0.065	3.703	0.000	0.000	0.000
64	S3	8	38.386	0.913	0.000	1.180-0.102	3.853	-0.603	0.000	0.000
65	BEND	8	40.786	0.962	0.000	1.150-0.102	4.247	-0.709	0.000	0.000
66	S5H	7	41.336	0.961	0.000	1.098 0.059	9.687	-1.558	0.000	0.000
67	CT	9	41.436	0.984	0.000	1.131 0.059	11.508	-1.752	0.000	0.000
68	SXD	3	41.536	0.988	0.000	1.136 0.059	11.862	-1.788	0.000	0.000
69	S2H	6	41.786	0.998	0.000	1.142 0.059	12.223	-1.823	0.000	0.000
70	QD	10	42.037	1.009	0.000	1.157 0.059	13.157	-1.912	0.000	0.000
71	QD	11	42.289	1.021	0.000	1.193 0.229	13.644	0.000	0.000	0.000
72	S32H	3	45.539	1.103	0.000	1.273 0.407	4.467	0.762	0.000	0.000
73	CT	10	45.639	1.104	0.000	2.595 0.407	4.319	0.727	0.000	0.000
74	S3H	4	45.989	1.108	0.000	2.636 0.407	3.853	0.603	0.000	0.000
75	QF	11	46.241	1.111	0.000	2.778 0.407	3.703	0.000	0.000	0.000
76	QF	12	46.493	1.114	0.000	2.831 0.011	3.853	-0.603	0.000	0.000
77	S3	9	46.793	1.118	0.000	2.784-0.385	3.853	-0.603	0.000	0.000
78	BEND	8	49.193	1.163	0.000	2.669-0.385	4.247	-0.709	0.000	0.000
79	S5H	8	49.743	1.180	0.000	1.919-0.239	9.687	-1.558	0.000	0.000
80	CT	11	49.843	1.183	0.000	1.787-0.239	11.508	-1.752	0.000	0.000
81	SXD	4	49.943	1.187	0.000	1.763-0.239	11.862	-1.788	0.000	0.000
82	S2H	7	50.193	1.196	0.000	1.740-0.239	12.223	-1.823	0.000	0.000
83	QD	12	50.445	1.206	0.000	1.680-0.239	13.157	-1.912	0.000	0.000
84	QD	13	50.697	1.216	0.000	1.681 0.242	13.644	0.000	0.000	0.000
85	S3	10	50.997	1.227	0.000	1.650 0.002	13.157	1.912	0.000	0.000
86	BEND	10	53.397	1.227	0.000	1.754 0.242	12.041	1.806	0.000	0.000
87	S5H	9	53.947	1.285	0.000	2.515 0.390	5.413	0.956	0.000	0.000
88	CT	12	54.047	1.293	0.000	2.729 0.390	4.467	0.762	0.000	0.000
89	S3H	15	54.397	1.294	0.000	2.768 0.390	4.319	0.727	0.000	0.000
90	QF	13	54.649	1.299	0.000	2.905 0.390	3.853	0.603	0.000	0.000
				1.302	0.000	2.951-0.023	3.703	0.000	0.000	0.000

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING", ZOHREH PARSA  
 DELTA(P)/P = 0.0000000

"MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10:18:00

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ELEMENT SEQUENCE POS. ELEMENT NO. NAME	DIST I [M]	I I	H O R I Z O N T A L			V E R T I C A L			DPY [1]						
			BETAX [M]	ALFAX [1]	MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	DPX [1]		BETAY [M]	ALFAY [1]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]	
91 QF	54.901	13.038	1.915	1.305	0.000	0.000	2.894	-0.435	3.853	-0.603	1.319	0.000	0.000	0.000	0.000
92 S32H	4	4.371	0.752	1.376	0.000	0.000	1.481	-0.435	11.508	-1.752	1.400	0.000	0.000	0.000	0.000
93 CT	58.251	4.224	0.716	1.379	0.000	0.000	1.437	-0.435	11.862	-1.788	1.401	0.000	0.000	0.000	0.000
94 S3H	58.601	3.767	0.590	1.393	0.000	0.000	1.285	-0.435	13.157	-1.912	1.406	0.000	0.000	0.000	0.000
95 QD	58.852	3.624	-0.018	1.404	0.000	0.000	1.198	-0.255	13.644	0.000	1.409	0.000	0.000	0.000	0.000
96 GD	59.104	3.785	-0.628	1.415	0.000	0.000	1.156	-0.085	13.157	1.912	1.412	0.000	0.000	0.000	0.000
97 S3	59.404	4.195	-0.739	1.427	0.000	0.000	1.130	-0.085	12.041	1.806	1.416	0.000	0.000	0.000	0.000
98 BEND	61.804	9.644	-1.509	1.488	0.000	0.000	1.118	0.075	5.413	0.956	1.464	0.000	0.000	0.000	0.000
99 S5H	62.354	11.407	-1.695	1.497	0.000	0.000	1.159	0.075	4.467	0.762	1.481	0.000	0.000	0.000	0.000
100 CT	62.454	11.749	-1.729	1.498	0.000	0.000	1.167	0.075	4.319	0.727	1.485	0.000	0.000	0.000	0.000
101 SXF	62.554	12.098	-1.763	1.499	0.000	0.000	1.175	0.075	4.177	0.691	1.489	0.000	0.000	0.000	0.000
102 S2H	62.804	13.001	-1.848	1.503	0.000	0.000	1.193	0.075	3.853	0.603	1.499	0.000	0.000	0.000	0.000
103 QF	63.056	13.477	-0.017	1.506	0.000	0.000	1.191	-0.093	3.703	0.000	1.509	0.000	0.000	0.000	0.000
104 QF	63.308	13.018	1.816	1.509	0.000	0.000	1.147	-0.258	3.853	-0.603	1.520	0.000	0.000	0.000	0.000
105 S3	63.608	11.959	1.717	1.512	0.000	0.000	1.070	-0.258	4.247	-0.709	1.532	0.000	0.000	0.000	0.000
106 BEND	66.008	5.405	0.986	1.560	0.000	0.000	0.647	-0.094	9.687	-1.558	1.593	0.000	0.000	0.000	0.000
107 S5H	66.558	4.431	0.785	1.578	0.000	0.000	0.596	-0.094	11.508	-1.752	1.601	0.000	0.000	0.000	0.000
108 CT	66.658	4.278	0.749	1.582	0.000	0.000	0.586	-0.094	11.862	-1.788	1.603	0.000	0.000	0.000	0.000
109 S3H	67.008	3.798	0.621	1.596	0.000	0.000	0.554	-0.094	13.157	-1.912	1.607	0.000	0.000	0.000	0.000
110 QD	67.260	3.642	0.009	1.607	0.000	0.000	0.540	-0.015	13.644	0.000	1.610	0.000	0.000	0.000	0.000
END RING	201.780	3.642	0.009	4.820	0.000	0.000	0.540	-0.015	13.644	0.000	4.830	0.000	0.000	0.000	0.000

TOTAL LENGTH =	201.780000	QX	=	4.820000	QY	=	4.829999
ALFA	=	QX'	=	0.001048	QY'	=	-0.001678
GAMMA(TR)	=	BETAX(MAX)	=	13.865707	BETAY(MAX)	=	13.644032
	=	DX(MAX)	=	2.951449	DY(MAX)	=	0.000000
	=	XCO(MAX)	=	0.000000	YCO(MAX)	=	0.000000
	=	XCO(R.M.S.)	=	0.000000	YCO(R.M.S.)	=	0.000000

TABLE III

SURVEY OF THE AGS - BOOSTER



AGS BOOSTER LATTICE FOR SURVEY SURVEY OF BEAM LINE "RING", ZOHREH PARSA "MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10:18:00

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TABLE III

\* TABLE III GIVES THE SURVEY, WITH X0=31.86063,Z0=5.55399,THETA0=-.161765

POS. NO.	ELEMENT NAME	SUM(L) M	SE QU EN C E ARC M	I I I	X M	P O S I T I O N S M	Z M	I I I	THETA RAD	A N G L E S PHI RAD	P S I RAD
BEGIN RING											
1 QD		0.000000	0.000000	0.000000	31.860630	0.000000	5.553990	0.000000	-0.161765	0.000000	0.000000
2 S3		0.251875	0.251875	0.251875	31.820063	0.000000	5.802577	0.000000	-0.161765	0.000000	0.000000
3 BEND		0.551875	0.551875	0.551875	31.771745	0.000000	6.098666	0.000000	-0.161765	0.000000	0.000000
4 S5H		2.951875	2.951875	2.951875	31.180978	0.000000	8.421673	0.000000	-0.336298	0.000000	0.000000
5 CT		3.501875	3.501875	3.501875	30.999481	0.000000	8.940863	0.000000	-0.336298	0.000000	0.000000
6 SXF		3.601875	3.601875	3.601875	30.966482	0.000000	9.035262	0.000000	-0.336298	0.000000	0.000000
7 S2H		3.701875	3.701875	3.701875	30.933482	0.000000	9.129666	0.000000	-0.336298	0.000000	0.000000
8 QF		3.951875	3.951875	3.951875	30.850984	0.000000	9.365656	0.000000	-0.336298	0.000000	0.000000
9 QF		4.203750	4.203750	4.203750	30.767865	0.000000	9.603421	0.000000	-0.336298	0.000000	0.000000
10 S3		4.455625	4.455625	4.455625	30.684749	0.000000	9.841187	0.000000	-0.336298	0.000000	0.000000
11 BEND		4.755625	4.755625	4.755625	30.585750	0.000000	10.124382	0.000000	-0.336298	0.000000	0.000000
12 S5H		7.155625	7.155625	7.155625	29.600572	0.000000	12.309517	0.000000	-0.510831	0.000000	0.000000
13 CT		7.705625	7.705625	7.705625	29.331676	0.000000	12.789303	0.000000	-0.510831	0.000000	0.000000
14 SXD		7.905625	7.905625	7.905625	29.282786	0.000000	12.876537	0.000000	-0.510831	0.000000	0.000000
15 S2H		7.905625	7.905625	7.905625	29.233895	0.000000	12.963771	0.000000	-0.510831	0.000000	0.000000
16 QD		8.407500	8.407500	8.407500	29.111670	0.000000	13.181856	0.000000	-0.510831	0.000000	0.000000
17 QD		8.659375	8.659375	8.659375	28.988528	0.000000	13.401576	0.000000	-0.510831	0.000000	0.000000
18 S32H		11.909375	11.909375	11.909375	28.865385	0.000000	13.621296	0.000000	-0.510831	0.000000	0.000000
19 CT		12.009375	12.009375	12.009375	27.227563	0.000000	16.456397	0.000000	-0.510831	0.000000	0.000000
20 S3H		12.359375	12.359375	12.359375	27.276453	0.000000	16.543631	0.000000	-0.510831	0.000000	0.000000
21 QF		12.611250	12.611250	12.611250	27.056447	0.000000	16.848949	0.000000	-0.510831	0.000000	0.000000
22 QF		12.863125	12.863125	12.863125	26.933305	0.000000	17.068669	0.000000	-0.510831	0.000000	0.000000
23 S3		13.163125	13.163125	13.163125	26.810163	0.000000	17.288390	0.000000	-0.510831	0.000000	0.000000
24 BEND		15.563125	15.563125	15.563125	26.563492	0.000000	17.550091	0.000000	-0.510831	0.000000	0.000000
25 S5H		16.113125	16.113125	16.113125	25.313836	0.000000	19.530955	0.000000	-0.685364	0.000000	0.000000
26 CT		16.213125	16.213125	16.213125	24.965711	0.000000	19.956759	0.000000	-0.685364	0.000000	0.000000
27 SXD		16.313125	16.313125	16.313125	24.902415	0.000000	20.034178	0.000000	-0.685364	0.000000	0.000000
28 S2H		16.563125	16.563125	16.563125	24.839120	0.000000	20.111597	0.000000	-0.685364	0.000000	0.000000
29 QD		16.815000	16.815000	16.815000	24.580881	0.000000	20.305144	0.000000	-0.685364	0.000000	0.000000
30 QD		17.066875	17.066875	17.066875	24.521456	0.000000	20.500143	0.000000	-0.685364	0.000000	0.000000
31 S3		17.366875	17.366875	17.366875	24.362203	0.000000	20.695142	0.000000	-0.685364	0.000000	0.000000
32 BEND		19.766875	19.766875	19.766875	24.172144	0.000000	20.927398	0.000000	-0.685364	0.000000	0.000000
33 S10		20.766875	20.766875	20.766875	22.499019	0.000000	22.643803	0.000000	-0.859897	0.000000	0.000000
34 QF		21.018750	21.018750	21.018750	21.741244	0.000000	23.296319	0.000000	-0.859897	0.000000	0.000000
35 QF		21.270625	21.270625	21.270625	21.550379	0.000000	23.460671	0.000000	-0.859897	0.000000	0.000000
36 S32H		24.520625	24.520625	24.520625	21.359514	0.000000	25.625024	0.000000	-0.859897	0.000000	0.000000
					18.896745	0.000000	25.745700	0.000000	-0.859897	0.000000	0.000000

TABLE III (CONTINUES)

AGS BOOSTER LATTICE FOR SURVEY SURVEY OF BEAM LINE "RING", ZOHREH PARSA "MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10:18:00 P PAGE 2

Table with columns: POS. NO., ELEMENT NAME, ELEMENT OCC. NO., SEQUENCE SUM(L) M, ARC M, I, X M, POSITIONS Y M, Z M, THETA RAD, ANGLE PHI RAD, PSI RAD. Rows include elements like 37 CT, 38 S3H, 39 QD, 40 QD, 41 S3, 42 BEND, 43 S5H, 44 CT, 45 SXF, 46 S2H, 47 QF, 48 QF, 49 S3, 50 BEND, 51 S5H, 52 CT, 53 S3H, 54 QD, 55 QD, 56 S3, 57 BEND, 58 S5H, 59 CT, 60 SXF, 61 S2H, 62 QF, 63 QF, 64 S3, 65 BEND, 66 S5H, 67 CT, 68 SXD, 69 S2H, 70 QD, 71 QD, 72 S32H, 73 CT.

TABLE III (CONTINUES)

AGS BOOSTER LATTICE FOR SURVEY SURVEY OF BEAM LINE "RING", ZOHREH PARSA "MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10:18:00 PAGE 3

Table with columns: POS. NO., ELEMENT NAME, ELEMENT OCC. NO., SEQUENCE SUM(L) M, SEQUENCE ARC M, I I I, X M, POSITIONS Y M, Z M, THETA RAD, PHI RAD, ANGLE S, PSI RAD. Rows include elements like 74 S3H, 75 QF, 76 QF, 77 S3, 78 BEND, 79 S5H, 80 CT, 81 SXD, 82 S2H, 83 QD, 84 QD, 85 S3, 86 BEND, 87 S5H, 88 CT, 89 S3H, 90 QF, 91 QF, 92 S32H, 93 CT, 94 S3H, 95 QD, 96 QD, 97 S3, 98 BEND, 99 S5H, 100 CT, 101 SXF, 102 S2H, 103 QF, 104 QF, 105 S3, 106 BEND, 107 S5H, 108 CT, 109 S3H, 110 QD.

TABLE III (CONTINUES)

AGS BOOSTER LATTICE FOR SURVEY SURVEY OF BEAM LINE "RING", ZOHREH PARSA "MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10:18:00 PAGE 4

Table with columns: POS. NO., ELEMENT NAME, OCC. NO., SEQUENCE SUM(L) M, ARC M, I, X M, POSITIONS Y M, Z M, THETA RAD, ANGLS PHI RAD, PSI RAD. Rows 111-147.

TABLE III (CONTINUES)

AGS BOOSTER LATTICE FOR SURVEY SURVEY OF BEAM LINE "RING", ZOHREH PARSA "MAD" VERSION: 6.01/03 RUN: 2:-NOV-8 10:18:00 PAGE 5

Table with columns: POS. NO., ELEMENT NAME, OCC. NO., SEQUENCE SUM(L) M, ARC M, I, X M, POSIT IONS Y M, Z M, THETA RAD, ANGLE S PHI RAD, PSI RAD. Rows 148-183.

TABLE III (CONTINUES)

AGS BOOSTER LATTICE FOR SURVEY SURVEY OF BEAM LINE "RING", ZOHREH PARSA "MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10.18:00 PAGE 6

Table with columns: POS. NO., ELEMENT NAME, OCC. NO., SEQUENCE SUM(L) M, SEQUENCE ARC M, POSITION X M, POSITION Y M, POSITION Z M, THETA RAD, PHI RAD, PSI RAD. Rows 184-219.

TABLE III (CONTINUES)

AGS BOOSTER LATTICE FOR SURVEY "RING", SURVEY OF BEAM LINE "RING", ZOHREH PARSA, "MAD" VERSION: 6.01/03, RUN: 21-NOV-8 10:18:00, PAG 7

Table with columns: POS. NO., ELEMENT NAME, ELEMENT OCC. NO., SEQUENCE SUM(L) M, SEQUENCE ARC M, I, X, M, POSITIONS Y, M, Z, M, THETA RAD, ANGLE S PHI RAD, PSI RAD. Rows 220-258.

TABLE III (CONTINUES)

AGS BOOSTER LATTICE FOR SURVEY "RING", SURVEY OF BEAM LINE "RING" ZOHREH PARSA "MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10:18:00 PAGE 8

Table with columns: POS. NO., ELEMENT NAME, ELEMENT OCC. NO., SEQUENCE SUM(L) M, ARC M, I, X M, POSITIONS Y M, Z M, THETA RAD, ANGLE PHI RAD, PSI RAD. Rows 259-293.



TABLE III (CONTINUES)

AGS BOOSTER LATTICE FOR SURVEY SURVEY OF BEAM LINE "RING", ZOHREH PARSA "MAD" VERSION: 6.01/03 RUN: 21-NOV-8 10:18:00 PAGE 9

Table with columns: POS. NO., ELEMENT NAME, ELEMENT OCC. NO., SEQUENCE SUM(L) M, SEQUENCE ARC M, I I, X M, POSITIONS Y M, Z M, THETA RAD, ANGLE S, PHI RAD, PSI RAD. Rows 294-324.

TOTAL LENGTH = 201.780000 ARC LENGTH = 201.780000
ERROR(X) = 0.865636E-10 ERROR(Y) = 0.000000E+00 ERROR(Z) = -0.496590E-09
ERROR(THETA) = 0.155864E-10 ERROR(PHI) = 0.000000E+00 ERROR(PSI) = 0.000000E+00

ZOHREH PARSA 21-NOV-8 10:18:34
\*USED BNL DAG: DUA0:[PARSA1.MAD.MAD6]MAD6.EX

TABLE IV

a - k

LATTICE FUNCTIONS FOR THE AGS - BOOSTER

WITH

DELTA(P)/P = -.01 TO +.01 with .002 increments.

TABLE IV a

AGS BOOSTER LATTICE FOR SURVEY  
LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING  
DELTA(P)/P = -0.010000 SYMM = F  
"MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
ZOHREH PARSA /

POS. NO.	ELEMENT NAME	SEQUENCE ELEMENT NO.	DIST I [M]	I	H O R I Z O N T A L			V E R T I C A L			PAGE	1						
					BETAX [M]	ALFAX [1]	MUX [2PI]	X(CO) [MM]	PX(CO) [.001]	DX [M]			DPX [1]	BETAY [M]	ALFAY [1]	MUY [2PI]	Y(CO) [MM]	PY(CO) [.001]
BEGIN	RING	1	0.000		3.721	0.018	0.000	-4.957	0.096	0.451	-0.005	13.368	-0.045	0.000	0.000	0.000	0.000	0.000
BEGIN	B4S	1	33.630		3.720	0.018	0.004	-4.957	0.096	0.451	-0.005	13.375	-0.045	0.004	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	33.630		3.720	0.018	0.004	-4.957	0.096	0.451	-0.005	13.375	-0.045	0.004	0.000	0.000	0.000	0.000
	55 QD	9	33.882		3.867	-0.603	0.815	-5.024	-0.625	0.458	0.061	12.915	1.831	0.807	0.000	0.000	0.000	0.000
	56 S3	7	34.182		4.265	-0.710	0.827	-5.213	-0.625	0.476	0.061	11.836	1.729	0.811	0.000	0.000	0.000	0.000
	57 BEND	7	35.582		9.575	-1.466	0.888	-8.755	-2.292	0.831	0.229	5.412	0.922	0.860	0.000	0.000	0.000	0.000
	58 S5H	6	37.132		11.305	-1.648	0.897	-10.028	-2.292	0.960	0.229	4.494	0.732	0.878	0.000	0.000	0.000	0.000
	59 CT	8	37.232		11.641	-1.682	0.898	-10.260	-2.292	0.983	0.229	4.350	0.697	0.881	0.000	0.000	0.000	0.000
	60 SXF	3	37.332		11.986	-1.732	0.899	-10.491	-2.300	1.006	0.230	4.212	0.668	0.885	0.000	0.000	0.000	0.000
	61 S2H	5	37.582		12.882	-1.816	0.903	-11.072	-2.300	1.065	0.077	3.896	0.582	0.895	0.000	0.000	0.000	0.000
	62 QF	9	37.834		13.350	-0.002	0.906	-11.456	-0.711	1.105	0.077	3.757	-0.027	0.906	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	37.834		13.350	-0.002	0.906	-11.456	-0.711	1.105	0.077	3.757	-0.027	0.906	0.000	0.000	0.000	0.000
	63 QF	10	38.086		12.884	1.812	0.909	-11.432	0.903	1.104	-0.079	3.924	-0.639	0.916	0.000	0.000	0.000	0.000
	64 S3	8	38.386		11.816	1.711	0.913	-11.158	0.903	1.080	-0.079	4.344	-0.748	0.928	0.000	0.000	0.000	0.000
	65 BEND	8	40.786		5.313	0.952	0.962	-10.939	-0.722	1.089	0.086	10.021	-1.590	0.988	0.000	0.000	0.000	0.000
	66 S5H	7	41.336		4.366	0.753	0.980	-11.340	-0.722	1.137	0.086	11.896	-1.786	0.996	0.000	0.000	0.000	0.000
	67 CT	9	41.436		4.217	0.717	0.984	-11.413	-0.722	1.145	0.086	12.260	-1.821	0.997	0.000	0.000	0.000	0.000
	68 SXD	3	41.536		4.072	0.718	0.988	-11.483	-0.669	1.153	0.075	12.643	-1.974	0.999	0.000	0.000	0.000	0.000
	69 S2H	6	41.786		3.733	0.624	0.998	-11.652	-0.669	1.173	0.075	13.665	-2.072	1.002	0.000	0.000	0.000	0.000
	70 QD	10	42.037		3.571	0.020	1.009	-12.038	-2.380	1.214	0.247	14.221	-0.085	1.005	0.000	0.000	0.000	0.000
END	HCDF	3	42.037		3.571	0.020	1.009	-12.038	-2.380	1.214	0.247	14.221	-0.085	1.005	0.000	0.000	0.000	0.000
BEGIN	HCDF	2	42.037		3.571	0.020	1.009	-12.038	-2.380	1.214	0.247	14.221	-0.085	1.005	0.000	0.000	0.000	0.000
	71 QD	11	42.289		3.713	-0.582	1.021	-12.870	-4.180	1.300	0.429	13.749	1.914	1.007	0.000	0.000	0.000	0.000
	72 S2H	3	45.539		11.418	-1.765	1.105	-26.590	-4.180	2.722	0.429	4.838	0.800	1.073	0.000	0.000	0.000	0.000
	73 CT	10	45.639		11.779	-1.802	1.106	-27.012	-4.180	2.766	0.429	4.680	0.766	1.077	0.000	0.000	0.000	0.000
	74 S3H	4	45.969		13.098	-1.929	1.114	-29.490	-4.180	2.919	0.429	4.017	0.646	1.089	0.000	0.000	0.000	0.000
	75 QF	11	46.241		13.616	-0.084	1.114	-29.039	-0.123	2.976	0.013	4.017	0.003	1.099	0.000	0.000	0.000	0.000
END	HCDF	2	46.241		13.616	-0.084	1.114	-29.039	-0.123	2.976	0.013	4.017	0.003	1.099	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	46.241		13.616	-0.084	1.114	-29.039	-0.123	2.976	0.013	4.017	0.003	1.099	0.000	0.000	0.000	0.000
	76 QF	12	46.493		13.181	1.772	1.117	-28.552	3.937	2.926	-0.403	4.178	-0.640	1.109	0.000	0.000	0.000	0.000
	77 S3	9	46.793		12.136	1.677	1.120	-27.359	3.937	2.802	-0.403	4.597	-0.743	1.120	0.000	0.000	0.000	0.000
	78 BEND	9	49.193		5.759	0.951	1.167	-19.665	2.413	2.014	-0.243	10.043	-1.502	1.178	0.000	0.000	0.000	0.000
	79 S5H	8	49.743		4.804	0.768	1.184	-18.325	2.413	1.878	-0.243	11.811	-1.682	1.186	0.000	0.000	0.000	0.000
	80 CT	11	49.843		4.652	0.734	1.187	-18.061	2.413	1.853	-0.243	12.154	-1.714	1.188	0.000	0.000	0.000	0.000
	81 SXD	4	49.943		4.501	0.766	1.191	-17.831	2.544	1.827	-0.270	12.522	-1.929	1.189	0.000	0.000	0.000	0.000
	82 S2H	7	50.193		4.136	0.677	1.200	-17.189	2.544	1.758	-0.270	13.521	-2.025	1.192	0.000	0.000	0.000	0.000
	83 QD	12	50.445		3.960	0.022	1.210	-16.856	0.084	1.721	-0.019	14.057	-0.059	1.195	0.000	0.000	0.000	0.000
END	HCDF	4	50.445		3.960	0.022	1.210	-16.856	0.084	1.721	-0.019	14.057	-0.059	1.195	0.000	0.000	0.000	0.000
BEGIN	HCDF	1	50.445		3.960	0.022	1.210	-16.856	0.084	1.721	-0.019	14.057	-0.059	1.195	0.000	0.000	0.000	0.000
	84 QD	13	50.697		4.113	-0.631	1.220	-17.146	-2.372	1.748	0.232	13.579	1.915	1.198	0.000	0.000	0.000	0.000
	85 S3	10	50.997		4.527	-0.733	1.231	-17.865	-2.372	1.819	0.232	12.450	1.811	1.202	0.000	0.000	0.000	0.000
	86 BEND	10	53.397		9.925	-1.490	1.290	-25.476	-3.909	2.580	0.391	5.612	1.009	1.248	0.000	0.000	0.000	0.000
	87 S5H	9	53.947		11.681	-1.671	1.298	-27.647	-3.909	2.799	0.391	4.602	0.809	1.266	0.000	0.000	0.000	0.000
	88 CT	12	54.047		12.022	-1.703	1.300	-28.042	-3.909	2.839	0.391	4.443	0.772	1.269	0.000	0.000	0.000	0.000
	89 S3H	5	54.397		13.267	-1.818	1.304	-29.424	-3.909	2.975	0.391	3.942	0.645	1.283	0.000	0.000	0.000	0.000
	90 QF	13	54.649		13.722	-0.051	1.307	-29.888	0.273	3.025	-0.032	3.772	0.031	1.293	0.000	0.000	0.000	0.000
END	HCDF	1	54.649		13.722	-0.051	1.307	-29.888	0.273	3.025	-0.032	3.772	0.031	1.293	0.000	0.000	0.000	0.000

TABLE IV a

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING"  
 DELTA(P)/P = -0.010000 SYMM = F ZOHREH PARSA /

"MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 PAGE 2

POS. NO.	ELEMENT SEQUENCE	DIST [M]	H O R I Z O N T A L			V E R T I C A L			DY [M]	DPY [1]				
			MUX [2PI]	X[CO] [MM]	PX[CO] [MM]	MUY [2PI]	Y[CO] [MM]							
BEGIN	HCFDO	2	54.649	13.722	0.051	1.307-29.888	0.273	3.025-0.032	3.772	0.031	1.293	0.000	0.000	0.000
91	QF	14	54.901	13.216	1.913	1.310-29.286	4.445	2.963-0.454	3.910	-0.579	1.304	0.000	0.000	0.000
92	S32H	4	58.151	4.456	0.756	1.380-14.693	4.445	1.457-0.454	11.399	-1.702	1.386	0.000	0.000	0.000
93	CT	13	58.251	4.307	0.720	1.384-14.245	4.445	1.411-0.454	11.746	-1.737	1.387	0.000	0.000	0.000
94	S3H	6	58.601	3.841	0.596	1.398-12.673	4.445	1.249-0.454	13.017	-1.858	1.392	0.000	0.000	0.000
95	QD	14	58.852	3.697	-0.022	1.409-11.770	2.680	1.155-0.280	13.487	0.033	1.395	0.000	0.000	0.000
END	HCFDO	2	58.852	3.697	-0.022	1.409-11.770	2.680	1.155-0.280	13.487	0.033	1.395	0.000	0.000	0.000
BEGIN	HCFDF	4	59.104	3.864	-0.643	1.420-11.301	1.013	1.104-0.117	12.984	1.919	1.398	0.000	0.000	0.000
96	QD	15	59.104	4.288	-0.754	1.431-10.994	1.013	1.068-0.117	11.854	1.810	1.402	0.000	0.000	0.000
97	S3	11	59.404	9.907	-1.547	1.492-10.511	-0.615	0.983-0.047	5.155	0.949	1.452	0.000	0.000	0.000
98	BEND	11	61.804	11.732	-1.738	1.500-10.853	-0.615	1.010-0.047	4.215	0.744	1.471	0.000	0.000	0.000
99	S5H	10	62.354	12.087	-1.772	1.501-10.915	-0.615	1.015-0.047	4.068	0.707	1.475	0.000	0.000	0.000
100	CT	14	62.454	12.450	-1.825	1.503-10.977	-0.623	1.019-0.049	3.928	0.675	1.479	0.000	0.000	0.000
101	SXF	4	62.554	13.394	-1.913	1.505-11.135	-0.623	1.032-0.049	3.611	0.581	1.489	0.000	0.000	0.000
102	S2H	8	62.804	13.893	-0.026	1.509-11.094	0.944	1.026-0.096	3.463	0.007	1.501	0.000	0.000	0.000
103	QF	15	63.056	13.893	-0.026	1.509-11.094	0.944	1.026-0.096	3.463	0.007	1.501	0.000	0.000	0.000
END	HCFDF	4	63.056	13.893	-0.026	1.509-11.094	0.944	1.026-0.096	3.463	0.007	1.501	0.000	0.000	0.000
BEGIN	HCFDL	2	63.056	13.893	-0.026	1.509-11.094	0.944	1.026-0.096	3.463	0.007	1.501	0.000	0.000	0.000
104	QF	16	63.308	13.419	1.865	1.512-10.657	2.478	0.983-0.238	3.604	-0.566	1.512	0.000	0.000	0.000
105	S3	12	63.608	12.320	1.764	1.515-9.906	2.478	0.910-0.238	3.981	-0.678	1.525	0.000	0.000	0.000
106	BEND	12	66.008	5.552	1.009	1.562-5.902	0.821	0.532-0.071	9.378	-1.549	1.599	0.000	0.000	0.000
107	S5H	11	66.558	4.543	0.807	1.580-5.446	0.821	0.493-0.071	11.211	-1.750	1.599	0.000	0.000	0.000
108	CT	15	66.658	4.384	0.770	1.584-5.363	0.821	0.485-0.071	11.568	-1.787	1.600	0.000	0.000	0.000
109	S3H	7	67.008	3.885	0.642	1.597-5.073	0.821	0.451-0.071	12.876	-1.915	1.605	0.000	0.000	0.000
110	QD	16	67.260	3.719	0.018	1.608-4.957	0.096	0.451-0.005	13.381	-0.045	1.608	0.000	0.000	0.000
END	HCFDL	2	67.260	3.719	0.018	1.608-4.957	0.096	0.451-0.005	13.381	-0.045	1.608	0.000	0.000	0.000
END	B4S	1	67.260	3.719	0.018	1.608-4.957	0.096	0.451-0.005	13.381	-0.045	1.608	0.000	0.000	0.000
END	RING	1	201.780	3.713	0.018	4.828-4.957	0.096	0.451-0.005	13.408	-0.045	4.819	0.000	0.000	0.000
TOTAL LENGTH =			201.780000						QX' = 4.827757	QY' = 4.818567				
ALFA									BETAX(MAX) = -0.527747	BETAY(MAX) = 0.932452				
GAMMA(TR)									DX(MAX) = 13.898436	DY(MAX) = 14.248702				
									XCO(MAX) = 3.025205	YCO(MAX) = 0.000000				
									XCO(R.M.S.) = 29.887657	YCO(R.M.S.) = 0.000000				

SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = -0.008000, SYMM = F

ITER.	X	PX	Y	PY	ERROR
1	-0.004048	0.000078	0.000000	0.000000	0.203318E-02
2	-0.004037	0.000085	0.000000	0.000000	0.277075E-04
3	-0.004037	0.000085	0.000000	0.000000	0.621002E-09

POS. NO.	ELEMENT NAME	SEQUENCE NO.	H O R I Z O N T A L			V E R T I C A L			MUY [2PI]	ALFAY [1]	BETAY [M]	DPX [1]	DX [M]	PX(CO) [.001]	Y(CO) [MM]	PY(CO) [.001]	DY [M]	DPY [1]
			MUX [2PI]	MUY [2PI]	ALFAX [1]	BETAX [M]	ALFAY [1]	BETAY [M]										
BEGIN	RING	1	0.000	3.706	0.016	0.000	-4.037	0.085	0.469	-0.007	13.418	-0.035	0.000	0.000	0.000	0.000	0.000	
BEGIN	B4S	1	33.630	3.706	0.016	0.804	-4.037	0.085	0.469	-0.007	13.423	-0.035	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	3	33.630	3.706	0.016	0.804	-4.037	0.085	0.469	-0.007	13.423	-0.035	0.000	0.000	0.000	0.000	0.000	
55	QD	9	33.882	3.853	-0.603	0.814	-4.090	-0.503	0.476	0.062	12.957	1.847	0.000	0.000	0.000	0.000	0.000	
56	S3	7	34.182	4.250	-0.710	0.826	-4.242	-0.503	0.495	0.062	11.871	1.744	0.000	0.000	0.000	0.000	0.000	
57	BEND	7	36.582	9.551	-1.465	0.888	-7.074	-1.834	0.849	0.229	5.407	0.928	0.000	0.000	0.000	0.000	0.000	
58	S5H	6	37.132	11.277	-1.647	0.897	-8.091	-1.834	0.977	0.229	4.484	0.737	0.000	0.000	0.000	0.000	0.000	
59	CT	8	37.232	11.612	-1.681	0.898	-8.276	-1.834	1.001	0.229	4.339	0.703	0.000	0.000	0.000	0.000	0.000	
60	SXF	3	37.332	11.956	-1.727	0.899	-8.461	-1.839	1.024	0.230	4.200	0.673	0.000	0.000	0.000	0.000	0.000	
61	S2H	5	37.582	12.848	-1.811	0.903	-8.925	-1.839	1.082	0.230	3.883	0.585	0.000	0.000	0.000	0.000	0.000	
62	QF	9	37.834	13.314	-0.003	0.906	-9.230	-0.559	1.121	0.075	3.742	-0.021	0.000	0.000	0.000	0.000	0.000	
63	HCDF	3	37.834	13.314	-0.003	0.906	-9.230	-0.559	1.121	0.075	3.742	-0.021	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	3	37.834	13.314	-0.003	0.906	-9.230	-0.559	1.121	0.075	3.742	-0.021	0.000	0.000	0.000	0.000	0.000	
63	QF	10	38.086	12.850	1.807	0.909	-9.207	0.741	1.200	-0.083	3.905	-0.631	0.000	0.000	0.000	0.000	0.000	
64	S3	8	38.386	11.788	1.706	0.913	-8.983	0.741	1.095	-0.083	4.320	-0.739	0.000	0.000	0.000	0.000	0.000	
65	BEND	8	40.786	5.304	0.953	0.962	-8.759	-0.556	1.091	0.080	9.947	-1.583	0.000	0.000	0.000	0.000	0.000	
66	S5H	7	41.336	4.358	0.754	0.980	-9.067	-0.556	1.136	0.080	11.811	-1.779	0.000	0.000	0.000	0.000	0.000	
67	CT	9	41.436	4.210	0.717	0.984	-9.123	-0.556	1.144	0.080	12.173	-1.814	0.000	0.000	0.000	0.000	0.000	
68	SXD	3	41.536	4.066	0.711	0.988	-9.178	-0.522	1.152	0.072	12.551	-1.943	0.000	0.000	0.000	0.000	0.000	
69	S2H	6	41.786	3.731	0.618	0.998	-9.309	-0.522	1.170	0.072	13.555	-2.039	0.000	0.000	0.000	0.000	0.000	
70	QD	10	42.037	3.572	0.014	1.009	-9.615	-1.889	1.210	0.244	14.097	-0.068	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	2	42.037	3.572	0.014	1.009	-9.615	-1.889	1.210	0.244	14.097	-0.068	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	2	42.037	3.572	0.014	1.009	-9.615	-1.889	1.210	0.244	14.097	-0.068	0.000	0.000	0.000	0.000	0.000	
71	QD	11	42.289	3.717	-0.589	1.020	-10.275	-3.326	1.295	0.425	13.623	1.912	0.000	0.000	0.000	0.000	0.000	
72	S32H	3	45.539	11.461	-1.775	1.104	-21.171	-3.326	2.697	0.425	4.762	0.792	0.000	0.000	0.000	0.000	0.000	
73	CT	10	45.639	11.822	-1.812	1.106	-21.506	-3.326	2.740	0.425	4.606	0.758	0.000	0.000	0.000	0.000	0.000	
74	S3H	4	45.989	13.146	-1.939	1.113	-23.116	-0.097	2.891	0.425	4.114	0.637	0.000	0.000	0.000	0.000	0.000	
75	QF	11	46.241	13.666	-0.088	1.113	-23.116	-0.097	2.947	0.013	3.954	0.002	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	2	46.241	13.666	-0.088	1.113	-23.116	-0.097	2.947	0.013	3.954	0.002	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	2	46.241	13.666	-0.088	1.113	-23.116	-0.097	2.947	0.013	3.954	0.002	0.000	0.000	0.000	0.000	0.000	
76	QF	12	46.493	13.233	1.776	1.116	-22.729	3.135	2.898	-0.399	4.112	-0.633	0.000	0.000	0.000	0.000	0.000	
77	S3	9	46.793	12.187	1.681	1.120	-21.781	3.135	2.776	-0.399	4.526	-0.736	0.000	0.000	0.000	0.000	0.000	
78	BEND	9	49.193	5.771	0.964	1.166	-15.656	1.927	1.995	-0.243	9.971	-1.513	0.000	0.000	0.000	0.000	0.000	
79	S5H	8	49.743	4.805	0.778	1.183	-14.598	1.927	1.860	-0.243	11.750	-1.696	0.000	0.000	0.000	0.000	0.000	
80	CT	11	49.843	4.651	0.745	1.186	-14.394	1.927	1.835	-0.243	12.095	-1.729	0.000	0.000	0.000	0.000	0.000	
81	SXD	4	49.943	4.499	0.763	1.190	-14.195	2.010	1.809	-0.264	12.461	-1.907	0.000	0.000	0.000	0.000	0.000	
82	S2H	7	50.193	4.137	0.675	1.199	-13.689	2.010	1.742	-0.264	13.446	-2.000	0.000	0.000	0.000	0.000	0.000	
83	QD	12	50.445	3.963	0.019	1.209	-13.428	0.051	1.707	-0.015	13.972	-0.046	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	4	50.445	3.963	0.019	1.209	-13.428	0.051	1.707	-0.015	13.972	-0.046	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	4	50.445	3.963	0.019	1.209	-13.428	0.051	1.707	-0.015	13.972	-0.046	0.000	0.000	0.000	0.000	0.000	
84	QD	13	50.697	4.117	-0.634	1.219	-13.663	-1.907	1.735	0.015	13.492	-0.046	0.000	0.000	0.000	0.000	0.000	
85	S3	10	50.997	4.532	-0.737	1.230	-14.239	-1.907	1.806	0.234	12.365	1.811	0.000	0.000	0.000	0.000	0.000	
86	BEND	10	53.397	9.920	-1.483	1.289	-20.329	-3.126	2.567	0.391	5.567	0.998	0.000	0.000	0.000	0.000	0.000	
87	S5H	9	53.947	11.664	-1.662	1.297	-22.062	-3.126	2.766	0.391	4.571	0.799	0.000	0.000	0.000	0.000	0.000	
88	CT	12	54.047	12.002	-1.695	1.298	-22.377	-3.126	2.825	0.391	4.413	0.763	0.000	0.000	0.000	0.000	0.000	
89	S3H	15	54.397	13.238	-1.809	1.303	-23.480	-3.126	2.965	0.391	3.520	0.636	0.000	0.000	0.000	0.000	0.000	
90	QF	13	54.649	13.688	-0.056	1.306	-23.852	0.211	3.011	-0.030	3.754	0.025	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	1	54.649	13.688	-0.056	1.306	-23.852	0.211	3.011	-0.030	3.754	0.025	0.000	0.000	0.000	0.000	0.000	

TABLE IV b

POS. NO.	ELEMENT OCC. NO.	ELEMENT SEQUENCE	DIST I [M]	I	H O R I Z O N T A L	A L F A X [1]	B E T A X [M]	M U X [2PI]	X (CO) [MM]	P X (CO) [001] [M]	D X [M]	D P X [1] I	I	B E T A Y [M]	A L F A Y [1]	M U Y [2PI]	V E R T I C A L	Y (CO) [MM]	P Y (CO) [001] [M]	D Y [M]	D P Y [1]	
BEGIN	HC F D O	2	54.649		13.688	0.056	13.688	1.306	-23.852	0.211	3.011	-0.030		3.754	0.025	1.297	0.000	0.000	0.000	0.000	0.000	0.000
91	Q F	14	54.901		13.182	1.913	13.182	1.309	-23.374	3.541	2.949	-0.450		3.894	-0.583	1.307	0.000	0.000	0.000	0.000	0.000	0.000
92	S 3 2 H	4	58.151		4.440	0.755	4.440	1.379	-11.774	3.541	1.462	-0.450		11.412	-1.712	1.389	0.000	0.000	0.000	0.000	0.000	0.000
93	C T	13	58.251		4.291	0.720	4.291	1.383	-11.417	3.541	1.417	-0.450		11.761	-1.746	1.390	0.000	0.000	0.000	0.000	0.000	0.000
94	S 3 H	16	58.601		3.828	0.595	3.828	1.397	-10.168	3.541	1.256	-0.450		13.036	-1.868	1.395	0.000	0.000	0.000	0.000	0.000	0.000
95	Q D	14	58.852		3.684	-0.021	3.684	1.408	-9.451	2.124	1.164	-0.275		13.510	0.026	1.398	0.000	0.000	0.000	0.000	0.000	0.000
END	HC F D O	2	58.852		3.684	-0.021	3.684	1.408	-9.451	2.124	1.164	-0.275		13.510	0.026	1.398	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HC D F	4	59.104		3.850	-0.640	3.850	1.418	-9.083	2.124	1.115	-0.111		13.510	0.026	1.398	0.000	0.000	0.000	0.000	0.000	0.000
96	Q D	15	59.104		4.270	-0.751	4.270	1.430	-8.845	0.785	1.081	-0.111		11.808	1.916	1.401	0.000	0.000	0.000	0.000	0.000	0.000
97	S 3	11	59.404		9.857	-1.540	9.857	1.491	-8.518	-0.514	1.011	0.053		5.205	0.950	1.405	0.000	0.000	0.000	0.000	0.000	0.000
98	B E N D	11	61.804		11.669	-1.729	11.669	1.499	-8.803	-0.514	1.046	0.053		4.265	0.747	1.473	0.000	0.000	0.000	0.000	0.000	0.000
99	S 5 H	10	62.354		12.022	-1.764	12.022	1.502	-8.907	-0.520	1.051	0.054		3.978	0.678	1.481	0.000	0.000	0.000	0.000	0.000	0.000
100	C T	14	62.454		13.813	-0.024	13.813	1.508	-9.008	0.753	1.066	-0.095		3.659	0.586	1.492	0.000	0.000	0.000	0.000	0.000	0.000
101	S X F	4	62.554		13.813	-0.024	13.813	1.508	-9.008	0.753	1.066	-0.095		3.511	0.006	1.503	0.000	0.000	0.000	0.000	0.000	0.000
102	S 2 H	8	62.804		13.342	1.856	13.342	1.511	-8.657	1.998	1.016	-0.242		3.654	-0.574	1.514	0.000	0.000	0.000	0.000	0.000	0.000
103	Q F	15	63.056		12.250	1.755	12.250	1.515	-8.053	1.998	0.943	-0.242		4.034	-0.684	1.527	0.000	0.000	0.000	0.000	0.000	0.000
END	HC D F	4	63.056		12.250	1.755	12.250	1.515	-8.053	1.998	0.943	-0.242		4.034	-0.684	1.527	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HC F D L	2	63.308		4.522	1.004	4.522	1.562	-4.814	0.675	0.556	-0.075		9.436	-1.549	1.591	0.000	0.000	0.000	0.000	0.000	0.000
104	Q F	16	63.608		5.524	1.004	5.524	1.562	-4.814	0.675	0.556	-0.075		11.265	-1.749	1.599	0.000	0.000	0.000	0.000	0.000	0.000
105	S 3	12	66.008		4.364	0.803	4.364	1.580	-4.440	0.675	0.514	-0.075		11.621	-1.786	1.601	0.000	0.000	0.000	0.000	0.000	0.000
106	B E N D	12	66.558		3.869	0.638	3.869	1.583	-4.372	0.675	0.479	-0.075		12.926	-1.913	1.605	0.000	0.000	0.000	0.000	0.000	0.000
107	S 5 H	11	67.008		3.705	0.016	3.705	1.597	-4.133	0.675	0.469	-0.007		13.427	-0.035	1.609	0.000	0.000	0.000	0.000	0.000	0.000
108	C T	15	67.260		3.705	0.016	3.705	1.608	-4.037	0.085	0.469	-0.007		13.427	-0.035	1.609	0.000	0.000	0.000	0.000	0.000	0.000
109	S 3 H	7	67.008		3.705	0.016	3.705	1.608	-4.037	0.085	0.469	-0.007		13.427	-0.035	1.609	0.000	0.000	0.000	0.000	0.000	0.000
110	Q D	16	67.260		3.705	0.016	3.705	1.608	-4.037	0.085	0.469	-0.007		13.427	-0.035	1.609	0.000	0.000	0.000	0.000	0.000	0.000
END	HC F D L	2	67.260		3.705	0.016	3.705	1.608	-4.037	0.085	0.469	-0.007		13.427	-0.035	1.609	0.000	0.000	0.000	0.000	0.000	0.000
END	B 4 S	1	67.260		3.705	0.016	3.705	1.608	-4.037	0.085	0.469	-0.007		13.427	-0.035	1.609	0.000	0.000	0.000	0.000	0.000	0.000
END	R I N G	1	201.780		3.701	0.016	3.701	4.825	-4.037	0.085	0.469	-0.007		13.444	-0.035	4.823	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL LENGTH =			201.780000																			
ALFA					Q X					4.824956				Q Y								
GAMMA (TR)					B E T A X (M A X)					-0.414831				Q Y								
					D X (M A X)					13.815980				B E T A Y (M A X)								
					X C O (M A X)					3.010862				D Y (M A X)								
					X C O (R . M . S .)					23.851559				Y C O (M A X)								
										13.378647				Y C O (R . M . S .)								

... SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = -0.006000, SYMM = F  
 ... ITER. X PX PY ERROR  
 1 -0.003087 0.000066 0.000000 0.154875E-02  
 2 -0.003082 0.000069 0.000000 0.153442E-04  
 3 -0.003082 0.000069 0.000000 0.213103E-09

TABLE IV C

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING  
 DELTA(P)/P = -0.005000 SYMM = F  
 "MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 ZOHREH PARSA /

PAGE 1

POS. NO.	ELEMENT NAME	SEQUENCE NO.	DIST I		H O R I Z O N T A L		V E R T I C A L		ALFAY [I]	BETAX [M]	DPX [I]	DX [M]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]	DY [M]	DPY [I]
			I	I	MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	Y(CO) [MM]									
BEGIN	RING	1	0.000	0.000	0.000	-3.082	0.069	0.487	-0.000	0.487	-0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	B4S	33	6.330	0.015	0.015	-3.082	0.069	0.487	-0.000	0.487	-0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	33	6.330	0.015	0.015	-3.082	0.069	0.487	-0.000	0.487	-0.000	0.000	0.000	0.000	0.000	0.000	0.000
55	QD	33	882	0.814	0.814	-3.121	-0.379	0.494	0.062	0.494	0.062	1.863	0.805	0.805	0.000	0.000	0.000
56	S3	34	182	0.826	0.826	-3.235	-0.379	0.513	0.062	0.513	0.062	1.759	0.808	0.808	0.000	0.000	0.000
57	BEND	36	582	0.888	0.888	-5.358	-1.376	0.867	0.229	0.867	0.229	0.935	0.866	0.866	0.000	0.000	0.000
58	S5H	37	132	1.248	1.248	-6.119	-1.376	0.995	0.229	0.995	0.229	0.743	0.878	0.878	0.000	0.000	0.000
59	CT	37	232	1.680	1.680	-6.258	-1.376	1.041	0.229	1.041	0.229	0.708	0.882	0.882	0.000	0.000	0.000
60	SXF	37	332	1.925	1.925	-6.396	-1.379	1.099	0.230	1.099	0.230	0.589	0.885	0.885	0.000	0.000	0.000
61	S2H	37	582	1.807	1.807	-6.743	-1.379	1.099	0.230	1.099	0.230	0.589	0.885	0.885	0.000	0.000	0.000
62	QF	37	834	0.003	0.003	-6.971	-0.412	1.138	0.072	1.138	0.072	0.016	0.906	0.906	0.000	0.000	0.000
END	HCDF	33	834	0.003	0.003	-6.971	-0.412	1.138	0.072	1.138	0.072	0.016	0.906	0.906	0.000	0.000	0.000
BEGIN	HCDF	33	834	0.003	0.003	-6.971	-0.412	1.138	0.072	1.138	0.072	0.016	0.906	0.906	0.000	0.000	0.000
63	QF	38	086	1.801	1.801	-6.971	-0.412	1.136	0.088	1.136	0.088	0.624	0.917	0.917	0.000	0.000	0.000
64	S3	38	386	1.701	1.701	-6.779	-0.570	1.109	0.088	1.109	0.088	0.731	0.929	0.929	0.000	0.000	0.000
65	BEND	40	786	0.954	0.954	-6.575	-0.401	1.093	0.075	1.093	0.075	0.577	0.989	0.989	0.000	0.000	0.000
66	S5H	41	336	0.754	0.754	-6.797	-0.401	1.135	0.075	1.135	0.075	0.772	0.997	0.997	0.000	0.000	0.000
67	CT	41	436	0.718	0.718	-6.837	-0.401	1.142	0.075	1.142	0.075	0.772	0.997	0.997	0.000	0.000	0.000
68	SXD	41	536	0.704	0.704	-6.877	-0.382	1.150	0.068	1.150	0.068	0.912	0.998	0.998	0.000	0.000	0.000
69	S2H	41	786	0.611	0.611	-6.973	-0.382	1.167	0.068	1.167	0.068	0.006	1.003	1.003	0.000	0.000	0.000
70	QD	42	037	0.008	0.008	-7.198	-1.406	1.206	0.240	1.206	0.240	0.051	1.006	1.006	0.000	0.000	0.000
END	HCDF	33	037	0.008	0.008	-7.198	-1.406	1.206	0.240	1.206	0.240	0.051	1.006	1.006	0.000	0.000	0.000
BEGIN	HCDF	33	037	0.008	0.008	-7.198	-1.406	1.206	0.240	1.206	0.240	0.051	1.006	1.006	0.000	0.000	0.000
71	QD	42	037	0.008	0.008	-7.198	-1.406	1.206	0.240	1.206	0.240	0.051	1.006	1.006	0.000	0.000	0.000
72	S32H	42	289	0.595	0.595	-7.689	-2.481	1.290	0.420	1.290	0.420	1.911	1.076	1.076	0.000	0.000	0.000
73	CT	45	539	1.785	1.785	-15.802	-2.481	2.672	0.420	2.672	0.420	0.784	1.076	1.076	0.000	0.000	0.000
74	S3H	45	639	1.822	1.822	-16.052	-2.481	2.714	0.420	2.714	0.420	0.750	1.080	1.080	0.000	0.000	0.000
75	QF	45	989	1.950	1.950	-16.925	-2.481	2.863	0.420	2.863	0.420	0.628	1.093	1.093	0.000	0.000	0.000
END	HCDF	46	241	0.091	0.091	-17.250	-0.072	2.919	0.013	2.919	0.013	0.001	1.103	1.103	0.000	0.000	0.000
BEGIN	HCDF	46	241	0.091	0.091	-17.250	-0.072	2.919	0.013	2.919	0.013	0.001	1.103	1.103	0.000	0.000	0.000
76	QF	46	493	1.780	1.780	-17.250	-0.072	2.919	0.013	2.919	0.013	0.001	1.103	1.103	0.000	0.000	0.000
77	S3	46	793	1.685	1.685	-16.962	-2.341	2.870	0.396	2.870	0.396	0.625	1.113	1.113	0.000	0.000	0.000
78	BEND	49	193	0.976	0.976	-16.255	-2.341	2.750	0.396	2.750	0.396	0.729	1.124	1.124	0.000	0.000	0.000
79	S5H	49	743	0.789	0.789	-16.685	-1.442	1.976	0.242	1.976	0.242	1.524	1.183	1.183	0.000	0.000	0.000
80	CT	182	0.887	0.755	0.755	-10.742	-1.442	1.842	0.242	1.842	0.242	1.710	1.192	1.192	0.000	0.000	0.000
81	SXD	189	0.594	0.760	0.760	-10.594	-1.488	1.817	0.242	1.817	0.242	1.744	1.193	1.193	0.000	0.000	0.000
82	S2H	196	0.220	0.672	0.672	-10.220	-1.488	1.792	0.257	1.792	0.257	1.885	1.194	1.194	0.000	0.000	0.000
83	QD	198	0.029	0.016	0.016	-10.029	-0.026	1.693	0.010	1.693	0.010	0.933	1.200	1.200	0.000	0.000	0.000
END	HCDF	198	0.029	0.016	0.016	-10.029	-0.026	1.693	0.010	1.693	0.010	0.933	1.200	1.200	0.000	0.000	0.000
BEGIN	HCDF	198	0.029	0.016	0.016	-10.029	-0.026	1.693	0.010	1.693	0.010	0.933	1.200	1.200	0.000	0.000	0.000
84	QD	208	0.207	0.637	0.637	-10.207	-1.436	1.721	0.236	1.721	0.236	1.915	1.200	1.200	0.000	0.000	0.000
85	S3	218	0.640	0.740	0.740	-10.640	-1.436	1.793	0.236	1.793	0.236	1.807	1.203	1.203	0.000	0.000	0.000
86	BEND	229	0.640	1.476	1.476	-15.208	-2.344	2.554	0.391	2.554	0.391	1.807	1.254	1.254	0.000	0.000	0.000
87	S5H	229	0.640	1.654	1.654	-16.505	-2.344	2.772	0.391	2.772	0.391	0.790	1.272	1.272	0.000	0.000	0.000
88	CT	297	0.741	1.686	1.686	-16.741	-2.344	2.811	0.391	2.811	0.391	0.758	1.276	1.276	0.000	0.000	0.000
89	S3H	302	0.566	1.799	1.799	-17.566	-2.344	2.950	0.391	2.950	0.391	0.628	1.289	1.289	0.000	0.000	0.000
90	QF	305	0.844	0.062	0.062	-17.844	-0.153	2.996	0.028	2.996	0.028	0.019	1.300	1.300	0.000	0.000	0.000
END	HCDF	305	0.844	0.062	0.062	-17.844	-0.153	2.996	0.028	2.996	0.028	0.019	1.300	1.300	0.000	0.000	0.000

TABLE IV C

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING"  
 DELTA(P)/P = -0.006000 SYMM = F  
 "MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 ZOHREH PARSA /

POS. NO.	ELEMENT SEQUENCE	ELEMENT NO.	DIST I [M]	I	H	MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	DX [M]	DPX [I]	I	BETAY [M]	ALFAY [I]	MUY [2PI]	V E R T I C A L	PY(CO) [MM]	Y(CO) [MM]	DPY [I]
BEGIN	HC F D O	2	54.649			1.305	-17.844	0.153	2.996	-0.028		3.738	0.019	1.300	0.000	0.000	0.000	0.000
91	Q F	14	54.901			1.308	-17.489	2.644	2.936	-0.447		3.880	-0.588	1.310	0.000	0.000	0.000	0.000
92	S 3 2 H	4	58.151			1.378	-8.844	2.644	1.467	-0.447		11.430	-1.721	1.392	0.000	0.000	0.000	0.000
93	C T	13	58.251			1.382	-8.578	2.644	1.422	-0.447		11.780	-1.756	1.393	0.000	0.000	0.000	0.000
94	S 3 H	6	58.601			1.396	-7.647	2.644	1.264	-0.447		13.060	-1.878	1.398	0.000	0.000	0.000	0.000
95	Q D	14	58.852			1.407	-7.114	1.578	1.173	-0.270		13.537	0.019	1.401	0.000	0.000	0.000	0.000
END	HC F D O	2	58.852			1.407	-7.114	1.578	1.173	-0.270		13.537	0.019	1.401	0.000	0.000	0.000	0.000
BEGIN	HC D F	4	58.852			1.418	-6.843	0.569	1.125	-0.104		13.041	1.913	1.404	0.000	0.000	0.000	0.000
96	Q D	15	59.104			1.429	-6.671	0.569	1.093	-0.104		11.919	1.806	1.408	0.000	0.000	0.000	0.000
97	S 3	11	61.804			1.490	-5.469	-0.402	1.038	0.059		5.256	0.951	1.457	0.000	0.000	0.000	0.000
98	B E N D	11	61.804			1.498	-6.732	-0.402	1.071	0.059		4.315	0.750	1.476	0.000	0.000	0.000	0.000
99	S 5 H	10	62.354			1.501	-6.773	-0.405	1.083	0.060		4.168	0.714	1.479	0.000	0.000	0.000	0.000
100	C T	4	62.454			1.504	-6.875	-0.405	1.098	0.060		4.027	0.681	1.483	0.000	0.000	0.000	0.000
101	S X F	4	62.554			1.507	-6.855	0.563	1.093	-0.095		3.708	0.590	1.494	0.000	0.000	0.000	0.000
102	S 2 H	8	62.804			1.507	-6.855	0.563	1.093	-0.095		3.559	0.004	1.505	0.000	0.000	0.000	0.000
103	Q F	15	63.056			1.507	-6.855	0.563	1.093	-0.095		3.559	0.004	1.505	0.000	0.000	0.000	0.000
END	HC D F	4	63.056			1.510	-6.591	0.563	1.050	-0.246		3.703	-0.581	1.516	0.000	0.000	0.000	0.000
BEGIN	HC F D L	2	63.308			1.514	-6.135	1.511	0.975	-0.246		4.087	-0.690	1.528	0.000	0.000	0.000	0.000
104	Q F	16	63.308			1.514	-6.135	1.511	0.975	-0.246		4.087	-0.690	1.528	0.000	0.000	0.000	0.000
105	S 3	12	63.608			1.561	-3.679	0.520	0.579	-0.080		9.497	-1.551	1.592	0.000	0.000	0.000	0.000
106	B E N D	12	66.008			1.561	-3.679	0.520	0.579	-0.080		9.497	-1.551	1.592	0.000	0.000	0.000	0.000
107	S 5 H	11	66.558			1.583	-3.339	0.520	0.526	-0.080		11.678	-1.785	1.602	0.000	0.000	0.000	0.000
108	C T	15	66.658			1.583	-3.339	0.520	0.526	-0.080		11.678	-1.785	1.602	0.000	0.000	0.000	0.000
109	S 3 H	7	67.008			1.596	-3.156	0.069	0.498	-0.000		12.979	-1.911	1.606	0.000	0.000	0.000	0.000
110	Q D	16	67.260			1.607	-3.082	0.069	0.487	-0.000		13.476	-0.026	1.609	0.000	0.000	0.000	0.000
END	HC F D L	2	67.260			1.607	-3.082	0.069	0.487	-0.000		13.476	-0.026	1.609	0.000	0.000	0.000	0.000
END	B 4 S	1	67.260			1.607	-3.082	0.069	0.487	-0.000		13.476	-0.026	1.609	0.000	0.000	0.000	0.000
END	R I N G	1	201.780			4.823	-3.082	0.069	0.487	-0.000		13.486	-0.026	4.826	0.000	0.000	0.000	0.000
TOTAL LENGTH =			201.780000						4.822782			QY				4.825870		
ALFA						BETAX(MAX)			-0.305524			QY				0.560531		
GAMMA(TR)						DX(MAX)			13.732558			BETAY(MAX)				13.986908		
						XCO(MAX)			2.996328			DY(MAX)				0.000000		
						XCO(R.M.S.)			17.844336			YCO(MAX)				0.000000		
									10.022115			YCO(R.M.S.)				0.000000		

SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = -0.004000, SYMM = F

ITER.	X	PX	PY	ERROR
1	-0.002092	0.000049	0.000000	0.104601E-02
2	-0.002090	0.000050	0.000000	0.669404E-05
3	-0.002090	0.000050	0.000000	0.454029E-10



POS. NO.	ELEMENT NAME	SEQUENCE ELEMENT NO.	H O R I Z O N T A L			V E R T I C A L			DY [M]	DPY [MM]				
			MUX [2PI]	X(CO) [MM]	PX(CO) [.001]	DX [M]	DPX [1]	BETAX [M]			ALFAX [1]	MUY [2PI]	Y(CO) [MM]	PY(CO) [.001]
BEGIN	RING	1	0.000	0.000	-2.090	0.050	0.505	-0.011	13.527	-0.017	0.000	0.000	0.000	0.000
BEGIN	B4S	1	33.630	3.675	0.013	0.013	0.505	-0.011	13.528	-0.017	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	33.630	3.675	0.013	0.013	0.000	0.000	13.528	-0.017	0.000	0.000	0.000	0.000
		9	33.882	3.822	-0.603	0.814	-2.116	-0.254	13.051	1.879	0.000	0.000	0.000	0.000
		7	34.182	4.218	-0.710	0.888	-2.192	-0.254	11.950	1.775	0.000	0.000	0.000	0.000
		7	36.582	9.501	-1.463	0.888	-3.605	-0.918	5.405	0.942	0.000	0.000	0.000	0.000
		6	37.132	11.217	-1.645	0.897	-4.113	-0.918	4.471	0.749	0.000	0.000	0.000	0.000
		8	37.232	11.551	-1.679	0.898	-4.205	-0.918	4.324	0.714	0.000	0.000	0.000	0.000
		3	37.332	11.892	-1.719	0.899	-4.297	-0.919	4.184	0.681	0.000	0.000	0.000	0.000
		5	37.582	12.776	-1.802	0.906	-4.679	-0.270	3.864	0.594	0.000	0.000	0.000	0.000
		9	37.834	13.238	-0.004	0.906	-4.679	-0.270	3.718	-0.011	0.000	0.000	0.000	0.000
END	HCDF	3	37.834	13.238	-0.004	0.906	-4.679	-0.270	3.718	-0.011	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	37.834	13.238	-0.004	0.906	-4.679	-0.270	3.718	-0.011	0.000	0.000	0.000	0.000
		10	38.086	12.780	1.795	0.909	-4.664	0.389	3.875	-0.616	0.000	0.000	0.000	0.000
		8	38.386	11.728	1.696	0.913	-4.546	0.389	4.278	-0.724	0.000	0.000	0.000	0.000
		8	40.786	5.286	0.954	0.962	-4.387	-0.257	9.809	-1.570	0.000	0.000	0.000	0.000
		6	41.336	4.342	0.754	0.980	-4.529	-0.257	11.651	-1.766	0.000	0.000	0.000	0.000
		7	41.436	4.195	0.718	0.984	-4.554	-0.257	12.009	-1.801	0.000	0.000	0.000	0.000
		9	41.536	4.052	0.697	0.988	-4.580	-0.248	12.379	-1.882	0.000	0.000	0.000	0.000
		3	41.786	3.726	0.605	0.998	-4.642	-0.248	13.347	-1.974	0.000	0.000	0.000	0.000
		6	42.037	3.574	0.001	1.009	-4.790	-0.930	13.862	-0.034	0.000	0.000	0.000	0.000
END	HCDF	3	42.037	3.574	0.001	1.009	-4.790	-0.930	13.862	-0.034	0.000	0.000	0.000	0.000
BEGIN	HCDF	2	42.037	3.574	0.001	1.009	-4.790	-0.930	13.862	-0.034	0.000	0.000	0.000	0.000
		11	42.289	3.724	-0.602	1.020	-5.115	-1.645	13.381	1.910	0.000	0.000	0.000	0.000
		3	45.539	11.544	-1.795	1.103	-10.484	-1.645	4.613	0.777	0.000	0.000	0.000	0.000
		10	45.639	11.908	-1.832	1.105	-10.649	-1.645	4.461	0.742	0.000	0.000	0.000	0.000
		4	45.989	13.241	-1.960	1.109	-11.227	-1.645	3.983	0.620	0.000	0.000	0.000	0.000
		11	46.241	13.767	-0.095	1.112	-11.442	-0.047	3.828	0.001	0.000	0.000	0.000	0.000
END	HCDF	4	46.241	13.767	-0.095	1.112	-11.442	-0.047	3.828	0.001	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	46.241	13.767	-0.095	1.112	-11.442	-0.047	3.828	0.001	0.000	0.000	0.000	0.000
		12	46.493	13.334	1.784	1.115	-11.251	1.553	3.982	-0.618	0.000	0.000	0.000	0.000
		9	46.793	12.288	1.689	1.119	-10.783	1.553	4.386	-0.722	0.000	0.000	0.000	0.000
		8	49.193	5.795	0.988	1.165	-7.751	0.960	9.828	-1.535	0.000	0.000	0.000	0.000
		8	49.743	4.808	0.800	1.181	-7.222	0.960	11.628	-1.724	0.000	0.000	0.000	0.000
		11	49.843	4.650	0.765	1.185	-7.125	0.960	11.978	-1.758	0.000	0.000	0.000	0.000
		4	49.943	4.498	0.757	1.188	-7.028	0.980	12.341	-1.864	0.000	0.000	0.000	0.000
		7	50.193	4.140	0.669	1.197	-6.782	0.980	12.541	-1.954	0.000	0.000	0.000	0.000
		12	50.445	3.969	0.014	1.207	-6.657	0.009	13.805	-0.022	0.000	0.000	0.000	0.000
END	HCDF	4	50.445	3.969	0.014	1.207	-6.657	0.009	13.805	-0.022	0.000	0.000	0.000	0.000
BEGIN	HCDF	1	50.445	3.969	0.014	1.207	-6.657	0.009	13.805	-0.022	0.000	0.000	0.000	0.000
		13	50.697	4.126	-0.640	1.207	-6.557	0.009	13.321	1.914	0.000	0.000	0.000	0.000
		10	50.997	4.542	-0.743	1.229	-7.067	-0.962	12.199	1.809	0.000	0.000	0.000	0.000
		10	53.397	9.908	-1.469	1.267	-10.112	-1.562	5.485	0.977	0.000	0.000	0.000	0.000
		8	53.947	11.627	-1.645	1.295	-10.975	-1.562	4.515	0.780	0.000	0.000	0.000	0.000
		12	54.047	11.960	-1.677	1.296	-11.132	-1.562	4.361	0.744	0.000	0.000	0.000	0.000
		9	54.397	13.178	-1.677	1.304	-11.681	-1.562	3.882	0.619	0.000	0.000	0.000	0.000
		15	54.649	13.619	-1.068	1.304	-11.866	-0.098	3.724	0.013	0.000	0.000	0.000	0.000
END	HCDF	1	54.649	13.619	-1.068	1.304	-11.866	-0.098	3.724	0.013	0.000	0.000	0.000	0.000

POS. NO.	ELEMENT NAME	SEQUENCE NO.	OCC.	DIST [M]	H O R I Z O N T A L			V E R T I C A L			DPY [1]				
					MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	DX [M]	DPX [1]	BETAY [M]		ALFAY [1]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]
BEGIN	HCFDO	2		54.649	1.304	-11.866	0.098	2.982	-0.026	3.724	0.013	1.303	0.000	0.000	0.000
91	QF	14		54.901	1.307	-11.631	1.755	2.922	-0.443	3.869	-0.592	1.313	0.000	0.000	0.000
92	S3ZH	4		58.151	1.377	-5.905	1.755	1.472	-0.443	11.452	-1.732	1.395	0.000	0.000	0.000
93	CT	13		58.251	1.381	-5.729	1.755	1.427	-0.443	11.803	-1.767	1.396	0.000	0.000	0.000
94	S3H	6		58.601	1.395	-5.112	1.755	1.271	-0.443	13.088	-1.889	1.401	0.000	0.000	0.000
95	QD	14		58.852	1.406	-4.760	1.042	1.181	-0.265	13.568	0.012	1.404	0.000	0.000	0.000
END	HCFDO	2		58.852	1.406	-4.760	1.042	1.181	-0.265	13.568	0.012	1.404	0.000	0.000	0.000
BEGIN	HCFD	4		59.104	1.417	-4.582	0.367	1.135	-0.098	13.568	0.012	1.404	0.000	0.000	0.000
96	QD	15		59.404	1.429	-4.472	0.367	1.106	-0.098	11.956	1.805	1.411	0.000	0.000	0.000
97	S3	11		61.804	1.489	-4.366	-0.279	1.065	0.064	5.308	0.952	1.459	0.000	0.000	0.000
98	BEND	11		62.354	1.498	-4.520	-0.279	1.107	0.064	4.366	0.754	1.478	0.000	0.000	0.000
99	S5H	10		62.454	1.499	-4.549	-0.279	1.107	0.064	4.218	0.718	1.481	0.000	0.000	0.000
100	CT	14		62.554	1.500	-4.577	-0.281	1.114	0.065	4.077	0.684	1.485	0.000	0.000	0.000
101	SXF	4		62.804	1.504	-4.647	-0.281	1.130	0.065	3.756	0.594	1.496	0.000	0.000	0.000
102	S2H	8		63.056	1.507	-4.635	0.374	1.126	-0.094	3.607	0.003	1.507	0.000	0.000	0.000
103	QF	15		63.056	1.507	-4.635	0.374	1.126	-0.094	3.607	0.003	1.507	0.000	0.000	0.000
END	HCFD	4		63.056	1.507	-4.635	0.374	1.126	-0.094	3.607	0.003	1.507	0.000	0.000	0.000
BEGIN	HCFDL	2		63.308	1.507	-4.635	0.374	1.126	-0.094	3.607	0.003	1.507	0.000	0.000	0.000
104	QF	16		63.608	1.513	-4.459	1.015	1.082	-0.250	3.753	-0.588	1.518	0.000	0.000	0.000
105	S3	12		66.008	1.561	-2.498	0.356	0.602	-0.084	9.558	-1.552	1.592	0.000	0.000	0.000
106	BEND	12		66.558	1.579	-2.302	0.356	0.555	-0.084	11.382	-1.749	1.601	0.000	0.000	0.000
107	S5H	11		66.658	1.582	-2.266	0.356	0.547	-0.084	11.737	-1.785	1.602	0.000	0.000	0.000
108	CT	15		67.008	1.596	-2.141	0.356	0.517	-0.084	13.035	-1.911	1.607	0.000	0.000	0.000
109	S3H	7		67.260	1.607	-2.090	0.050	0.505	-0.011	13.529	-0.017	1.610	0.000	0.000	0.000
110	QD	16		67.260	1.607	-2.090	0.050	0.505	-0.011	13.529	-0.017	1.610	0.000	0.000	0.000
END	HCFDL	2		67.260	1.607	-2.090	0.050	0.505	-0.011	13.529	-0.017	1.610	0.000	0.000	0.000
END	B4S	1		201.780	4.821	-2.090	0.050	0.505	-0.011	13.533	-0.017	4.828	0.000	0.000	0.000
END	RING	1		201.780	4.821	-2.090	0.050	0.505	-0.011	13.533	-0.017	4.828	0.000	0.000	0.000
TOTAL LENGTH =				201.780000	QX			4.821234	QY			4.828163			
ALFA				0.412897E-01	QX'			-0.199795	QY'			0.373762			
GAMMA(TR)				4.921294	BETAX(MAX)			13.767548	BETAY(MAX)			13.865950			
					DX(MAX)			2.981590	DY(MAX)			0.000000			
					XCO(MAX)			11.866382	YCO(MAX)			0.000000			
					XCO(R.M.S.)			6.673468	YCO(R.M.S.)			0.000000			

... SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = -0.002000, SYMM = F  
 ... ITER: X PX PY ERROR  
 ... 1 -0.001063 0.000027 0.000000 0.528537E-03  
 ... 2 -0.001063 0.000027 0.000000 0.163783E-05  
 ... 3 -0.001063 0.000027 0.000000 0.3004682E-11

TABLE IV

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING"  
 DELTA(P)/P = -0.002000 SYMM = F

"MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 ZOHREH PARSA /

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POS. NO.	ELEMENT NAME	ELEMENT OCC. NO.	ELEMENT SEQUENCE			H O R I Z O N T A L			V E R T I C A L			DPY [I]			
			DIST [M]	BETAX [M]	ALFAX [I]	MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	DX [M]	DPX [I]	BETAY [M]		ALFAY [I]	MUY [2PI]	Y(CO) [MM]
BEGIN	RING	1	0.000	3.659	0.011	0.000	-1.063	0.027	0.523	-0.013	13.584	-0.008	0.000	0.000	0.000
BEGIN	B4S	1	33.630	3.659	0.011	0.803	-1.063	0.027	0.523	-0.013	13.585	-0.008	0.805	0.000	0.000
BEGIN	HCDF	3	33.630	3.659	0.011	0.803	-1.063	0.027	0.523	-0.013	13.585	-0.008	0.805	0.000	0.000
55	GD	9	33.882	3.806	-0.602	0.814	-1.075	-0.127	0.529	0.063	13.102	1.895	0.808	0.000	0.000
56	S3	7	34.182	4.201	-0.710	0.826	-1.113	-0.127	0.548	0.063	11.995	1.790	0.82	0.000	0.000
57	BEND	7	36.582	9.474	-1.462	0.888	-1.820	-0.459	0.902	0.229	5.407	0.949	0.868	0.000	0.000
58	S5H	6	37.132	11.186	-1.644	0.897	-2.073	-0.459	1.028	0.229	4.468	0.755	0.878	0.000	0.000
59	CT	8	37.232	11.519	-1.678	0.898	-2.119	-0.459	1.051	0.229	4.320	0.720	0.882	0.000	0.000
60	SXF	3	37.332	11.859	-1.714	0.899	-2.165	-0.459	1.074	0.230	4.179	0.686	0.885	0.000	0.000
61	S2H	5	37.582	12.739	-1.797	0.903	-2.280	-0.459	1.132	0.230	3.858	0.598	0.895	0.000	0.000
62	GF	9	37.834	13.199	-0.004	0.906	-2.355	-0.132	1.170	0.067	3.710	-0.005	0.906	0.000	0.000
END	HCDF	3	37.834	13.199	-0.004	0.906	-2.355	-0.132	1.170	0.067	3.710	-0.005	0.906	0.000	0.000
BEGIN	HCDF	3	37.834	13.199	-0.004	0.906	-2.355	-0.132	1.170	0.067	3.710	-0.005	0.906	0.000	0.000
63	GF	10	38.086	12.743	1.790	0.909	-2.346	-0.199	1.166	-0.097	3.863	-0.609	0.917	0.000	0.000
64	S3	8	38.386	11.697	1.690	0.913	-2.287	0.199	1.137	-0.097	4.261	-0.716	0.928	0.000	0.000
65	BEND	8	40.786	5.276	0.954	0.962	-2.195	-0.123	1.097	0.064	9.746	-1.564	0.989	0.000	0.000
66	S5H	7	41.336	4.334	0.755	0.980	-2.263	0.123	1.132	0.064	11.578	-1.759	0.997	0.000	0.000
67	CT	9	41.436	4.187	0.718	0.984	-2.275	-0.123	1.135	0.064	11.934	-1.794	0.999	0.000	0.000
68	SXD	3	41.536	4.045	0.690	0.988	-2.287	-0.121	1.145	0.062	12.299	-1.853	1.000	0.000	0.000
69	S2H	6	41.786	3.723	0.598	0.998	-2.318	-0.121	1.161	0.062	13.250	-1.943	1.003	0.000	0.000
70	GD	10	42.037	3.575	-0.005	1.009	-2.391	-0.461	1.198	0.232	13.751	-0.017	1.006	0.000	0.000
END	HCDF	2	42.037	3.575	-0.005	1.009	-2.391	-0.461	1.198	0.232	13.751	-0.017	1.006	0.000	0.000
BEGIN	HCDF	2	42.037	3.575	-0.005	1.009	-2.391	-0.461	1.198	0.232	13.751	-0.017	1.006	0.000	0.000
71	GD	11	42.289	3.728	-0.608	1.020	-2.552	-0.818	1.279	0.411	13.267	-1.911	1.009	0.000	0.000
72	S2H	3	45.539	11.586	-1.805	1.103	-5.216	-0.818	2.621	0.411	4.540	0.769	1.078	0.000	0.000
73	CT	10	45.639	11.951	-1.841	1.104	-5.298	-0.818	2.662	0.411	4.389	0.734	1.082	0.000	0.000
74	S3H	4	45.989	13.288	-1.971	1.109	-5.585	-0.818	2.807	0.411	3.918	0.611	1.095	0.000	0.000
75	GF	11	46.241	13.816	-0.099	1.112	-5.692	-0.023	2.860	0.012	3.765	0.000	1.106	0.000	0.000
END	HCDF	2	46.241	13.816	-0.099	1.112	-5.692	-0.023	2.860	0.012	3.765	0.000	1.106	0.000	0.000
BEGIN	HCDF	2	46.241	13.816	-0.099	1.112	-5.692	-0.023	2.860	0.012	3.765	0.000	1.106	0.000	0.000
76	GF	12	46.493	13.385	1.787	1.115	-5.597	0.773	2.813	-0.388	3.917	-0.610	1.116	0.000	0.000
77	S3	9	46.793	12.339	1.693	1.118	-5.364	0.773	2.696	-0.388	4.316	-0.716	1.128	0.000	0.000
78	BEND	9	49.193	5.807	1.000	1.164	-3.857	0.479	1.938	-0.240	9.757	-1.547	1.188	0.000	0.000
79	S5H	8	49.743	4.810	0.810	1.181	-3.593	0.479	1.805	-0.240	11.568	-1.738	1.196	0.000	0.000
80	CT	11	49.843	4.651	0.776	1.184	-3.545	0.479	1.781	-0.240	11.919	-1.773	1.198	0.000	0.000
81	SXD	4	49.943	4.497	0.754	1.187	-3.497	0.484	1.757	-0.240	1.199	-1.843	1.199	0.000	0.000
82	S2H	7	50.193	4.141	0.667	1.197	-3.375	0.484	1.696	-0.245	12.282	-1.933	1.202	0.000	0.000
83	GD	12	50.445	3.972	0.011	1.207	-3.314	0.000	1.664	-0.002	13.724	-0.010	1.205	0.000	0.000
END	HCDF	4	50.445	3.972	0.011	1.207	-3.314	0.000	1.664	-0.002	13.724	-0.010	1.205	0.000	0.000
BEGIN	HCDF	4	50.445	3.972	0.011	1.207	-3.314	0.000	1.664	-0.002	13.724	-0.010	1.205	0.000	0.000
84	GD	13	50.697	4.130	-0.643	1.217	-3.375	-0.483	1.664	0.240	13.238	-1.913	1.208	0.000	0.000
85	S3	10	50.997	4.548	-0.746	1.228	-3.520	-0.483	1.767	0.240	12.119	-1.807	1.212	0.000	0.000
86	BEND	10	53.397	9.901	-1.461	1.286	-5.043	-0.781	2.528	0.391	5.447	0.967	1.260	0.000	0.000
87	S5H	9	53.947	11.608	-1.636	1.294	-5.473	-0.781	2.744	0.391	4.490	0.771	1.278	0.000	0.000
88	CT	12	54.047	11.939	-1.667	1.295	-5.551	-0.781	2.783	0.391	4.339	0.735	1.281	0.000	0.000
89	S3H	5	54.397	13.147	-1.778	1.300	-5.825	-0.781	2.920	0.391	3.867	0.611	1.295	0.000	0.000
90	GF	13	54.649	13.583	0.073	1.303	-5.918	0.047	2.967	-0.025	3.713	0.006	1.305	0.000	0.000
END	HCDF	1	54.649	13.583	0.073	1.303	-5.918	0.047	2.967	-0.025	3.713	0.006	1.305	0.000	0.000

TABLE IV e

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING"  
 DELTA(P)/P = -0.002000 SYMM = F  
 "MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 ZOHREH PARSA /

POS. NO.	ELEMENT NAME	OCC. NO.	ELEMENT SEQUENCE		H O R I Z O N T A L		V E R T I C A L		MUY [2PI]	ALFAY [I]	BETAY [M]	DPX [I]	DX [M]	PX(CO) [MM]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]	DY [M]	DPY [I]
			DIST [M]	I	MUX [2PI]	X(CO) [MM]	MUX [2PI]	X(CO) [MM]											
BEGIN	HC FDO	2	54.649	13.583	0.073	1.303	-5.918	0.047	2.967	-0.025	3.713	0.006	0.006	0.000	0.000	0.000	0.000	0.000	0.000
91	QF	14	54.901	13.075	1.915	1.306	-5.802	0.874	2.908	-0.439	3.860	-0.597	1.316	0.000	0.000	0.000	0.000	0.000	0.000
92	S32H	4	58.151	4.389	0.753	1.376	-2.957	0.874	1.476	-0.439	11.478	-1.742	1.398	0.000	0.000	0.000	0.000	0.000	0.000
93	CT	13	58.251	4.242	0.717	1.380	-2.869	0.874	1.432	-0.439	11.830	-1.777	1.399	0.000	0.000	0.000	0.000	0.000	0.000
94	S3H	6	58.601	3.783	0.592	1.394	-2.563	0.874	1.278	-0.439	13.120	-1.900	1.403	0.000	0.000	0.000	0.000	0.000	0.000
95	QD	14	58.852	3.640	-0.019	1.405	-2.388	0.516	1.190	-0.260	13.604	0.006	1.406	0.000	0.000	0.000	0.000	0.000	0.000
END	HC FDO	2	58.852	3.640	-0.019	1.405	-2.388	0.516	1.190	-0.260	13.604	0.006	1.406	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	58.852	3.640	-0.019	1.405	-2.388	0.516	1.190	-0.260	13.604	0.006	1.406	0.000	0.000	0.000	0.000	0.000	0.000
96	QD	15	59.104	3.802	-0.631	1.416	-2.301	0.177	1.146	-0.092	13.114	1.911	1.413	0.000	0.000	0.000	0.000	0.000	0.000
97	S3	11	59.404	4.215	-0.742	1.428	-2.248	0.177	1.180	-0.092	11.997	1.805	1.413	0.000	0.000	0.000	0.000	0.000	0.000
98	BEND	11	61.804	9.699	-1.517	1.489	-2.210	-0.145	1.092	0.070	5.360	0.954	1.462	0.000	0.000	0.000	0.000	0.000	0.000
99	S5H	10	62.354	11.474	-1.704	1.497	-2.290	-0.145	1.130	0.070	4.416	0.758	1.480	0.000	0.000	0.000	0.000	0.000	0.000
100	CT	14	62.454	11.819	-1.738	1.499	-2.304	-0.145	1.137	0.070	4.268	0.722	1.483	0.000	0.000	0.000	0.000	0.000	0.000
101	SXF	4	62.554	12.171	-1.776	1.500	-2.319	-0.146	1.144	0.070	4.127	0.688	1.487	0.000	0.000	0.000	0.000	0.000	0.000
102	S2H	8	62.804	13.082	-1.862	1.503	-2.355	-0.146	1.162	0.070	3.805	0.598	1.497	0.000	0.000	0.000	0.000	0.000	0.000
103	QF	15	63.056	13.563	-0.019	1.506	-2.350	0.186	1.159	-0.093	3.655	0.001	1.508	0.000	0.000	0.000	0.000	0.000	0.000
END	HCDF	4	63.056	13.563	-0.019	1.506	-2.350	0.186	1.159	-0.093	3.655	0.001	1.508	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDFL	2	63.056	13.563	-0.019	1.506	-2.350	0.186	1.159	-0.093	3.655	0.001	1.508	0.000	0.000	0.000	0.000	0.000	0.000
104	QF	16	63.308	13.101	1.826	1.509	-2.262	0.511	1.115	-0.254	3.803	-0.595	1.519	0.000	0.000	0.000	0.000	0.000	0.000
105	S3	12	63.608	12.033	1.727	1.513	-2.108	0.511	1.038	-0.254	4.194	-0.702	1.531	0.000	0.000	0.000	0.000	0.000	0.000
106	BEND	12	66.008	5.436	0.991	1.561	-1.272	0.183	0.625	-0.089	9.622	-1.555	1.593	0.000	0.000	0.000	0.000	0.000	0.000
107	S5H	11	66.558	4.455	0.790	1.578	-1.171	0.183	0.576	-0.089	11.444	-1.751	1.601	0.000	0.000	0.000	0.000	0.000	0.000
108	CT	15	66.558	4.301	0.753	1.582	-1.153	0.183	0.567	-0.089	11.798	-1.786	1.602	0.000	0.000	0.000	0.000	0.000	0.000
109	S3H	7	67.008	3.817	0.625	1.596	-1.089	0.183	0.535	-0.089	13.094	-1.911	1.607	0.000	0.000	0.000	0.000	0.000	0.000
110	QD	15	67.250	3.658	0.011	1.607	-1.063	0.027	0.523	-0.013	13.585	-0.008	1.610	0.000	0.000	0.000	0.000	0.000	0.000
END	HCDFL	2	67.250	3.658	0.011	1.607	-1.063	0.027	0.523	-0.013	13.585	-0.008	1.610	0.000	0.000	0.000	0.000	0.000	0.000
END	B4S	1	67.260	3.658	0.011	1.607	-1.063	0.027	0.523	-0.013	13.585	-0.008	1.610	0.000	0.000	0.000	0.000	0.000	0.000
END	RING	1	201.780	3.658	0.011	4.820	-1.063	0.027	0.523	-0.013	13.586	-0.008	4.830	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL LENGTH			201.780000						4.820307		QV					4.829541			
ALFA									-0.097612		QV					0.186378			
GAMMA( TR )									13.816597		BETAY(MAX)					13.751647			
									2.966634		DY(MAX)					0.000000			
									5.918122		YCO(MAX)					0.000000			
									3.332744		YCO(R.M.S.)					0.000000			

... SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = 0.000000, SYMM = F  
 ... ITER. X 0.000000 PX 0.000000 PY 0.000000 ERROR 0.288847E-19  
 ... Y 0.000000

TABLE IV f

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING  
 DELTA(P)/P = 0.000000 SYMM = F  
 "MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 PAGE 1

POS. NO.	ELEMENT NAME	SEQUENCE NO.	H O R I Z O N T A L			V E R T I C A L			DY [M]	DPY [I]							
			DIST [M]	BETAX [M]	ALFAX [I]	MUX [I]	X(CO) [MM]	PX(CO) [I]			DX [M]	DPX [I]	MUY [I]	Y(CO) [MM]	PY(CO) [I]		
BEGIN	RING	1	0.000	3.642	0.009	0.000	0.000	0.540	0.015	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	B4S	1	33.630	3.642	0.009	0.000	0.000	0.540	0.015	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	33.630	3.642	0.009	0.000	0.000	0.540	0.015	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
55	QD	9	33.882	3.789	-0.602	0.000	0.000	0.546	0.064	13.157	1.912	0.000	0.000	0.000	0.000	0.000	0.000
56	S3	7	34.182	4.183	-0.710	0.000	0.000	0.565	0.064	12.041	1.806	0.000	0.000	0.000	0.000	0.000	0.000
57	BEND	7	36.582	9.447	-1.461	0.000	0.000	0.918	0.229	5.413	0.956	0.000	0.000	0.000	0.000	0.000	0.000
58	S5H	6	37.132	11.154	-1.643	0.000	0.000	1.045	0.229	4.467	0.762	0.000	0.000	0.000	0.000	0.000	0.000
59	CT	8	37.232	11.486	-1.676	0.000	0.000	1.068	0.229	4.319	0.727	0.000	0.000	0.000	0.000	0.000	0.000
60	SXF	3	37.332	11.825	-1.710	0.000	0.000	1.090	0.229	4.177	0.691	0.000	0.000	0.000	0.000	0.000	0.000
61	S2H	5	37.582	12.700	-1.793	0.000	0.000	1.148	0.229	3.853	0.603	0.000	0.000	0.000	0.000	0.000	0.000
62	QF	9	37.834	13.158	-0.005	0.000	0.000	1.185	0.065	3.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	37.834	13.158	-0.005	0.000	0.000	1.185	0.065	3.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	37.834	13.158	-0.005	0.000	0.000	1.185	0.065	3.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000
63	QF	10	38.086	12.705	1.783	0.000	0.000	1.180	0.102	3.853	-0.603	0.000	0.000	0.000	0.000	0.000	0.000
64	S3	8	38.386	11.665	1.685	0.000	0.000	1.150	0.102	4.247	-0.709	0.000	0.000	0.000	0.000	0.000	0.000
65	BEND	8	40.786	5.266	0.954	0.000	0.000	1.098	0.059	9.687	-1.558	0.000	0.000	0.000	0.000	0.000	0.000
66	S5H	7	41.336	4.326	0.755	0.000	0.000	1.131	0.059	11.508	-1.752	0.000	0.000	0.000	0.000	0.000	0.000
67	CT	9	41.436	4.178	0.719	0.000	0.000	1.136	0.059	11.862	-1.788	0.000	0.000	0.000	0.000	0.000	0.000
68	SXD	3	41.536	4.038	0.682	0.000	0.000	1.142	0.059	12.223	-1.823	0.000	0.000	0.000	0.000	0.000	0.000
69	S2H	6	41.786	3.720	0.592	0.000	0.000	1.157	0.059	13.157	-1.912	0.000	0.000	0.000	0.000	0.000	0.000
70	QD	10	42.037	3.575	-0.011	0.000	0.000	1.193	0.229	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	2	42.037	3.575	-0.011	0.000	0.000	1.193	0.229	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	2	42.037	3.575	-0.011	0.000	0.000	1.193	0.229	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
71	QD	11	42.289	3.731	-0.011	0.000	0.000	1.193	0.407	13.157	1.912	0.000	0.000	0.000	0.000	0.000	0.000
72	S32H	3	45.539	11.627	-1.815	0.000	0.000	2.595	0.407	4.467	0.762	0.000	0.000	0.000	0.000	0.000	0.000
73	CT	10	45.639	11.993	-1.981	0.000	0.000	2.636	0.407	4.319	0.727	0.000	0.000	0.000	0.000	0.000	0.000
74	S3H	4	45.989	13.335	-1.952	0.000	0.000	2.778	0.407	3.853	0.603	0.000	0.000	0.000	0.000	0.000	0.000
75	QF	11	46.241	13.866	-0.102	0.000	0.000	2.831	0.011	3.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	2	46.241	13.866	-0.102	0.000	0.000	2.831	0.011	3.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	2	46.241	13.866	-0.102	0.000	0.000	2.831	0.011	3.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000
76	QF	12	46.493	13.435	1.791	0.000	0.000	2.784	0.385	3.853	-0.603	0.000	0.000	0.000	0.000	0.000	0.000
77	S3	9	46.793	12.389	1.697	0.000	0.000	2.669	0.385	4.247	-0.709	0.000	0.000	0.000	0.000	0.000	0.000
78	BEND	9	49.193	5.820	1.012	0.000	0.000	1.919	0.239	9.687	-1.558	0.000	0.000	0.000	0.000	0.000	0.000
79	S5H	8	49.743	4.812	0.821	0.000	0.000	1.787	0.239	11.508	-1.752	0.000	0.000	0.000	0.000	0.000	0.000
80	CT	11	49.843	4.651	0.786	0.000	0.000	1.763	0.239	11.862	-1.788	0.000	0.000	0.000	0.000	0.000	0.000
81	SXD	4	49.943	4.498	0.751	0.000	0.000	1.740	0.239	12.223	-1.823	0.000	0.000	0.000	0.000	0.000	0.000
82	S2H	7	50.193	4.144	0.664	0.000	0.000	1.680	0.239	13.157	-1.912	0.000	0.000	0.000	0.000	0.000	0.000
83	QD	12	50.445	3.976	0.008	0.000	0.000	1.650	0.002	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	50.445	3.976	0.008	0.000	0.000	1.650	0.002	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	50.445	3.976	0.008	0.000	0.000	1.650	0.002	13.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	QD	13	50.697	4.135	-0.008	0.000	0.000	1.681	0.242	13.157	1.912	0.000	0.000	0.000	0.000	0.000	0.000
85	S3	10	50.997	4.553	-0.749	0.000	0.000	1.754	0.242	12.041	1.806	0.000	0.000	0.000	0.000	0.000	0.000
86	BEND	10	53.397	9.894	-1.453	0.000	0.000	2.519	0.390	5.413	0.956	0.000	0.000	0.000	0.000	0.000	0.000
87	S5H	9	53.947	11.588	-1.627	0.000	0.000	2.729	0.390	4.467	0.762	0.000	0.000	0.000	0.000	0.000	0.000
88	CT	12	54.047	11.916	-1.658	0.000	0.000	2.768	0.390	4.319	0.727	0.000	0.000	0.000	0.000	0.000	0.000
89	S3H	5	54.397	13.115	-1.768	0.000	0.000	2.905	0.390	3.853	0.603	0.000	0.000	0.000	0.000	0.000	0.000
90	QF	13	54.649	13.546	0.079	0.000	0.000	2.951	0.023	3.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	1	54.649	13.546	0.079	0.000	0.000	2.951	0.023	3.703	0.000	0.000	0.000	0.000	0.000	0.000	0.000

TABLE IV f

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING"  
 DELTA(P)/P = 0.000000 SYMM = F  
 "MAD" VERSION: 6.01/03 ZOHREH PARSA /  
 RUN: 19-NOV-8 08:07:18  
 PAGE 2

POS. NO.	ELEMENT NAME	SEQUENCE NO.	DIST I [M]	DIST I [M]	BETAX [M]	ALFAX [1]	H Q R I Z O N T A L MUX [2PI]	X(CO) [MM]	PX(CO) [1.001]	DX [M]	DPX [1]	I I I	BETAY [M]	ALFAY [1]	MUY [2PI]	V E R T I C A L Y(CO) [MM]	PY(CO) [1.001]	DY [M]	DPY [1]
BEGIN	HCFDO	2	54.649	13.546	0.079	1.302	0.000	0.000	0.000	2.951	-0.023		3.703	0.000	1.308	0.000	0.000	0.000	0.000
91	QF	14	54.901	13.038	1.915	1.305	0.000	0.000	0.000	2.894	-0.435		3.853	-0.603	1.319	0.000	0.000	0.000	0.000
92	S32H	4	58.151	4.371	0.752	1.376	0.000	0.000	0.000	1.481	-0.435		11.508	-1.752	1.400	0.000	0.000	0.000	0.000
93	CT	13	58.251	4.224	0.716	1.379	0.000	0.000	0.000	1.437	-0.435		11.862	-1.788	1.401	0.000	0.000	0.000	0.000
94	S3H	6	58.601	3.767	0.590	1.393	0.000	0.000	0.000	1.285	-0.435		13.157	-1.912	1.406	0.000	0.000	0.000	0.000
95	QD	14	58.852	3.624	-0.018	1.404	0.000	0.000	0.000	1.198	-0.255		13.644	0.000	1.409	0.000	0.000	0.000	0.000
END	HCFDO	2	58.852	3.624	-0.018	1.404	0.000	0.000	0.000	1.198	-0.255		13.644	0.000	1.409	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	58.852	3.624	-0.018	1.404	0.000	0.000	0.000	1.198	-0.255		13.644	0.000	1.409	0.000	0.000	0.000	0.000
96	QD	15	59.104	3.785	-0.628	1.415	0.000	0.000	0.000	1.156	-0.085		13.157	1.912	1.412	0.000	0.000	0.000	0.000
97	S3	11	59.404	4.195	-0.739	1.427	0.000	0.000	0.000	1.130	-0.085		12.041	1.806	1.416	0.000	0.000	0.000	0.000
98	BEND	11	61.804	9.644	-1.509	1.488	0.000	0.000	0.000	1.118	0.075		5.413	0.956	1.464	0.000	0.000	0.000	0.000
99	S5H	10	62.354	11.407	-1.695	1.497	0.000	0.000	0.000	1.159	-0.075		4.467	0.762	1.481	0.000	0.000	0.000	0.000
100	CT	14	62.454	11.749	-1.729	1.498	0.000	0.000	0.000	1.167	0.075		4.319	0.727	1.485	0.000	0.000	0.000	0.000
101	SXF	4	62.554	12.098	-1.763	1.499	0.000	0.000	0.000	1.175	0.075		4.177	0.691	1.489	0.000	0.000	0.000	0.000
102	S2H	8	62.804	13.001	-1.848	1.503	0.000	0.000	0.000	1.193	0.075		3.853	0.603	1.499	0.000	0.000	0.000	0.000
103	GF	15	63.056	13.477	-0.017	1.506	0.000	0.000	0.000	1.191	-0.093		3.703	0.000	1.509	0.000	0.000	0.000	0.000
END	HCDF	4	63.056	13.477	-0.017	1.506	0.000	0.000	0.000	1.191	-0.093		3.703	0.000	1.509	0.000	0.000	0.000	0.000
BEGIN	HCDFL	2	63.056	13.477	-0.017	1.506	0.000	0.000	0.000	1.191	-0.093		3.703	0.000	1.509	0.000	0.000	0.000	0.000
104	QF	16	63.308	13.018	1.816	1.509	0.000	0.000	0.000	1.147	-0.258		3.853	-0.603	1.520	0.000	0.000	0.000	0.000
105	S3	12	63.608	11.959	1.717	1.512	0.000	0.000	0.000	1.070	-0.258		4.247	-0.709	1.532	0.000	0.000	0.000	0.000
106	BEND	12	66.008	5.405	0.986	1.560	0.000	0.000	0.000	0.647	-0.094		9.687	-1.558	1.593	0.000	0.000	0.000	0.000
107	S5H	11	66.558	4.431	0.785	1.578	0.000	0.000	0.000	0.596	-0.094		11.508	-1.752	1.601	0.000	0.000	0.000	0.000
108	CT	15	66.658	4.278	0.749	1.582	0.000	0.000	0.000	0.586	-0.094		11.862	-1.788	1.603	0.000	0.000	0.000	0.000
109	S3H	7	67.008	3.798	0.621	1.596	0.000	0.000	0.000	0.554	-0.094		13.157	-1.912	1.607	0.000	0.000	0.000	0.000
110	QD	16	67.260	3.642	0.009	1.607	0.000	0.000	0.000	0.540	-0.015		13.644	0.000	1.610	0.000	0.000	0.000	0.000
END	HCDFL	2	67.260	3.642	0.009	1.607	0.000	0.000	0.000	0.540	-0.015		13.644	0.000	1.610	0.000	0.000	0.000	0.000
END	B4S	1	67.260	3.642	0.009	1.607	0.000	0.000	0.000	0.540	-0.015		13.644	0.000	1.610	0.000	0.000	0.000	0.000
END	RING	1	201.780	3.642	0.009	4.820	0.000	0.000	0.000	0.540	-0.015		13.644	0.000	4.830	0.000	0.000	0.000	0.000
TOTAL LENGTH																			
ALFA																			
GAMMA(1R)																			

... SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = 0.002000, SYMM = F  
 ... ITER. X PX PY ERROR  
 ... 1 0.001097 -0.000032 0.000000 0.535866E-03  
 ... 2 0.001097 -0.000031 0.000000 0.155487E-05  
 ... 3 0.001097 -0.000031 0.000000 0.347445E-11

TABLE IV 9

POS. NO.	ELEMENT OCC. NO.	ELEMENT SEQUENCE NAME	H O R I Z O N T A L			V E R T I C A L			DPY [I]						
			DIST I [M]	BETAX [M]	ALFAX [I]	MUX [2PI]	X(CO) [MM]	PX(CO) [MM]		DPX [I]	BETAY [M]	ALFAY [I]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]
BEGIN	1	RING	0.000	3.624	0.007	0.000	1.097	-0.031	0.557	-0.017	13.706	0.008	0.000	0.000	0.000
BEGIN	3	B4S	33.630	3.624	0.007	0.803	1.097	-0.031	0.557	-0.017	13.706	0.008	0.000	0.000	0.000
BEGIN	3	HCDF	33.630	3.624	0.007	0.803	1.097	-0.031	0.557	-0.017	13.706	0.008	0.000	0.000	0.000
	55	QD	33.882	3.722	-0.602	0.814	1.110	0.128	0.563	0.064	13.213	1.928	0.000	0.000	0.000
	56	S3	34.182	4.165	-0.710	0.826	1.148	0.128	0.583	0.064	12.091	1.821	0.000	0.000	0.000
	57	BEND	36.582	9.419	-1.460	0.888	1.853	0.459	0.935	0.229	5.420	0.964	0.000	0.000	0.000
	58	S5H	37.132	11.121	-1.642	0.897	2.105	0.459	1.060	0.229	4.469	0.769	0.000	0.000	0.000
	59	CT	37.232	11.452	-1.675	0.898	2.151	0.459	1.083	0.229	4.319	0.733	0.000	0.000	0.000
	60	SXF	37.332	11.790	-1.705	0.903	2.197	0.459	1.106	0.229	4.177	0.696	0.000	0.000	0.000
	61	S2H	37.582	12.661	-1.788	0.906	2.311	0.459	1.163	0.229	3.851	0.608	0.000	0.000	0.000
	62	QF	37.834	13.117	-0.006	0.906	2.385	0.127	1.200	0.062	3.699	0.005	0.000	0.000	0.000
END	3	HCDF	37.834	13.117	-0.006	0.906	2.385	0.127	1.200	0.062	3.699	0.005	0.000	0.000	0.000
BEGIN	3	HCDF	37.834	13.117	-0.006	0.906	2.385	0.127	1.200	0.062	3.699	0.005	0.000	0.000	0.000
	63	QF	38.086	12.667	1.777	0.909	2.375	-0.208	1.194	-0.106	3.846	-0.596	0.000	0.000	0.000
	64	S3	38.386	11.632	1.679	0.913	2.313	-0.208	1.163	-0.106	4.235	-0.702	0.000	0.000	0.000
	65	BEND	40.786	5.255	0.954	0.962	2.198	0.112	1.099	0.054	9.632	-1.552	0.000	0.000	0.000
	66	S5H	41.336	4.317	0.755	0.981	2.259	0.112	1.129	0.054	11.442	-1.746	0.000	0.000	0.000
	67	CT	41.436	4.170	0.719	0.984	2.271	0.112	1.134	0.054	11.794	-1.781	0.000	0.000	0.000
	68	SXD	41.536	4.031	0.675	0.988	2.282	0.115	1.140	0.056	12.151	-1.794	0.000	0.000	0.000
	69	S2H	41.786	3.717	0.585	0.999	2.310	0.115	1.153	0.056	13.068	-1.881	0.000	0.000	0.000
	70	QD	42.037	3.576	-0.017	1.010	2.382	0.454	1.188	0.225	13.542	0.017	0.000	0.000	0.000
END	3	HCDF	42.037	3.576	-0.017	1.010	2.382	0.454	1.188	0.225	13.542	0.017	0.000	0.000	0.000
BEGIN	2	HCDF	42.037	3.576	-0.017	1.010	2.382	0.454	1.188	0.225	13.542	0.017	0.000	0.000	0.000
	71	QD	42.289	3.734	-0.621	1.021	2.540	0.809	1.267	0.402	13.051	1.913	0.000	0.000	0.000
	72	S32H	45.539	11.667	-1.825	1.102	5.164	0.809	2.569	0.402	4.396	0.755	0.000	0.000	0.000
	73	CT	45.639	12.035	-1.862	1.104	5.248	0.809	2.609	0.402	4.278	0.719	0.000	0.000	0.000
	74	S3H	45.989	13.381	-1.991	1.108	5.528	0.809	2.749	0.402	3.789	0.595	0.000	0.000	0.000
	75	QF	46.241	13.915	-0.106	1.111	5.633	0.022	2.801	0.011	3.642	0.000	0.000	0.000	0.000
END	2	HCDF	46.241	13.915	-0.106	1.111	5.633	0.022	2.801	0.011	3.642	0.000	0.000	0.000	0.000
BEGIN	4	HCDF	46.241	13.915	-0.106	1.111	5.633	0.022	2.801	0.011	3.642	0.000	0.000	0.000	0.000
	76	QF	46.493	13.485	1.794	1.114	5.539	-0.765	2.755	-0.381	3.790	-0.595	0.000	0.000	0.000
	77	S3	46.793	12.439	1.700	1.118	5.310	-0.765	2.641	-0.381	4.178	-0.702	0.000	0.000	0.000
	78	BEND	49.193	5.833	1.024	1.163	3.818	-0.476	1.899	-0.238	9.617	-1.569	0.000	0.000	0.000
	79	S5H	49.743	4.815	0.831	1.179	3.557	-0.476	1.769	-0.238	11.448	-1.767	0.000	0.000	0.000
	80	CT	49.843	4.652	0.796	1.183	3.509	-0.476	1.745	-0.238	11.805	-1.803	0.000	0.000	0.000
	81	SXD	49.943	4.498	0.749	1.186	3.462	-0.471	1.722	-0.233	12.165	-1.804	0.000	0.000	0.000
	82	S2H	50.193	4.146	0.662	1.195	3.344	-0.471	1.654	-0.233	13.087	-1.892	0.000	0.000	0.000
	83	QD	50.445	3.980	0.006	1.205	3.286	0.008	1.636	0.006	13.566	0.010	0.000	0.000	0.000
END	4	HCDF	50.445	3.980	0.006	1.205	3.286	0.008	1.636	0.006	13.566	0.010	0.000	0.000	0.000
BEGIN	4	HCDF	50.445	3.980	0.006	1.205	3.286	0.008	1.636	0.006	13.566	0.010	0.000	0.000	0.000
	84	QD	50.697	4.140	-0.649	1.215	3.487	0.487	1.667	0.244	13.077	1.910	0.000	0.000	0.000
	85	S3	50.997	4.559	-0.752	1.226	3.494	0.487	1.740	0.244	11.965	1.803	0.000	0.000	0.000
	86	BEND	53.397	9.887	-1.446	1.284	5.016	0.487	2.501	0.390	5.380	0.946	0.000	0.000	0.000
	87	S5H	53.947	11.568	-1.617	1.292	5.444	0.780	2.715	0.390	4.447	0.753	0.000	0.000	0.000
	88	CT	54.047	11.894	-1.648	1.293	5.522	0.780	2.754	0.390	4.301	0.718	0.000	0.000	0.000
	89	S3H	54.397	13.083	-1.757	1.298	5.795	0.780	2.890	0.390	3.842	0.595	0.000	0.000	0.000
	90	QF	54.649	13.509	0.085	1.301	5.888	-0.043	2.936	-0.021	3.696	-0.006	0.000	0.000	0.000
END	1	HCDF	54.649	13.509	0.085	1.301	5.888	-0.043	2.936	-0.021	3.696	-0.006	0.000	0.000	0.000

TABLE IV 9

POS. NO.	ELEMENT NO.	SEQUENCE	DIST [M]	H O R I Z O N T A L			V E R T I C A L			DPY [I]				
				MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]					
BEGIN	HC F D O	2	54.649	1.301	5.888	-0.043	2.936	-0.021	3.696	-0.006	1.311	0.000	0.000	0.000
91	Q F	14	54.901	1.304	5.773	-0.866	2.879	-0.431	3.849	-0.609	1.321	0.000	0.000	0.000
92	S 3 2 H	4	58.151	1.375	2.965	-0.866	1.485	-0.431	11.542	-1.763	1.402	0.000	0.000	0.000
93	CT	13	58.251	1.379	2.879	0.866	1.442	-0.431	11.897	-1.799	1.404	0.000	0.000	0.000
94	S 3 H	6	58.601	1.393	2.577	-0.866	1.292	-0.431	13.197	-1.923	1.408	0.000	0.000	0.000
95	Q D	14	58.852	1.404	2.405	-0.506	1.207	-0.250	13.688	-0.006	1.411	0.000	0.000	0.000
END	H C F D O	2	58.852	1.404	2.405	-0.506	1.207	-0.250	13.688	-0.006	1.411	0.000	0.000	0.000
BEGIN	H C D F	4	58.852	1.404	2.405	-0.506	1.207	-0.250	13.688	-0.006	1.411	0.000	0.000	0.000
96	Q D	15	59.104	1.414	2.321	-0.164	1.165	-0.079	12.089	1.807	1.414	0.000	0.000	0.000
97	S 3	11	59.404	1.426	2.272	-0.164	1.142	-0.079	5.465	0.959	1.418	0.000	0.000	0.000
98	B E N D	11	61.804	1.488	2.262	0.156	1.144	0.081	4.519	0.766	1.465	0.000	0.000	0.000
99	S 5 H	10	62.354	1.496	2.348	0.156	1.189	0.081	4.369	0.731	1.483	0.000	0.000	0.000
100	CT	14	62.454	1.498	2.364	0.156	1.197	0.081	4.227	0.695	1.486	0.000	0.000	0.000
101	S X F	4	62.554	1.499	2.379	0.156	1.205	0.080	3.902	0.607	1.490	0.000	0.000	0.000
102	S 2 H	8	62.804	1.502	2.418	0.156	1.225	0.080	3.752	-0.001	1.500	0.000	0.000	0.000
103	Q F	15	63.056	1.505	2.414	-0.185	1.223	-0.092	3.752	-0.001	1.510	0.000	0.000	0.000
END	H C D F	4	63.056	1.505	2.414	-0.185	1.223	-0.092	3.752	-0.001	1.510	0.000	0.000	0.000
BEGIN	H C F D L	2	63.056	1.505	2.414	-0.185	1.223	-0.092	3.752	-0.001	1.510	0.000	0.000	0.000
104	Q F	16	63.308	1.508	2.326	-0.519	1.179	-0.261	3.903	-0.610	1.521	0.000	0.000	0.000
105	S 3	12	63.608	1.512	2.170	-0.519	1.101	-0.261	4.300	-0.715	1.533	0.000	0.000	0.000
106	B E N D	12	66.008	1.560	1.317	-0.192	0.669	-0.098	9.754	-1.562	1.593	0.000	0.000	0.000
107	S 5 H	11	66.558	1.578	1.211	-0.192	0.616	-0.098	11.574	-1.755	1.601	0.000	0.000	0.000
108	CT	15	67.008	1.582	1.192	-0.192	0.572	-0.098	11.928	-1.790	1.603	0.000	0.000	0.000
109	S 3 H	7	67.008	1.596	1.125	-0.192	0.572	-0.098	13.221	-1.913	1.607	0.000	0.000	0.000
110	Q D	16	67.260	1.607	1.097	-0.031	0.557	-0.017	13.706	0.008	1.610	0.000	0.000	0.000
END	H C F D L	2	67.260	1.607	1.097	-0.031	0.557	-0.017	13.706	0.008	1.610	0.000	0.000	0.000
END	B 4 S	1	67.260	1.607	1.097	-0.031	0.557	-0.017	13.706	0.008	1.610	0.000	0.000	0.000
END	R I N G	1	201.780	4.820	1.097	-0.031	0.557	-0.017	13.707	0.008	4.830	0.000	0.000	0.000
TOTAL LENGTH =			201.780000	QX' =	4.820310	QY' =	0.096209					4.829533		
ALFA			0.422958E-01	BETAX(MAX)		BETAY(MAX)	13.914840					-0.190458		
GAMMA( TR )			4.862407	DX(MAX)		DY(MAX)	2.936023					13.707415		
				XCO(MAX)		YCO(MAX)	5.887512					0.000000		
				XCO(R.M.S.)		YCO(R.M.S.)	3.324695					0.000000		

... SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = 0.004000, SYMM = F  
 ... ITER 1 X PX -0.000000 Y PY 0.000000 ERROR 0.107529E-02  
 ... 2 X PX -0.000000 Y PY 0.000000 0.603280E-05  
 ... 3 X PX -0.000000 Y PY 0.000000 0.590999E-10



TABLE IV b

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING  
 DELTA(P)/P = 0.004000 SYMM = F  
 "MAD" VERSION: 6.01/03 ZOHREH PARSA /  
 RUN: 19-NOV-8 08:07:18  
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POS. NO.	ELEMENT OCC. NO.	ELEMENT SEQUENCE	DIST I [M]	I	H O R I Z O N T A L			V E R T I C A L			DY [M]	DPY [1]					
					BETAX [M]	ALFAX [1]	MUX [2PI]	X(CO) [MM]	PX(CO) [1.001]	DX [M]			DPX [1]	BETAY [M]	ALFAY [1]	MUY [2PI]	Y(CO) [MM]
BEGIN	RING	1	0.000		3.607	0.005	0.000	2.229	-0.066	0.575	-0.019	13.769	0.016	0.000	0.000	0.000	0.000
BEGIN	B4S	1	33.630		3.606	0.005	0.803	2.229	-0.066	0.575	-0.019	13.770	0.016	0.805	0.000	0.000	0.000
BEGIN	HCDF	3	33.630		3.606	0.005	0.803	2.229	-0.066	0.575	-0.019	13.770	0.016	0.805	0.000	0.000	0.000
	55 QD	9	33.882		3.754	-0.602	0.814	2.263	0.258	0.580	0.065	13.273	1.944	0.808	0.000	0.000	0.000
	56 S3	7	34.182		4.146	-0.710	0.826	2.330	0.258	0.600	0.065	12.143	1.837	0.812	0.000	0.000	0.000
	57 BEND	7	36.582		9.389	-1.459	0.889	3.739	0.918	0.951	0.229	5.430	0.972	0.859	0.000	0.000	0.000
	58 S5H	6	37.132		11.087	-1.641	0.897	4.242	0.918	1.076	0.229	4.473	0.775	0.877	0.000	0.000	0.000
	59 CT	8	37.232		11.418	-1.674	0.899	4.333	0.918	1.099	0.229	4.322	0.740	0.880	0.000	0.000	0.000
	60 SXF	3	37.332		11.754	-1.700	0.900	4.424	0.916	1.122	0.229	4.179	0.702	0.884	0.000	0.000	0.000
	61 S2H	5	37.582		12.621	-1.783	0.903	4.653	0.916	1.178	0.229	3.851	0.613	0.894	0.000	0.000	0.000
	62 QF	9	37.834		13.075	-0.006	0.906	4.799	0.250	1.214	0.060	3.697	0.110	0.905	0.000	0.000	0.000
END	HCDF	3	37.834		13.075	-0.006	0.906	4.799	0.250	1.214	0.060	3.697	0.110	0.905	0.000	0.000	0.000
BEGIN	HCDF	10	38.086		12.627	-1.771	0.909	4.777	-0.425	1.208	-0.111	3.841	-0.591	0.915	0.000	0.000	0.000
	63 QF	8	38.386		11.598	1.673	0.913	4.650	-0.425	1.175	-0.111	4.225	-0.595	0.927	0.000	0.000	0.000
	64 S3	8	40.786		5.245	0.955	0.963	4.397	0.214	1.100	0.048	9.580	-1.546	0.989	0.000	0.000	0.000
	65 BEND	7	41.336		4.308	0.755	0.981	4.515	0.214	1.127	0.048	11.380	-1.740	0.997	0.000	0.000	0.000
	66 S5H	7	41.436		4.162	0.719	0.985	4.536	0.214	1.132	0.048	11.730	-1.775	0.998	0.000	0.000	0.000
	67 CT	9	41.536		3.713	0.668	0.989	4.558	0.223	1.137	0.053	12.083	-1.766	0.998	0.000	0.000	0.000
	68 SXD	3	41.786		3.576	-0.023	1.010	4.754	0.900	1.184	0.221	12.984	-1.851	1.003	0.000	0.000	0.000
	69 S2H	6	42.037		3.576	-0.023	1.010	4.754	0.900	1.184	0.221	13.445	-0.035	1.006	0.000	0.000	0.000
	70 QD	10	42.037		3.576	-0.023	1.010	4.754	0.900	1.184	0.221	13.445	-0.035	1.006	0.000	0.000	0.000
END	HCDF	2	42.037		3.576	-0.023	1.010	4.754	0.900	1.184	0.221	13.445	-0.035	1.006	0.000	0.000	0.000
BEGIN	HCDF	11	42.289		3.737	-0.628	1.021	5.068	1.609	1.261	0.398	12.949	1.916	1.009	0.000	0.000	0.000
	71 QD	3	45.539		11.707	-1.835	1.021	5.068	1.609	1.261	0.398	13.424	0.748	1.080	0.000	0.000	0.000
	72 S32H	3	45.639		12.077	-2.002	1.104	10.437	1.609	2.543	0.398	4.324	0.748	1.080	0.000	0.000	0.000
	73 CT	10	45.989		13.427	-2.002	1.108	10.998	1.609	2.720	0.398	4.179	0.712	1.084	0.000	0.000	0.000
	74 S3H	4	46.241		13.963	-0.110	1.111	11.206	0.044	2.772	0.010	3.581	0.000	1.109	0.000	0.000	0.000
	75 QF	11	46.241		13.963	-0.110	1.111	11.206	0.044	2.772	0.010	3.581	0.000	1.109	0.000	0.000	0.000
END	HCDF	2	46.241		13.963	-0.110	1.111	11.206	0.044	2.772	0.010	3.581	0.000	1.109	0.000	0.000	0.000
BEGIN	HCDF	4	46.493		13.535	1.797	1.114	11.019	-1.523	2.726	-0.377	3.727	-0.588	1.120	0.000	0.000	0.000
	76 QF	12	46.493		13.535	1.797	1.114	11.019	-1.523	2.726	-0.377	3.727	-0.588	1.120	0.000	0.000	0.000
	77 S3	9	46.793		12.489	1.704	1.117	10.564	-1.523	2.613	-0.377	4.110	-0.595	1.132	0.000	0.000	0.000
	78 BEND	9	49.193		5.847	1.036	1.162	7.597	-0.950	1.880	-0.236	9.549	-1.580	1.194	0.000	0.000	0.000
	79 S5H	8	49.743		4.818	0.842	1.179	7.077	-0.950	1.751	-0.236	11.390	-1.781	1.203	0.000	0.000	0.000
	80 CT	11	49.843		4.654	0.807	1.182	6.982	-0.950	1.728	-0.236	11.748	-1.818	1.204	0.000	0.000	0.000
	81 SXD	4	49.943		4.499	0.746	1.186	6.888	-0.931	1.705	-0.227	12.107	-1.786	1.205	0.000	0.000	0.000
	82 S2H	7	50.193		4.149	0.660	1.195	6.657	-0.931	1.648	-0.227	15.018	-1.872	1.209	0.000	0.000	0.000
	83 QD	12	50.445		3.984	0.004	1.205	6.543	0.023	1.621	0.010	13.489	0.019	1.212	0.000	0.000	0.000
END	HCDF	4	50.445		3.984	0.004	1.205	6.543	0.023	1.621	0.010	13.489	0.019	1.212	0.000	0.000	0.000
BEGIN	HCDF	1	50.445		3.984	0.004	1.205	6.543	0.023	1.621	0.010	13.489	0.019	1.212	0.000	0.000	0.000
	84 QD	13	50.697		4.145	-0.652	1.215	6.668	0.023	1.653	0.246	13.000	1.907	1.215	0.000	0.000	0.000
	85 S3	10	50.997		4.566	-0.755	1.225	6.961	0.978	1.727	0.246	11.892	1.801	1.218	0.000	0.000	0.000
	86 BEND	10	53.397		9.879	-1.438	1.283	10.004	1.560	2.487	0.390	5.350	0.936	1.267	0.000	0.000	0.000
	87 S5H	9	53.947		11.547	-1.608	1.291	10.859	1.560	2.700	0.390	4.430	0.744	1.285	0.000	0.000	0.000
	88 CT	12	54.047		11.870	-1.639	1.293	11.014	1.560	2.739	0.390	4.285	0.709	1.289	0.000	0.000	0.000
	89 S3H	5	54.397		13.051	-1.747	1.297	11.558	1.560	2.874	0.390	3.833	0.587	1.302	0.000	0.000	0.000
	90 QF	13	54.649		13.471	0.091	1.300	11.744	-0.083	2.920	-0.019	3.691	-0.013	1.313	0.000	0.000	0.000
END	HCDF	1	54.649		13.471	0.091	1.300	11.744	-0.083	2.920	-0.019	3.691	-0.013	1.313	0.000	0.000	0.000

TABLE IV h

AGS BOOSTER LATTICE FOR SURVEY ZOHREH PARSA / "MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING" SYMM = F  
 DELTA(P)/P = 0.004000

POS. NO.	ELEMENT SEQUENCE	DIST I [M]	I	H	O	R	I	Z	O	N	T	A	L	V	E	R	T	I	C	A	L	DPY
NAME	NO.	NO.	NO.	ALFAX [I]	BETAX [M]	BETAX [M]	ALFAX [I]	MUX [C2PI]	X(CO) [MM]	PX(CO) [MM]	DX [M]	DPX [I]	I	BETAY [M]	ALFAY [I]	MUY [C2PI]	Y(CO) [MM]	PY(CO) [MM]	ALFAY [I]	BETAY [M]	ALFAY [I]	DPY [I]
BEGIN	HCEDO	2	54.649	13.471	0.091	1.300	11.744	-0.083	2.920	-0.019	3.691	-0.013	1.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
91	QF	14	54.901	12.961	1.916	1.303	11.517	-1.723	2.865	-0.427	3.846	-0.615	1.324	0.000	0.000	1.324	0.000	0.000	0.000	0.000	0.000	0.000
92	S32H	4	58.151	4.333	0.749	1.374	5.939	-1.723	1.489	-0.427	11.580	-1.774	1.404	0.000	0.000	1.404	0.000	0.000	0.000	0.000	0.000	0.000
93	CT	13	58.251	4.187	0.714	1.378	5.768	-1.723	1.447	-0.427	11.937	-1.810	1.406	0.000	0.000	1.406	0.000	0.000	0.000	0.000	0.000	0.000
94	S3H	6	58.601	3.733	0.588	1.392	5.167	-1.723	1.298	-0.427	13.243	-1.935	1.410	0.000	0.000	1.410	0.000	0.000	0.000	0.000	0.000	0.000
95	QD	14	58.852	3.591	-0.016	1.403	4.826	-1.001	1.215	-0.245	13.737	-0.011	1.413	0.000	0.000	1.413	0.000	0.000	0.000	0.000	0.000	0.000
END	HCEDO	2	58.852	3.591	-0.016	1.403	4.826	-1.001	1.215	-0.245	13.737	-0.011	1.413	0.000	0.000	1.413	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	58.852	3.749	-0.622	1.414	4.662	-0.316	1.175	-0.072	13.253	1.915	1.416	0.000	0.000	1.416	0.000	0.000	0.000	0.000	0.000	0.000
96	QD	15	59.104	3.749	-0.622	1.414	4.662	-0.316	1.175	-0.072	13.253	1.915	1.416	0.000	0.000	1.416	0.000	0.000	0.000	0.000	0.000	0.000
97	S3	11	59.404	4.154	-0.732	1.426	4.567	-0.323	1.154	-0.086	12.140	1.810	1.427	0.000	0.000	1.427	0.000	0.000	0.000	0.000	0.000	0.000
98	BEND	11	61.804	9.532	-1.492	1.488	4.577	0.323	1.170	0.086	5.519	0.962	1.467	0.000	0.000	1.467	0.000	0.000	0.000	0.000	0.000	0.000
99	S5H	10	62.354	11.269	-1.678	1.496	4.754	0.323	1.217	0.086	4.570	0.771	1.484	0.000	0.000	1.484	0.000	0.000	0.000	0.000	0.000	0.000
100	CT	14	62.454	11.606	-1.711	1.497	4.786	0.323	1.226	0.086	4.420	0.736	1.488	0.000	0.000	1.488	0.000	0.000	0.000	0.000	0.000	0.000
101	SXF	4	62.554	11.950	-1.737	1.499	4.818	0.322	1.234	0.086	4.277	0.698	1.491	0.000	0.000	1.491	0.000	0.000	0.000	0.000	0.000	0.000
102	S2H	8	62.804	12.836	-1.821	1.502	4.898	0.322	1.256	0.086	3.951	0.612	1.501	0.000	0.000	1.501	0.000	0.000	0.000	0.000	0.000	0.000
103	QF	15	63.056	13.302	-0.014	1.505	4.893	-0.368	1.255	-0.091	3.800	-0.003	1.511	0.000	0.000	1.511	0.000	0.000	0.000	0.000	0.000	0.000
END	HCDF	4	63.056	13.302	-0.014	1.505	4.893	-0.368	1.255	-0.091	3.800	-0.003	1.511	0.000	0.000	1.511	0.000	0.000	0.000	0.000	0.000	0.000
BEGIN	HCDFDL	2	63.056	13.302	-0.014	1.505	4.893	-0.368	1.255	-0.091	3.800	-0.003	1.511	0.000	0.000	1.511	0.000	0.000	0.000	0.000	0.000	0.000
104	QF	16	63.308	12.849	1.795	1.508	4.715	-1.046	1.210	-0.265	3.953	-0.617	1.522	0.000	0.000	1.522	0.000	0.000	0.000	0.000	0.000	0.000
105	S3	12	63.608	11.806	-1.697	1.512	4.402	-0.393	1.131	-0.103	4.354	-0.722	1.533	0.000	0.000	1.533	0.000	0.000	0.000	0.000	0.000	0.000
106	BEND	12	66.008	5.340	0.976	1.560	2.678	-0.393	0.692	-0.103	9.821	-1.556	1.593	0.000	0.000	1.593	0.000	0.000	0.000	0.000	0.000	0.000
107	S5H	11	66.558	4.381	0.776	1.578	2.463	-0.393	0.636	-0.103	11.642	-1.758	1.601	0.000	0.000	1.601	0.000	0.000	0.000	0.000	0.000	0.000
108	CT	15	66.658	4.230	0.612	1.582	2.424	-0.393	0.625	-0.103	11.996	-1.793	1.602	0.000	0.000	1.602	0.000	0.000	0.000	0.000	0.000	0.000
109	S3H	7	67.008	3.759	0.612	1.596	2.287	-0.393	0.590	-0.103	13.289	-1.916	1.607	0.000	0.000	1.607	0.000	0.000	0.000	0.000	0.000	0.000
110	QD	16	67.260	3.606	0.005	1.607	2.229	-0.066	0.575	-0.019	13.772	0.016	1.610	0.000	0.000	1.610	0.000	0.000	0.000	0.000	0.000	0.000
END	HCDFDL	2	67.260	3.606	0.005	1.607	2.229	-0.066	0.575	-0.019	13.772	0.016	1.610	0.000	0.000	1.610	0.000	0.000	0.000	0.000	0.000	0.000
END	B4S	1	67.260	3.606	0.005	1.607	2.229	-0.066	0.575	-0.019	13.772	0.016	1.610	0.000	0.000	1.610	0.000	0.000	0.000	0.000	0.000	0.000
END	RING	1	201.780	3.605	0.005	4.821	2.229	-0.066	0.575	-0.019	13.776	0.016	4.828	0.000	0.000	4.828	0.000	0.000	0.000	0.000	0.000	0.000

TOTAL LENGTH = 201.780000 QX = 4.821236 QV = 4.828138  
 ALFA = 0.426119E-01 BETAX(MAX) = 0.187891 QV = -0.380013  
 GAMMA(1R) = 4.844341 DX(MAX) = 13.963957 BETAY(MAX) = 13.775956  
 XCO(MAX) = 2.920346 DY(MAX) = 0.000000  
 XCO(R.M.S.) = 6.641259 YCO(MAX) = 0.000000  
 YCO(R.M.S.) = 0.000000

SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = 0.0065000, SYMM = F  
 ITER: 1 0.003394 -0.000000 0.000000 0.161451E-02 ERROR  
 2 0.003396 -0.000106 0.000000 0.131262E-04  
 3 0.003396 -0.000106 0.000000 0.317276E-09

TABLE IV (

POS. NO.	ELEMENT NAME	SEQUENCE NO.	H O R I Z O N T A L										V E R T I C A L				
			DIST [M]	BETAX [M]	ALFAX [I]	MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	DX [M]	DPX [I]	BETAY [M]	ALFAY [I]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]	DY [M]	DPY [I]
BEGIN	RING	1	0.000	3.588	0.003	0.000	3.396	-0.106	0.592	0.021	13.834	0.023	0.000	0.000	0.000	0.000	0.000
BEGIN	B4S	1	33.630	3.588	0.003	0.804	3.396	-0.106	0.592	0.021	13.837	0.023	0.805	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	33.630	3.588	0.003	0.804	3.396	-0.106	0.592	0.021	13.837	0.023	0.805	0.000	0.000	0.000	0.000
55	QD	9	33.882	4.127	-0.601	0.827	3.431	0.388	0.597	0.065	13.334	1.961	0.808	0.000	0.000	0.000	0.000
56	S3	7	34.182	3.736	-0.710	0.827	3.431	0.388	0.516	0.065	12.197	1.852	0.811	0.000	0.000	0.000	0.000
57	BEND	7	36.582	9.360	-1.457	0.889	5.657	1.376	0.967	0.229	5.442	0.979	0.859	0.000	0.000	0.000	0.000
58	S5H	6	37.132	11.053	-1.640	0.898	6.409	1.376	1.091	0.229	4.479	0.782	0.876	0.000	0.000	0.000	0.000
59	CT	8	37.232	11.382	-1.673	0.899	6.546	1.376	1.114	0.229	4.327	0.747	0.880	0.000	0.000	0.000	0.000
60	SXF	3	37.332	11.717	-1.696	0.900	6.683	1.373	1.137	0.228	4.183	0.707	0.884	0.000	0.000	0.000	0.000
61	S2H	5	37.582	12.580	-1.778	0.904	7.024	1.373	1.193	0.228	3.854	0.618	0.893	0.000	0.000	0.000	0.000
62	QF	9	37.834	13.032	-0.007	0.907	7.242	0.367	1.229	0.057	3.697	0.015	0.904	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	37.834	13.032	-0.007	0.907	7.242	0.367	1.229	0.057	3.697	0.015	0.904	0.000	0.000	0.000	0.000
63	QF	10	38.086	12.587	1.764	0.910	7.207	-0.651	1.221	0.115	3.838	-0.585	0.915	0.000	0.000	0.000	0.000
64	S3	8	38.386	11.564	1.667	0.914	7.012	-0.651	1.187	0.115	4.218	-0.689	0.927	0.000	0.000	0.000	0.000
65	BEND	8	40.786	5.234	0.954	0.963	6.599	0.306	1.101	0.043	9.533	-1.540	0.988	0.000	0.000	0.000	0.000
66	S5H	7	41.336	4.299	0.755	0.981	6.766	0.306	1.125	0.043	11.323	-1.734	0.996	0.000	0.000	0.000	0.000
67	CT	5	41.436	4.153	0.719	0.985	6.797	0.306	1.129	0.043	11.671	-1.769	0.998	0.000	0.000	0.000	0.000
68	SXD	3	41.536	4.016	0.660	0.989	6.828	0.325	1.133	0.049	12.020	-1.738	0.999	0.000	0.000	0.000	0.000
69	S2H	6	41.786	3.710	0.571	0.999	6.909	0.325	1.146	0.049	12.904	-1.821	1.002	0.000	0.000	0.000	0.000
70	QD	10	42.037	3.576	-0.029	1.010	7.116	1.338	1.179	0.217	13.352	0.053	1.005	0.000	0.000	0.000	0.000
BEGIN	HCDF	3	42.037	3.576	-0.029	1.010	7.116	1.338	1.179	0.217	13.352	0.053	1.005	0.000	0.000	0.000	0.000
BEGIN	HCDF	2	42.037	3.576	-0.029	1.010	7.116	1.338	1.179	0.217	13.352	0.053	1.005	0.000	0.000	0.000	0.000
71	QD	11	42.289	3.740	-0.634	1.021	7.583	2.400	1.254	0.393	12.852	1.920	1.008	0.000	0.000	0.000	0.000
72	S32H	3	45.539	11.747	-1.845	1.102	15.336	2.400	2.516	0.393	4.254	0.742	1.084	0.000	0.000	0.000	0.000
73	CT	10	45.639	12.118	-1.882	1.104	15.574	2.400	2.555	0.393	4.110	0.706	1.084	0.000	0.000	0.000	0.000
74	S3H	4	45.989	13.472	-2.012	1.108	16.409	2.400	2.691	0.393	3.663	0.579	1.098	0.000	0.000	0.000	0.000
75	QF	11	46.241	14.011	-0.114	1.111	16.719	0.064	2.741	0.010	3.520	-0.001	1.110	0.000	0.000	0.000	0.000
BEGIN	HCDF	2	46.241	14.011	-0.114	1.111	16.719	0.064	2.741	0.010	3.520	-0.001	1.110	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	46.241	14.011	-0.114	1.111	16.719	0.064	2.741	0.010	3.520	-0.001	1.110	0.000	0.000	0.000	0.000
76	QF	12	46.493	13.584	1.800	1.114	16.441	-2.274	2.696	0.373	3.664	-0.580	1.121	0.000	0.000	0.000	0.000
77	S3	9	46.793	12.538	1.707	1.117	15.763	-2.274	2.585	0.373	4.042	-0.689	1.133	0.000	0.000	0.000	0.000
78	BEND	9	49.193	5.860	1.048	1.162	11.337	-1.421	1.860	0.235	9.481	-1.592	1.196	0.000	0.000	0.000	0.000
79	S5H	8	49.743	4.821	0.852	1.178	10.560	-1.421	1.733	0.235	11.332	-1.796	1.205	0.000	0.000	0.000	0.000
80	CT	11	49.843	4.655	0.817	1.182	10.419	-1.421	1.710	0.235	11.693	-1.833	1.206	0.000	0.000	0.000	0.000
81	SXD	4	49.943	4.500	0.744	1.185	10.280	-1.377	1.687	0.220	12.051	-1.769	1.207	0.000	0.000	0.000	0.000
82	S2H	7	50.193	4.152	0.658	1.194	9.938	-1.377	1.633	0.220	12.951	-1.854	1.210	0.000	0.000	0.000	0.000
83	QD	12	50.445	3.989	0.001	1.204	9.772	0.046	1.607	0.014	13.414	0.027	1.213	0.000	0.000	0.000	0.000
BEGIN	HCDF	4	50.445	3.989	0.001	1.204	9.772	0.046	1.607	0.014	13.414	0.027	1.213	0.000	0.000	0.000	0.000
BEGIN	HCDF	13	50.697	3.989	0.001	1.204	9.772	0.046	1.607	0.014	13.414	0.027	1.213	0.000	0.000	0.000	0.000
84	QD	13	50.697	4.572	-0.655	1.214	9.961	1.472	1.639	0.248	12.924	1.905	1.216	0.000	0.000	0.000	0.000
85	S3	10	50.997	4.572	-0.758	1.225	10.400	1.472	1.713	0.248	11.820	1.798	1.220	0.000	0.000	0.000	0.000
86	BEND	10	53.397	9.871	-1.429	1.282	14.965	2.339	2.473	0.389	5.323	0.927	1.269	0.000	0.000	0.000	0.000
87	S5H	9	53.947	11.526	-1.598	1.291	16.244	2.339	2.685	0.389	4.474	0.736	1.287	0.000	0.000	0.000	0.000
88	CT	12	54.047	11.847	-1.629	1.292	16.476	2.339	2.723	0.389	4.272	0.701	1.291	0.000	0.000	0.000	0.000
89	S3H	5	54.397	13.017	-1.736	1.296	17.290	2.339	2.858	0.389	3.826	0.579	1.304	0.000	0.000	0.000	0.000
90	QF	13	54.649	13.432	0.097	1.299	17.569	-0.119	2.904	0.017	3.688	-0.020	1.315	0.000	0.000	0.000	0.000
BEGIN	HCDF	1	54.649	13.432	0.097	1.299	17.569	-0.119	2.904	0.017	3.688	-0.020	1.315	0.000	0.000	0.000	0.000

TABLE IV (

POS. NO.	ELEMENT NO.	SEQUENCE NO.	H O R I Z O N T A L		V E R T I C A L		DPY [1]									
			DIST [M]	BETAX [1]	ALFAX [1]	MUX [2PI]		X(CO) [MM]	PX(CO) [MM]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]				
BEGIN	HCFDO	2	54.649	13.432	0.097	1.299	17.569	-0.119	2.904	-0.017	3.688	-0.020	1.315	0.000	0.000	0.000
91	OF	14	54.901	12.922	1.917	1.302	17.231	-2.572	2.850	-0.423	3.846	-0.621	1.326	0.000	0.000	0.000
92	S32H	4	58.151	4.313	0.748	1.374	8.921	-2.572	1.493	-0.423	11.622	-1.786	1.406	0.000	0.000	0.000
93	CT	13	58.251	4.168	0.712	1.377	8.665	-2.572	1.451	-0.423	11.981	-1.822	1.407	0.000	0.000	0.000
94	S3H	6	58.601	3.716	0.587	1.391	7.770	-2.572	1.305	-0.423	13.292	-1.947	1.412	0.000	0.000	0.000
95	QD	14	58.852	3.574	-0.015	1.402	7.264	-1.486	1.223	-0.240	13.789	-0.015	1.415	0.000	0.000	0.000
END	HCFDO	2	58.852	3.574	-0.015	1.402	7.264	-1.486	1.223	-0.240	13.789	-0.015	1.415	0.000	0.000	0.000
BEGIN	HCFD	4	58.852	3.574	-0.015	1.402	7.264	-1.486	1.223	-0.240	13.789	-0.015	1.415	0.000	0.000	0.000
96	QD	15	59.104	3.731	-0.618	1.413	7.021	-0.454	1.185	-0.066	13.307	1.918	1.418	0.000	0.000	0.000
97	S3	11	59.404	4.133	-0.729	1.425	6.886	-0.454	1.165	-0.066	12.194	1.814	1.421	0.000	0.000	0.000
98	BEND	11	61.804	9.475	-1.484	1.487	6.943	0.502	1.196	0.092	5.573	0.965	1.468	0.000	0.000	0.000
99	SSH	10	62.354	11.198	-1.669	1.496	7.217	0.502	1.246	0.092	4.621	0.775	1.485	0.000	0.000	0.000
100	CT	14	62.454	11.533	-1.702	1.497	7.267	0.502	1.255	0.091	4.471	0.743	1.489	0.000	0.000	0.000
101	SXF	4	62.554	11.874	-1.724	1.499	7.317	0.498	1.264	0.091	4.327	0.702	1.492	0.000	0.000	0.000
102	S2H	8	62.804	12.751	-1.807	1.502	7.440	0.498	1.286	0.091	4.000	0.616	1.502	0.000	0.000	0.000
103	QF	15	63.056	13.212	-0.012	1.505	7.434	-0.551	1.286	-0.091	3.848	-0.004	1.512	0.000	0.000	0.000
END	HCFD	4	63.056	13.212	-0.012	1.505	7.434	-0.551	1.286	-0.091	3.848	-0.004	1.512	0.000	0.000	0.000
BEGIN	HCFDL	2	63.056	13.212	-0.012	1.505	7.434	-0.551	1.286	-0.091	3.848	-0.004	1.512	0.000	0.000	0.000
104	QF	16	63.308	12.763	1.785	1.508	7.166	-1.580	1.241	-0.269	4.003	-0.625	1.522	0.000	0.000	0.000
105	S3	12	63.608	11.728	1.687	1.512	6.695	-1.580	1.162	-0.269	4.407	-0.728	1.534	0.000	0.000	0.000
106	BEND	12	66.008	5.307	0.971	1.560	4.083	-0.603	0.714	-0.107	9.891	-1.570	1.592	0.000	0.000	0.000
107	SSH	11	66.558	4.355	0.771	1.579	3.754	-0.603	0.655	-0.107	11.713	-1.762	1.601	0.000	0.000	0.000
108	CT	15	66.658	4.205	0.734	1.582	3.694	-0.603	0.645	-0.107	12.066	-1.797	1.602	0.000	0.000	0.000
109	S3H	7	67.008	3.738	0.607	1.596	3.484	-0.603	0.607	-0.107	13.359	-1.919	1.606	0.000	0.000	0.000
110	QD	16	67.260	3.587	0.003	1.607	3.396	-0.106	0.592	-0.021	13.840	0.023	1.609	0.000	0.000	0.000
END	HCFDL	2	67.260	3.587	0.003	1.607	3.396	-0.106	0.592	-0.021	13.840	0.023	1.609	0.000	0.000	0.000
END	B4S	1	67.260	3.587	0.003	1.607	3.396	-0.106	0.592	-0.021	13.840	0.023	1.609	0.000	0.000	0.000
END	RING	1	201.780	3.585	0.003	4.823	3.396	-0.106	0.592	-0.021	13.850	0.023	4.826	0.000	0.000	0.000
TOTAL LENGTH =			201.780000						4.822774		QY			4.825811		
ALFA					QX'				0.276111		QV'			-0.570392		
GAMMA (TR)			0.429182E-01		BETAX (MAX)				14.013023		BETAY (MAX)			13.849585		
			4.827019		DX (MAX)				2.904409		DY (MAX)			0.000000		
					XCO (MAX)				17.568722		YCO (MAX)			0.000000		
					XCO (R.M.S.)				9.949599		YCO (R.M.S.)			0.000000		

SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = 0.008000, SYMM = F

ITER.	X	PX	Y	PY	ERROR
1	0.004595	-0.000156	0.000000	0.000000	0.214977E-02
2	0.004596	-0.000149	0.000000	0.000000	0.224955E-04
3	0.004596	-0.000149	0.000000	0.000000	0.1066091E-08

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TABLE IV 9

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING  
 DELTA(P)/P = 0.008000 SYMM = F ZOHREH PARSA /  
 "MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 PAGE 1

POS. NO.	ELEMENT SEQUENCE ELEMENT NAME	DIST I [M]	I I	H O R I Z O N T A L			V E R T I C A L			ALFAY [I]	BETAY [M]	DPX [I]	DX [M]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]	DY [M]	DPY [I]
				MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	MUY [2PI]	Y(CO) [MM]	PY(CO) [MM]									
1	BEGIN RING	0.0000		3.570	0.001	0.000	4.596	-0.149	0.608-0.023	13.901	0.030	0.000	0.000	0.000	0.000	0.000	0.000	
1	BEGIN B4S	33.630		3.569	0.001	0.000	4.596	-0.149	0.608-0.023	13.906	0.030	0.000	0.000	0.000	0.000	0.000	0.000	
3	BEGIN HCDF	33.630		3.569	0.001	0.000	4.596	-0.149	0.608-0.023	13.906	0.030	0.000	0.000	0.000	0.000	0.000	0.000	
9	55 QD	33.882		3.717	-0.501	0.815	4.642	0.518	0.614 0.066	13.398	1.977	0.807	0.000	0.000	0.000	0.000	0.000	
7	56 S3	34.182		4.107	-0.709	0.827	4.796	0.518	0.633 0.066	12.254	1.868	0.811	0.000	0.000	0.000	0.000	0.000	
7	57 BEND	36.582		9.329	-1.456	0.889	7.606	1.834	0.982 0.229	5.457	0.987	0.858	0.000	0.000	0.000	0.000	0.000	
6	58 S5H	37.132		11.017	-1.638	0.898	8.607	1.834	1.106 0.229	4.488	0.790	0.876	0.000	0.000	0.000	0.000	0.000	
8	59 CT	37.232		11.346	-1.672	0.899	8.789	1.834	1.129 0.229	4.335	0.754	0.879	0.000	0.000	0.000	0.000	0.000	
3	60 SXF	37.332		11.679	-1.691	0.901	8.970	1.829	1.151 0.228	4.189	0.713	0.883	0.000	0.000	0.000	0.000	0.000	
5	61 S2H	37.582		12.538	-1.773	0.904	9.424	1.829	1.207 0.228	3.858	0.623	0.893	0.000	0.000	0.000	0.000	0.000	
9	62 QF	37.834		12.988	-0.008	0.907	9.713	0.480	1.242 0.055	3.699	0.020	0.903	0.000	0.000	0.000	0.000	0.000	
3	BEGIN HCDF	37.834		12.988	-0.008	0.907	9.713	0.480	1.242 0.055	3.699	0.020	0.903	0.000	0.000	0.000	0.000	0.000	
3	BEGIN HCDFD	37.834		12.988	-0.008	0.907	9.713	0.480	1.242 0.055	3.699	0.020	0.903	0.000	0.000	0.000	0.000	0.000	
10	63 QF	38.086		12.546	1.757	0.910	9.662	-0.886	1.234-0.120	3.837	-0.580	0.914	0.000	0.000	0.000	0.000	0.000	
8	64 S3	38.386		11.529	1.660	0.914	9.398	-0.886	1.199-0.120	4.213	-0.683	0.926	0.000	0.000	0.000	0.000	0.000	
8	65 BEND	40.786		5.223	0.954	0.963	8.802	0.387	1.102 0.038	9.489	-1.535	0.987	0.000	0.000	0.000	0.000	0.000	
7	66 S5H	41.336		4.290	0.755	0.982	9.013	0.387	1.122 0.038	11.269	-1.728	0.996	0.000	0.000	0.000	0.000	0.000	
9	67 CT	41.436		4.144	0.718	0.985	9.051	0.387	1.126 0.038	11.616	-1.763	0.997	0.000	0.000	0.000	0.000	0.000	
3	68 SXD	41.536		4.008	0.653	0.989	9.091	0.420	1.130 0.046	11.960	-1.710	0.998	0.000	0.000	0.000	0.000	0.000	
6	69 S2H	41.786		3.706	0.565	1.000	9.195	0.420	1.141 0.046	12.825	-1.792	1.002	0.000	0.000	0.000	0.000	0.000	
10	70 QD	42.037		3.576	-0.035	1.011	9.468	1.769	1.173 0.213	13.264	0.071	1.005	0.000	0.000	0.000	0.000	0.000	
2	BEGIN HCDFD	42.037		3.576	-0.035	1.011	9.468	1.769	1.173 0.213	13.264	0.071	1.005	0.000	0.000	0.000	0.000	0.000	
3	BEGIN HCDFD	42.037		3.576	-0.035	1.011	9.468	1.769	1.173 0.213	13.264	0.071	1.005	0.000	0.000	0.000	0.000	0.000	
11	71 QD	42.289		3.743	-0.640	1.022	10.085	3.181	1.248 0.388	12.759	1.924	1.008	0.000	0.000	0.000	0.000	0.000	
3	45 S32H	45.539		11.786	-1.855	1.102	20.342	3.181	2.490 0.388	4.185	0.736	1.080	0.000	0.000	0.000	0.000	0.000	
3	45 S39	45.639		12.158	-1.892	1.104	20.657	3.181	2.528 0.388	4.042	0.699	1.084	0.000	0.000	0.000	0.000	0.000	
4	45 S98	45.989		13.517	-2.023	1.108	21.762	3.181	2.662 0.388	3.601	0.571	1.099	0.000	0.000	0.000	0.000	0.000	
11	46 S241	46.241		14.058	-0.118	1.111	22.171	0.084	2.711 0.010	3.460	-0.001	1.110	0.000	0.000	0.000	0.000	0.000	
2	BEGIN HCDFD	46.241		14.058	-0.118	1.111	22.171	0.084	2.711 0.010	3.460	-0.001	1.110	0.000	0.000	0.000	0.000	0.000	
4	46 S241	46.241		14.058	-0.118	1.111	22.171	0.084	2.711 0.010	3.460	-0.001	1.110	0.000	0.000	0.000	0.000	0.000	
12	46 S493	46.493		13.632	1.803	1.114	21.804	-3.017	2.666-0.370	3.602	-0.573	1.121	0.000	0.000	0.000	0.000	0.000	
9	46 S793	46.793		12.587	1.711	1.117	20.906	-3.017	2.557-0.370	3.975	-0.682	1.134	0.000	0.000	0.000	0.000	0.000	
9	49 S193	49.193		5.874	1.060	1.152	15.038	-1.889	1.841-0.233	9.413	-1.603	1.198	0.000	0.000	0.000	0.000	0.000	
8	49 S743	49.743		4.825	0.863	1.178	14.008	-1.889	1.714-0.233	11.276	-1.810	1.206	0.000	0.000	0.000	0.000	0.000	
11	49 S843	49.843		4.657	0.827	1.181	13.820	-1.889	1.691-0.233	11.639	-1.848	1.208	0.000	0.000	0.000	0.000	0.000	
4	49 S943	49.943		4.502	0.741	1.185	13.637	-1.889	1.669-0.214	11.996	-1.752	1.209	0.000	0.000	0.000	0.000	0.000	
7	50 S193	50.193		4.155	0.656	1.194	13.187	-1.812	1.617-0.214	12.885	-1.836	1.212	0.000	0.000	0.000	0.000	0.000	
12	50 S445	50.445		3.994	-0.001	1.204	12.971	0.078	1.592 0.017	13.341	0.035	1.215	0.000	0.000	0.000	0.000	0.000	
4	50 S445	50.445		3.994	-0.001	1.204	12.971	0.078	1.592 0.017	13.341	0.035	1.215	0.000	0.000	0.000	0.000	0.000	
13	50 S697	50.697		4.156	-0.658	1.204	13.226	1.970	1.626 0.250	12.851	1.902	1.218	0.000	0.000	0.000	0.000	0.000	
10	50 S997	50.997		4.578	-0.761	1.224	13.813	1.970	1.699 0.250	11.751	1.795	1.222	0.000	0.000	0.000	0.000	0.000	
10	53 S397	53.397		9.863	-1.421	1.262	19.897	3.117	2.459 0.389	5.298	0.917	1.271	0.000	0.000	0.000	0.000	0.000	
9	53 S947	53.947		11.505	-1.588	1.290	21.598	3.117	2.669 0.389	4.401	0.727	1.289	0.000	0.000	0.000	0.000	0.000	
12	54 S047	54.047		11.823	-1.619	1.291	21.907	3.117	2.708 0.389	4.261	0.693	1.293	0.000	0.000	0.000	0.000	0.000	
15	54 S397	54.397		12.984	-1.725	1.296	22.990	3.117	2.842 0.389	3.821	0.572	1.306	0.000	0.000	0.000	0.000	0.000	
13	54 S649	54.649		13.394	-1.003	1.299	23.361	-0.151	2.888-0.015	3.687	-0.026	1.317	0.000	0.000	0.000	0.000	0.000	
1	BEGIN HCDFL	54.649		13.394	-1.003	1.299	23.361	-0.151	2.888-0.015	3.687	-0.026	1.317	0.000	0.000	0.000	0.000	0.000	

TABLE IV 9

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING"  
 DELTA(P)/P = 0.008000 SYMM = F

"MAD" VERSION: 6.01/03

ZOHREH PARSA /

RUN: 19-NOV-8 08:07:18

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ELEMENT SEQUENCE	POS. ELEMENT NO.	NAME	OCC. NO.	DIST [M]	H O R I Z O N T A L			V E R T I C A L			DPY [1]				
					MUX [2PI]	X[CO] [MM]	PX[CO] [MM]	ALFAX [1]	BETAX [M]	ALFAY [1]		BETAY [M]	MUY [2PI]	Y[CO] [MM]	PY[CO] [MM]
BEGIN HCFDO	2	54.649	13.394	0.103	1.299	23.361	-0.151	2.888	-0.015	3.687	-0.026	1.317	0.000	0.000	0.000
91 QF	14	54.901	12.883	1.917	1.302	22.915	-3.413	2.834	-0.418	3.848	-0.628	1.328	0.000	0.000	0.000
92 S32H	4	58.151	4.293	0.747	1.373	11.910	-3.413	1.496	-0.418	11.668	-1.797	1.408	0.000	0.000	0.000
93 CT	13	58.251	4.148	0.711	1.377	11.571	-3.413	1.455	-0.418	12.028	-1.833	1.409	0.000	0.000	0.000
94 S3H	6	58.601	3.698	0.585	1.391	10.386	-3.413	1.311	-0.418	13.345	-1.959	1.413	0.000	0.000	0.000
95 QD	14	58.852	3.557	-0.014	1.402	9.717	-1.961	1.230	-0.235	13.845	-0.020	1.416	0.000	0.000	0.000
END HCFDO	2	58.852	3.557	-0.014	1.402	9.717	-1.961	1.230	-0.235	13.845	-0.020	1.416	0.000	0.000	0.000
BEGIN HCFD	4	58.852	3.557	-0.014	1.402	9.717	-1.961	1.230	-0.235	13.845	-0.020	1.416	0.000	0.000	0.000
96 QD	15	59.104	3.712	-0.615	1.413	9.400	-0.580	1.194	-0.060	13.364	1.923	1.419	0.000	0.000	0.000
97 S3	11	59.404	4.111	-0.725	1.425	9.228	-0.580	1.177	-0.060	12.251	1.818	1.423	0.000	0.000	0.000
98 BEND	11	61.804	9.417	-1.475	1.487	9.360	0.691	1.221	0.097	5.627	0.968	1.469	0.000	0.000	0.000
99 S5H	10	62.354	11.127	-1.659	1.496	9.737	0.691	1.274	0.097	4.673	0.780	1.486	0.000	0.000	0.000
100 CT	14	62.454	11.460	-1.693	1.497	9.805	0.691	1.284	0.097	4.377	0.746	1.489	0.000	0.000	0.000
101 SXF	4	62.554	11.797	-1.710	1.498	9.873	0.684	1.293	0.096	4.048	0.621	1.493	0.000	0.000	0.000
102 S2H	8	62.804	12.666	-1.793	1.502	10.043	0.684	1.317	0.096	3.896	-0.005	1.502	0.000	0.000	0.000
103 QF	15	63.056	13.122	-0.010	1.505	10.037	-0.732	1.317	-0.090	3.896	-0.005	1.512	0.000	0.000	0.000
END HCFD	4	63.056	13.122	-0.010	1.505	10.037	-0.732	1.317	-0.090	3.896	-0.005	1.512	0.000	0.000	0.000
BEGIN HCFDL	2	63.056	13.122	-0.010	1.505	10.037	-0.732	1.317	-0.090	3.896	-0.005	1.512	0.000	0.000	0.000
104 QF	16	63.308	12.676	1.774	1.508	9.680	-2.122	1.272	-0.273	4.054	-0.632	1.523	0.000	0.000	0.000
105 S3	12	63.608	11.649	1.677	1.512	9.048	-2.122	1.192	-0.273	4.460	-0.735	1.534	0.000	0.000	0.000
106 BEND	12	66.008	5.273	0.966	1.561	5.532	-0.822	0.735	-0.112	9.961	-1.576	1.592	0.000	0.000	0.000
107 S5H	11	66.558	4.328	0.766	1.579	5.083	-0.822	0.675	-0.112	11.785	-1.766	1.600	0.000	0.000	0.000
108 CT	15	66.658	4.179	0.730	1.583	5.002	-0.822	0.664	-0.112	12.139	-1.801	1.601	0.000	0.000	0.000
109 S3H	7	67.008	3.717	0.602	1.597	4.717	-0.822	0.625	-0.112	13.431	-1.923	1.606	0.000	0.000	0.000
110 QD	16	67.260	3.568	0.001	1.608	4.596	-0.149	0.608	-0.023	13.910	0.030	1.608	0.000	0.000	0.000
END HCFDL	2	67.260	3.568	0.001	1.608	4.596	-0.149	0.608	-0.023	13.910	0.030	1.608	0.000	0.000	0.000
END B4S	1	67.260	3.568	0.001	1.608	4.596	-0.149	0.608	-0.023	13.910	0.030	1.608	0.000	0.000	0.000
END RING	1	201.780	3.565	0.001	4.825	4.596	-0.149	0.608	-0.023	13.928	0.030	4.823	0.000	0.000	0.000
TOTAL LENGTH =		201.780000			4.824923			0.360883		QY,			4.822551		
ALFA					BETAX(MAX)			14.062001		QY,			-0.761640		
GAMMA(TR)					DX(MAX)			2.888203		BETAY(MAX)			13.928248		
					XCO(MAX)			23.361379		DY(MAX)			0.000000		
					XCO(R.M.S.)			13.249608		YCO(MAX)			0.000000		
										YCO(R.M.S.)			0.000000		

... SEARCHING FOR CLOSED ORBIT FOR BEAM LINE "RING", DELTA(P)/P = 0.010000, SYMM = F

ITER	X	PX	Y	PY	ERROR
1	0.005831	-0.000207	0.000000	0.000000	0.267735E-02
2	0.005829	-0.000197	0.000000	0.000000	0.337740E-04
3	0.005829	-0.000197	0.000000	0.000000	0.273442E-08

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TABLE IV A

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING"  
 DELTA(P)/P = 0.010000 SYMM = F  
 "MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18  
 ZOHREH PARSA /

POS. NO.	ELEMENT NAME	SEQUENCE NO.	OCC.	DIST I [M]	I	H	O R I Z O N T A L	MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	DX [M]	DPX [I]	I	BETAX [M]	ALFAX [I]	MUX [2PI]	V E R T I C A L	Y(CO) [MM]	PY(CO) [MM]	DY [M]	DPY [I]	
BEGIN	RING	1		0.000				0.000	5.829	-0.197	0.625	-0.025		13.969	0.036	0.000	0.000	0.000	0.000	0.000	0.000	
BEGIN	B4S	1		33.630				0.804	5.829	-0.197	0.625	-0.025		13.976	0.036	0.804	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	3		33.630				0.804	5.829	-0.197	0.625	-0.025		13.976	0.036	0.804	0.000	0.000	0.000	0.000	0.000	
	55 QD	9		33.882				0.815	5.886	0.650	0.630	0.066		13.464	1.993	0.807	0.000	0.000	0.000	0.000	0.000	
	56 S3	7		34.182				0.827	6.079	0.650	0.650	0.066		12.313	1.884	0.811	0.000	0.000	0.000	0.000	0.000	
	57 BEND	7		35.582				0.890	9.586	2.292	0.997	0.229		5.474	0.995	0.875	0.000	0.000	0.000	0.000	0.000	
	58 S5H	6		37.132				0.898	10.834	2.292	0.997	0.229		4.498	0.797	0.875	0.000	0.000	0.000	0.000	0.000	
	59 CT	8		37.232				0.900	11.060	2.292	1.143	0.229		4.344	0.761	0.878	0.000	0.000	0.000	0.000	0.000	
	60 SXF	3		37.332				0.901	11.287	2.283	1.165	0.227		4.198	0.718	0.882	0.000	0.000	0.000	0.000	0.000	
	61 S2H	5		37.582				0.904	11.852	2.283	1.221	0.227		3.864	0.629	0.892	0.000	0.000	0.000	0.000	0.000	
	62 QF	9		37.834				0.907	12.211	0.587	1.256	0.052		3.703	0.025	0.902	0.000	0.000	0.000	0.000	0.000	
END	HCDF			37.834				0.907	12.211	0.587	1.256	0.052		3.703	0.025	0.902	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	3		37.834				0.907	12.211	0.587	1.256	0.052		3.703	0.025	0.902	0.000	0.000	0.000	0.000	0.000	
	63 QF	10		38.086				0.911	12.143	-1.130	1.247	-0.124		3.839	-0.575	0.913	0.000	0.000	0.000	0.000	0.000	
	64 S3	8		38.386				0.914	11.807	-1.130	1.210	-0.124		4.211	-0.678	0.925	0.000	0.000	0.000	0.000	0.000	
	65 BEND	8		40.786				0.964	11.005	0.458	1.102	0.033		9.450	-1.530	0.986	0.000	0.000	0.000	0.000	0.000	
	66 S5H	7		41.336				0.982	11.254	0.458	1.119	0.033		11.220	-1.723	0.995	0.000	0.000	0.000	0.000	0.000	
	67 CT	9		41.436				0.986	11.300	0.458	1.123	0.033		11.565	-1.758	0.996	0.000	0.000	0.000	0.000	0.000	
	68 SXD	3		41.536				0.990	11.348	0.510	1.126	0.043		11.906	-1.683	0.998	0.000	0.000	0.000	0.000	0.000	
	69 S2H	6		41.786				1.000	11.474	0.510	1.137	0.043		12.759	-1.763	1.001	0.000	0.000	0.000	0.000	0.000	
	70 QD	10		42.037				1.011	11.809	2.192	1.168	0.210		13.181	0.089	1.004	0.000	0.000	0.000	0.000	0.000	
END	HCDF			42.037				1.011	11.809	2.192	1.168	0.210		13.181	0.089	1.004	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	3		42.037				1.011	11.809	2.192	1.168	0.210		13.181	0.089	1.004	0.000	0.000	0.000	0.000	0.000	
	71 QD	2		42.037				1.011	11.809	2.192	1.168	0.210		13.181	0.089	1.004	0.000	0.000	0.000	0.000	0.000	
	72 S32H	11		42.289				1.022	12.573	3.954	1.241	0.384		12.671	1.929	1.007	0.000	0.000	0.000	0.000	0.000	
	73 CT	3		45.539				1.102	25.294	3.954	2.463	0.384		4.116	0.730	1.084	0.000	0.000	0.000	0.000	0.000	
	74 S3H	10		45.639				1.104	27.685	3.954	2.500	0.384		3.975	0.693	1.084	0.000	0.000	0.000	0.000	0.000	
	75 QF	4		45.989				1.108	27.055	3.954	2.632	0.384		3.540	0.564	1.099	0.000	0.000	0.000	0.000	0.000	
	76 QF	11		46.241				1.111	27.562	0.103	2.680	0.009		3.401	-0.001	1.110	0.000	0.000	0.000	0.000	0.000	
END	HCDF			46.241				1.111	27.562	0.103	2.680	0.009		3.401	-0.001	1.110	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	2		46.241				1.111	27.562	0.103	2.680	0.009		3.401	-0.001	1.110	0.000	0.000	0.000	0.000	0.000	
	77 S3	4		46.493				1.114	27.562	-3.752	2.636	-0.366		3.401	-0.001	1.110	0.000	0.000	0.000	0.000	0.000	
	78 BEND	9		46.793				1.117	25.992	-3.752	2.529	-0.366		3.909	-0.676	1.135	0.000	0.000	0.000	0.000	0.000	
	79 S5H	8		49.193				1.161	18.699	-2.353	1.821	-0.231		9.347	-1.615	1.199	0.000	0.000	0.000	0.000	0.000	
	80 CT	11		49.843				1.181	17.185	-2.353	1.673	-0.231		11.220	-1.825	1.208	0.000	0.000	0.000	0.000	0.000	
	81 SXD	7		49.943				1.184	16.958	-2.353	1.652	-0.208		11.585	-1.863	1.209	0.000	0.000	0.000	0.000	0.000	
	82 S2H	4		50.193				1.194	16.405	-2.235	1.601	-0.208		11.941	-1.736	1.210	0.000	0.000	0.000	0.000	0.000	
	83 QD	12		50.445				1.203	16.142	-2.235	1.578	-0.208		12.821	-1.819	1.214	0.000	0.000	0.000	0.000	0.000	
END	HCDF			50.445				1.203	16.142	-2.235	1.578	-0.208		12.821	-1.819	1.214	0.000	0.000	0.000	0.000	0.000	
BEGIN	HCDF	4		50.445				1.203	16.142	-2.235	1.578	-0.208		12.821	-1.819	1.214	0.000	0.000	0.000	0.000	0.000	
	84 QD	13		50.697				1.203	16.142	0.116	1.578	0.021		13.270	0.043	1.217	0.000	0.000	0.000	0.000	0.000	
	85 S3	10		50.947				1.203	16.142	0.116	1.578	0.021		13.270	0.043	1.217	0.000	0.000	0.000	0.000	0.000	
	86 BEND	10		53.397				1.224	17.197	2.472	1.611	0.252		12.780	1.898	1.224	0.000	0.000	0.000	0.000	0.000	
	87 S5H	9		53.947				1.281	24.801	3.895	2.444	0.389		5.276	0.707	1.273	0.000	0.000	0.000	0.000	0.000	
	88 CT	12		54.047				1.289	26.921	3.895	2.654	0.389		4.391	0.685	1.291	0.000	0.000	0.000	0.000	0.000	
	89 S3H	5		54.397				1.291	27.307	3.895	2.692	0.389		4.252	0.685	1.294	0.000	0.000	0.000	0.000	0.000	
	90 QF	13		54.649				1.295	28.657	3.895	2.825	0.389		3.819	0.565	1.308	0.000	0.000	0.000	0.000	0.000	
END	HCDF			54.649				1.298	29.121	-0.179	2.872	-0.013		3.688	-0.033	1.319	0.000	0.000	0.000	0.000	0.000	
	91 QF	1		54.649				1.298	29.121	-0.179	2.872	-0.013		3.688	-0.033	1.319	0.000	0.000	0.000	0.000	0.000	0.000

TABLE IV

AGS BOOSTER LATTICE FOR SURVEY  
 LINEAR LATTICE PARAMETERS FOR BEAM LINE: "RING"  
 DELTA(P)/P = 0.010000 SYMM = F

"MAD" VERSION: 6.01/03 RUN: 19-NOV-8 08:07:18

POS. NO.	ELEMENT NAME	SEQUENCE NO.	ELEM OCC.	H O R I Z O N T A L			V E R T I C A L			DY [M]	DPY [I]			
				DIST [M]	MUX [2PI]	X(CO) [MM]	PX(CO) [MM]	DX [M]	DPX [I]			MUY [2PI]	Y(CO) [MM]	
BEGIN	HCEDO	2		54.649	1.298	29.121	-0.179	2.872	-0.013	1.319	0.000	0.000	0.000	0.000
91	QF	14		54.901	1.301	28.568	-4.246	2.819	-0.414	1.329	0.000	0.000	0.000	0.000
92	S32H	4		58.151	1.373	14.906	-4.246	1.500	-0.414	1.409	0.000	0.000	0.000	0.000
93	CT	13		58.251	1.376	14.486	-4.246	1.459	-0.414	1.410	0.000	0.000	0.000	0.000
94	S3H	6		58.601	1.390	13.015	-4.246	1.317	-0.414	1.415	0.000	0.000	0.000	0.000
95	QD	14		58.852	1.402	12.185	-2.425	1.238	-0.230	1.417	0.000	0.000	0.000	0.000
END	HCEDO	2		58.852	1.402	12.185	-2.425	1.238	-0.230	1.417	0.000	0.000	0.000	0.000
BEGIN	HCDF	4		59.104	1.402	12.185	-2.425	1.238	-0.230	1.417	0.000	0.000	0.000	0.000
96	QD	15		59.104	1.402	12.185	-2.425	1.238	-0.230	1.417	0.000	0.000	0.000	0.000
97	S3	11		59.404	1.425	11.592	-0.693	1.188	-0.053	1.424	0.000	0.000	0.000	0.000
98	BEND	11		61.804	1.487	11.828	0.891	1.247	0.103	1.470	0.000	0.000	0.000	0.000
99	S5H	10		62.354	1.496	12.313	0.891	1.302	0.103	1.487	0.000	0.000	0.000	0.000
100	CT	14		62.454	1.497	12.401	0.891	1.312	0.103	1.490	0.000	0.000	0.000	0.000
101	SXF	4		62.554	1.498	12.489	0.880	1.322	0.100	1.494	0.000	0.000	0.000	0.000
102	S2H	8		62.804	1.502	12.705	0.880	1.347	0.100	1.503	0.000	0.000	0.000	0.000
103	QF	15		63.056	1.505	12.702	-0.911	1.348	-0.090	1.513	0.000	0.000	0.000	0.000
END	HCDF	4		63.056	1.505	12.702	-0.911	1.348	-0.090	1.513	0.000	0.000	0.000	0.000
BEGIN	HCDFL	2		63.308	1.505	12.702	-0.911	1.348	-0.090	1.513	0.000	0.000	0.000	0.000
104	QF	16		63.608	1.512	11.461	-2.671	1.221	-0.276	1.523	0.000	0.000	0.000	0.000
105	S3	12		66.008	1.561	7.024	-1.050	0.757	-0.116	1.591	0.000	0.000	0.000	0.000
106	BEND	12		66.558	1.579	6.452	-1.050	0.694	-0.116	1.599	0.000	0.000	0.000	0.000
107	S5H	11		66.658	1.583	6.348	-1.050	0.683	-0.116	1.600	0.000	0.000	0.000	0.000
108	CT	15		67.008	1.597	5.984	-1.050	0.643	-0.116	1.605	0.000	0.000	0.000	0.000
109	S3H	7		67.260	1.608	5.829	-0.197	0.625	-0.025	1.608	0.000	0.000	0.000	0.000
110	QD	16		67.260	1.608	5.829	-0.197	0.625	-0.025	1.608	0.000	0.000	0.000	0.000
END	HCDFL	2		67.260	1.608	5.829	-0.197	0.625	-0.025	1.608	0.000	0.000	0.000	0.000
END	B4S	1		67.260	1.608	5.829	-0.197	0.625	-0.025	1.608	0.000	0.000	0.000	0.000
END	RING	1		201.780	4.828	5.829	-0.197	0.625	-0.025	4.818	0.000	0.000	0.000	0.000
TOTAL LENGTH				201.780000	QX			4.827681		QY			4.818355	
ALFA				0.435019E-01	QX'			0.442220		QY'			-0.953803	
GAMMA(TR)				4.794526	BETAX(MAX)			14.110854		BETAY(MAX)			14.0011904	
					DX(MAX)			2.871719		DY(MAX)			0.0000000	
					XCO(MAX)			29.121348		YCO(MAX)			0.0000000	
					XCO(R.M.S.)			16.541174		YCO(R.M.S.)			0.0000000	

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