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POWER DENSITY DISTRIBUTION ALONG THE BEAMLIN

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Author

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Publication Date

1980-11-01



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UNIVERSITY OF CALIFORNIA

Engineering & Technical Services Division

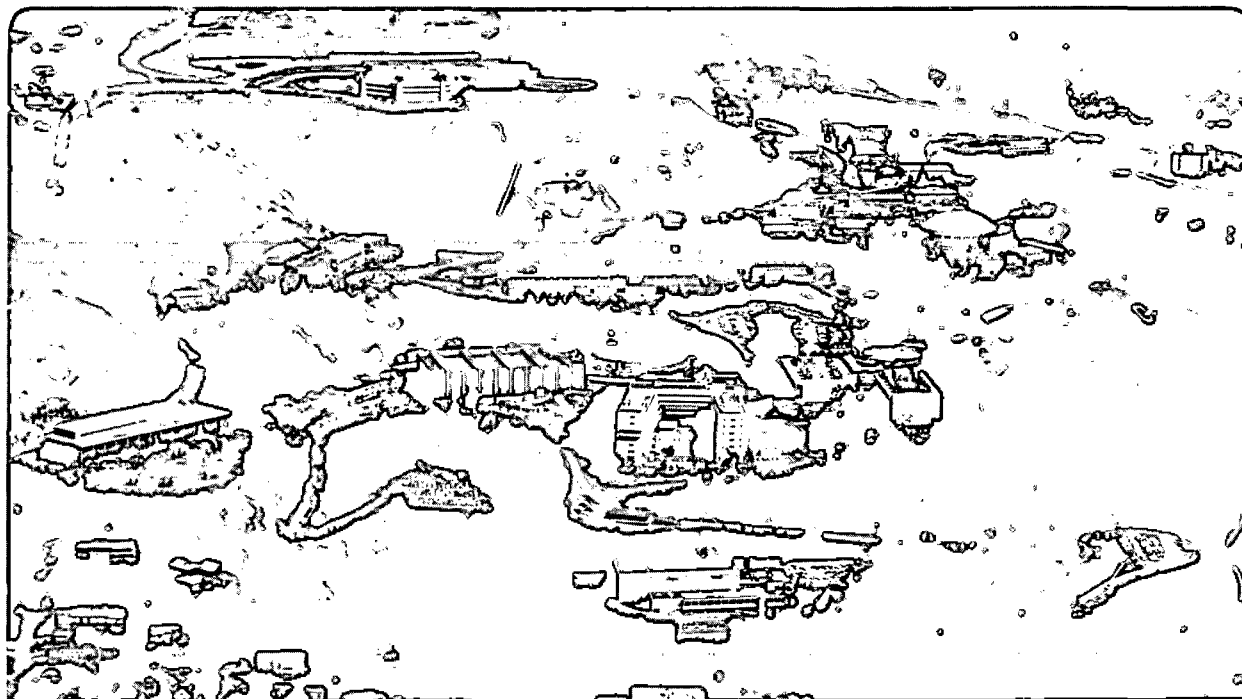
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LAWRENCE RADIATION LABORATORY - UNIVERSITY OF CALIFORNIA		CODE	SERIAL	PAGE
ENGINEERING NOTE		TF-00-00	M5627	1 OF 73
AUTHOR	DEPARTMENT	LOCATION	DATE	
J. HAUGHIAN	MECH. ENGRG	BERKELEY	25 NOVEMBER 1980	
PROGRAM - PROJECT - JOB				
NBSTF - TFTR				
GENERAL				
TITLE				
POWER DENSITY DISTRIBUTION ALONG THE BEAMLINER				

LEE PITTINGER OF LLL WROTE AN ENGINEERING NOTE [ENC-77-1 DTD. 28 NOV 1977] PRESENTING FORMULAE ENABLING CALCULATION OF THE POWER DENSITY FOR A BEAM WHICH CAN BE CHARACTERIZED BY A GAUSSIAN OR BI-GAUSSIAN ANGULAR POWER DENSITY DISTRIBUTION. THESE FORMULAE HAVE BEEN TAILORED TO THE RECTANGULAR SOURCES USED ON NBSTF-TFTR.

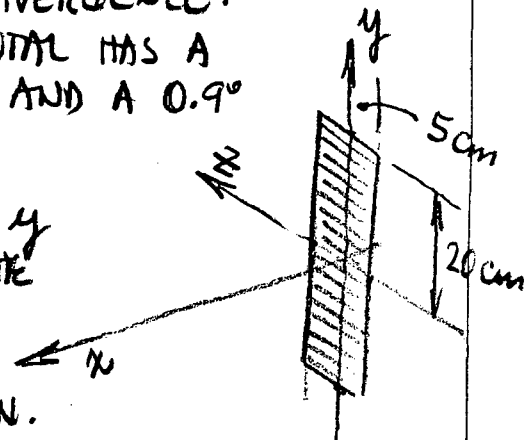
USING THE METHODS OUTLINED IN HIS NOTE, THE POWER DENSITIES WERE COMPUTED* FOR VARIOUS POINTS ALONG THE NO. 2 BEAMLINER OF THE NBSTF-TFTR INJECTOR-DUCT-AND TARGET CHAMBER ASSEMBLY.

THE GEOMETRY IS SHOWN ON DWG. NO. 19Q0924 WHICH SHOULD ACCOMPANY THIS NOTE. A GREATLY-REDUCED VERSION OF IT IS SHOWN ON PAGE 4.

THE FOLLOWING ASSUMPTIONS WERE MADE:

THE SOURCE IS A TYPICAL 10. CM X 40. CM NBSTF SOURCE WITH AN OUTPUT WHICH CAN BE CONSIDERED TO BE THE COMBINATION OF DIVERGENT BEAMS. 10% OF THE TOTAL CAN BE THOUGHT TO HAVE 0.5° HORIZONTAL DIVERGENCE & 5.0° VERTICAL DIVERGENCE. THE REMAINING 90% OF THE TOTAL HAS A 0.35° HORIZONTAL DIVERGENCE AND A 0.9° VERTICAL DIVERGENCE.

THE COORDINATE SYSTEM USES *y* AS THE LONG DIMENSION ON THE SOURCE, & *z* AS THE SHORT DIMENSION. THE PARTICLES ARE DIRECTED IN THE *x*-DIRECTION.



* ON 12-13-79 FOR THE DUCT & TARGET TANK;
ON 11-27-79 FOR ALL THE OTHER POINTS.

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THE SOURCE OUTPUT POINT IS LOCATED AT x, y, z COORDINATES $0, 0, 0$. THE SOURCE IS AIMED (INFINITELY FAR AWAY) AT $10000, 0, 0$.

ALL DIMENSIONS ARE GIVEN IN CM.

THE SOURCE PRODUCES A 120-KV, 65-AMP, BEAM. THE POWER DENSITIES, KW/CM², ARE GIVEN FOR THE TOTAL BEAM, I.E., IONS PLUS NEUTRALS. THESE DENSITIES ARE GIVEN ALONG THE y - AND z -AXES, AT VARIOUS PLACES ALONG THE x -AXIS.

ALTHOUGH THEY ARE LISTED ATOP DRAWING 19Q 0924, & ARE SHOWN IN LOCATION, NO ACCOUNT HAS BEEN TAKEN OF THE SCRAPERS ALONG THE BEAMLIN. THEY WILL BE DEALT WITH IN A SUBSEQUENT NOTE,

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THE OUTPUT CONTAINS THE FOLLOWING:

1. THE POWER DENSITY ALONG THE BEAM \hat{e} ($y=0, z=0$) AT 25-CM INTERVALS ALONG THE x -AXIS.
2. POWER DENSITY DISTRIBUTIONS ALONG THE y - AND z -AXES, FOR VARIOUS POINTS ALONG THE x -AXIS, THESE POINTS ARE CHOSEN AT 100-CM INTERVALS ALONG THE x -AXIS, STARTING AT $x = 300$ CM.
3. POWER DENSITY DISTRIBUTIONS ALONG THE y - AND z -AXES WHERE THE RIGHT-HAND SIDE OF THE DUCT NARROWS; I.E., AT A DISTANCE $x \approx 860.49$ CM. MEASURED ALONG THE x -AXIS.
4. POWER DENSITY DISTRIBUTIONS ALONG THE y - AND z -AXES, WHERE THE FLOOR AND CEILING OF THE DUCT NARROW; I.E., AT A DISTANCE $x \approx 876.82$ CM MEASURED ALONG THE x -AXIS.
5. POWER DENSITY DISTRIBUTIONS ALONG THE y - AND z -AXES, AT DISTANCES DOWNSTREAM WHERE THE CENTRAL RAY OF THE NO. 1, NO. 2 OR NO. 3 SOURCES INTERSECT THE TARGET CHAMBER BEAMDUMP.

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1. THE POWER DENSITY ALONG THE
NO. 2 BEAM \hat{e}_z (i.e., $y=0, z=0$)
AT 25-CM INTERVALS FROM
 $x=0$ TO $x=1200$ CM.

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 11/27/79

GRID NO. 1 S1 PARALLEL TO: -X- AXIS

GRID SPECS (X1,Y1,Z1): 0. 0. 0.
 (X2,Y2,Z2): 1200. 0. 0.
 (DS): 25.00

X	Y	Z	S1	POWER FLUX
0.	0.	0.	0.	19.50
25.00	0.	0.	25.00	19.51
50.00	0.	0.	50.00	19.52
75.00	0.	0.	75.00	19.53
100.0	0.	0.	100.0	19.54
125.0	0.	0.	125.0	19.53
150.0	0.	0.	150.0	19.50
175.0	0.	0.	175.0	19.44
200.0	0.	0.	200.0	19.37
225.0	0.	0.	225.0	19.29
250.0	0.	0.	250.0	19.21
275.0	0.	0.	275.0	19.13
300.0	0.	0.	300.0	19.05
325.0	0.	0.	325.0	18.97
350.0	0.	0.	350.0	18.89
375.0	0.	0.	375.0	18.81
400.0	0.	0.	400.0	18.71
425.0	0.	0.	425.0	18.61
450.0	0.	0.	450.0	18.48
475.0	0.	0.	475.0	18.35
500.0	0.	0.	500.0	18.19
525.0	0.	0.	525.0	18.02
550.0	0.	0.	550.0	17.83
575.0	0.	0.	575.0	17.62
600.0	0.	0.	600.0	17.40
625.0	0.	0.	625.0	17.16
650.0	0.	0.	650.0	16.91
675.0	0.	0.	675.0	16.64
700.0	0.	0.	700.0	16.36
725.0	0.	0.	725.0	16.08
750.0	0.	0.	750.0	15.78
775.0	0.	0.	775.0	15.48
800.0	0.	0.	800.0	15.17
825.0	0.	0.	825.0	14.86
850.0	0.	0.	850.0	14.55
875.0	0.	0.	875.0	14.24
900.0	0.	0.	900.0	13.92
925.0	0.	0.	925.0	13.61
950.0	0.	0.	950.0	13.30
975.0	0.	0.	975.0	12.99
1000.	0.	0.	1000.	12.69

ALSO SUM

MS025

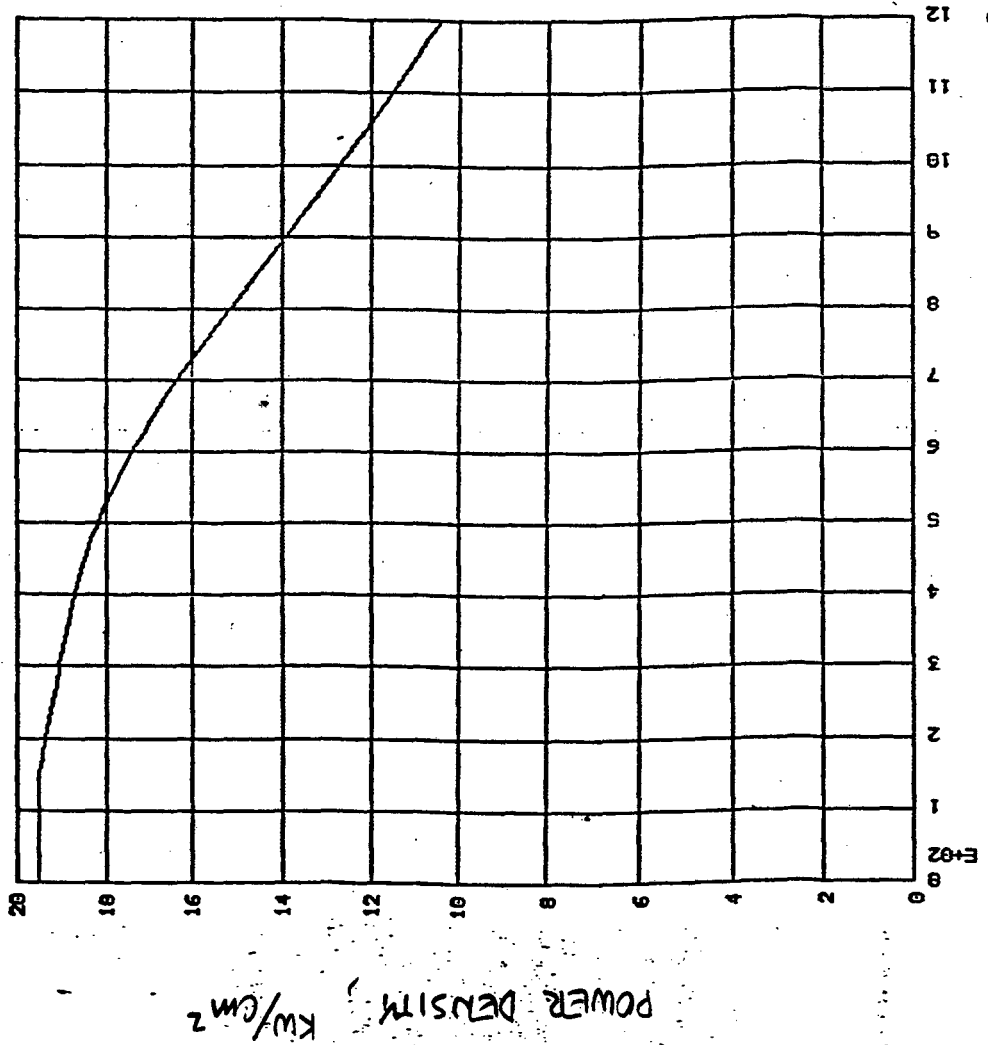
P6

1025.	0.	0.	1025.	12.39
1050.	0.	0.	1050.	12.09
1075.	0.	0.	1075.	11.80
1100.	0.	0.	1100.	11.51
1125.	0.	0.	1125.	11.23
1150.	0.	0.	1150.	10.96
1175.	0.	0.	1175.	10.69
1200.	0.	0.	1200.	10.43

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POWER DENSITY ALONG THE NO. 2 BEAM Q
($y=0, z=0$)



PHYS & DISTANCE ALONG X-AXIS, CM. X 10⁻²

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2. POWER DENSITY DISTRIBUTION
ALONG THE y - AND z -AXES,
FOR VARIOUS POINTS ALONG
THE x -AXIS. THE POINTS ARE
CHOSEN AT 100-CM INTERVALS
BETWEEN $x = 300$ CM $\&$ $x = 1200$ CM.

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

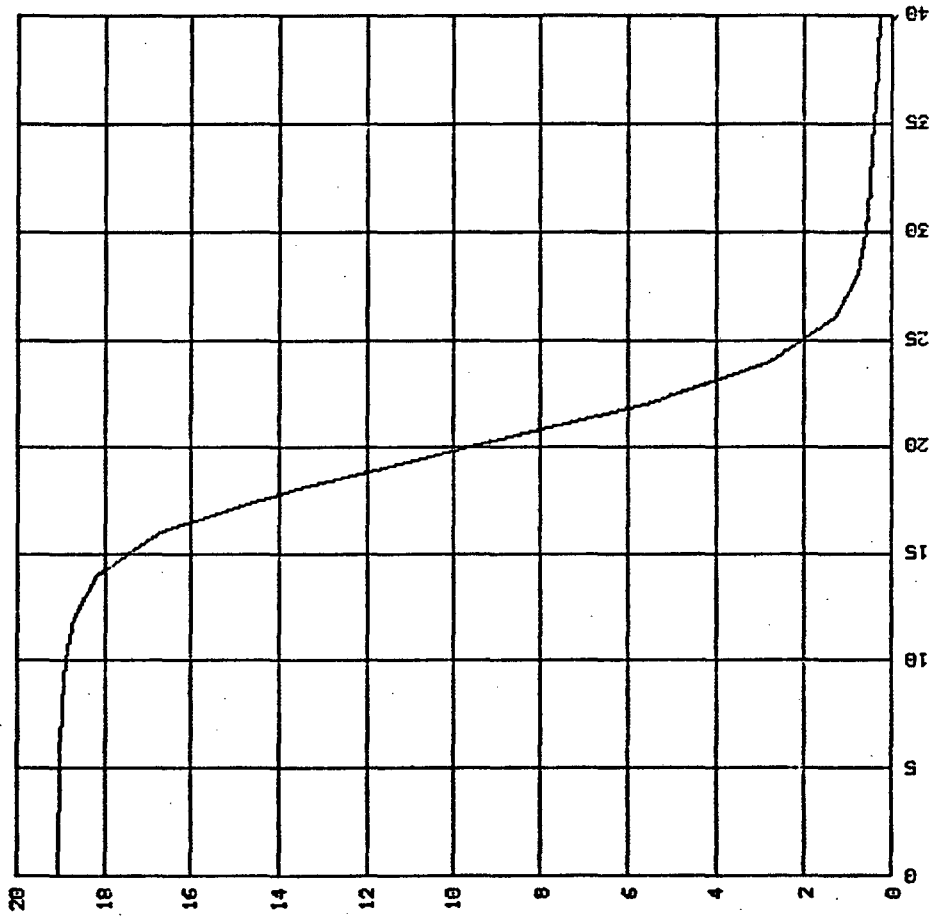
GRID NO. 1 SI PARALLEL TO: -Y- AXIS

GRID SPECS (X1, Y1, Z1): 300.0 0. 0.
 (X2, Y2, Z2): 300.0 40.00 0.
 (DS): 2.000

X	Y	Z	SI	POWER FLUX
300.0	0.	0.	0.	19.05
300.0	2.000	0.	2.000	19.05
300.0	4.000	0.	4.000	19.03
300.0	6.000	0.	6.000	19.00
300.0	8.000	0.	8.000	18.97
300.0	10.00	0.	10.00	18.90
300.0	12.00	0.	12.00	18.72
300.0	14.00	0.	14.00	18.15
300.0	16.00	0.	16.00	16.65
300.0	18.00	0.	18.00	13.72
300.0	20.00	0.	20.00	9.641
300.0	22.00	0.	22.00	5.600
300.0	24.00	0.	24.00	2.757
300.0	26.00	0.	26.00	1.320
300.0	28.00	0.	28.00	0.7741
300.0	30.00	0.	30.00	0.5071
300.0	32.00	0.	32.00	0.4990
300.0	34.00	0.	34.00	0.4326
300.0	36.00	0.	36.00	0.3732
300.0	38.00	0.	38.00	0.3190
300.0	40.00	0.	40.00	0.2701

MS627

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$\lambda = 300 \text{ cm}$.

$r, \text{ cm}$.

POWER DENSITY, kW/cm^2

P VS Y

BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:23:10 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

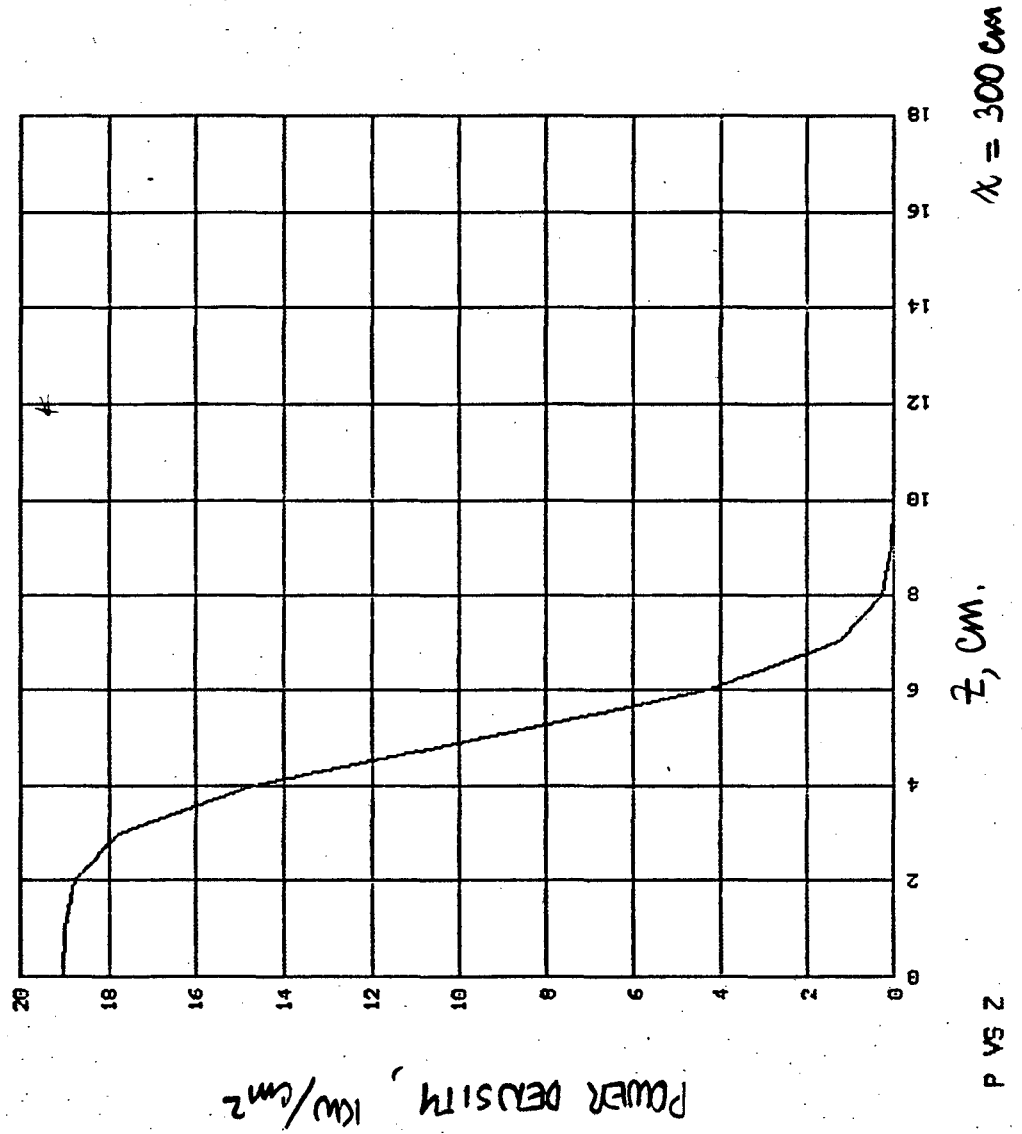
GRID NO. 2 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 300.0 0. 0.
(X2,Y2,Z2): 300.0 0. 18.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
300.0	0.	0.	0.	19.05
300.0	0.	1.000	1.000	19.02
300.0	0.	2.000	2.000	18.80
300.0	0.	3.000	3.000	17.76
300.0	0.	4.000	4.000	14.70
300.0	0.	5.000	5.000	9.447
300.0	0.	6.000	6.000	4.238
300.0	0.	7.000	7.000	1.254
300.0	0.	8.000	8.000	0.2493
300.0	0.	9.000	9.000	3.8389E-02
300.0	0.	10.00	10.00	5.7165E-03
300.0	0.	11.00	11.00	8.4609E-04
300.0	0.	12.00	12.00	1.0697E-04
300.0	0.	13.00	13.00	1.0533E-05
300.0	0.	14.00	14.00	7.8737E-07
300.0	0.	15.00	15.00	4.4422E-08
300.0	0.	16.00	16.00	1.8870E-09
300.0	0.	17.00	17.00	6.0349E-11
300.0	0.	18.00	18.00	1.4474E-12

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TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

GRID NO. 3 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): 400.0 0. 0.
 (X2,Y2,Z2): 400.0 50.00 0.
 (DS): 2.000

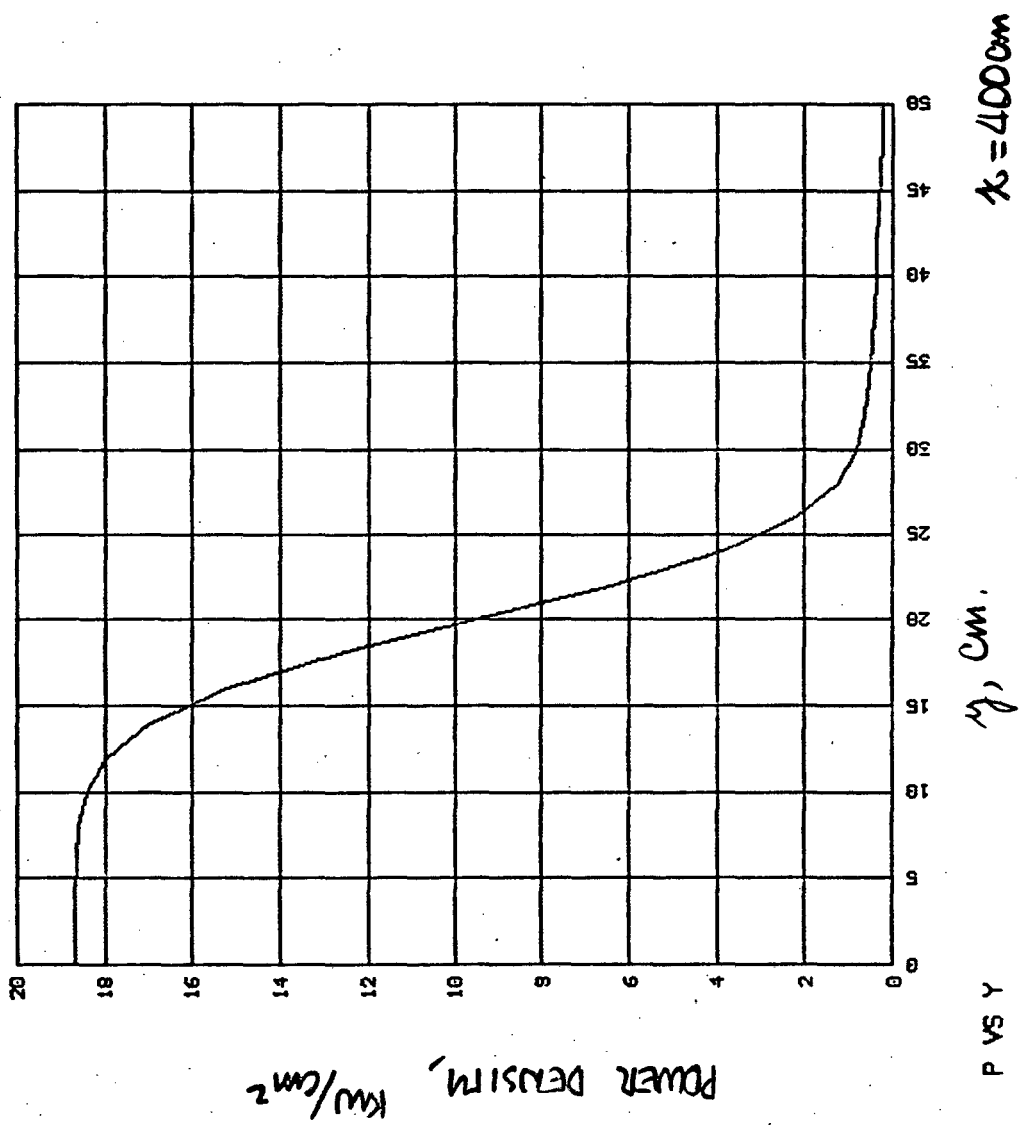
X	Y	Z	S1	POWER FLUX
400.0	0.	0.	0.	18.71
400.0	2.000	0.	2.000	18.71
400.0	4.000	0.	4.000	18.70
400.0	6.000	0.	6.000	18.67
400.0	8.000	0.	8.000	18.60
400.0	10.00	0.	10.00	18.42
400.0	12.00	0.	12.00	17.96
400.0	14.00	0.	14.00	16.97
400.0	16.00	0.	16.00	15.22
400.0	18.00	0.	18.00	12.64
400.0	20.00	0.	20.00	9.522
400.0	22.00	0.	22.00	6.429
400.0	24.00	0.	24.00	3.904
400.0	26.00	0.	26.00	2.206
400.0	28.00	0.	28.00	1.257
400.0	30.00	0.	30.00	0.8066
400.0	32.00	0.	32.00	0.6115
400.0	34.00	0.	34.00	0.5205
400.0	36.00	0.	36.00	0.4644
400.0	38.00	0.	38.00	0.4186
400.0	40.00	0.	40.00	0.3767
400.0	42.00	0.	42.00	0.3374
400.0	44.00	0.	44.00	0.3005
400.0	46.00	0.	46.00	0.2661
400.0	48.00	0.	48.00	0.2344
400.0	50.00	0.	50.00	0.2052

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BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:23:10 TIME LEFT: 0.983

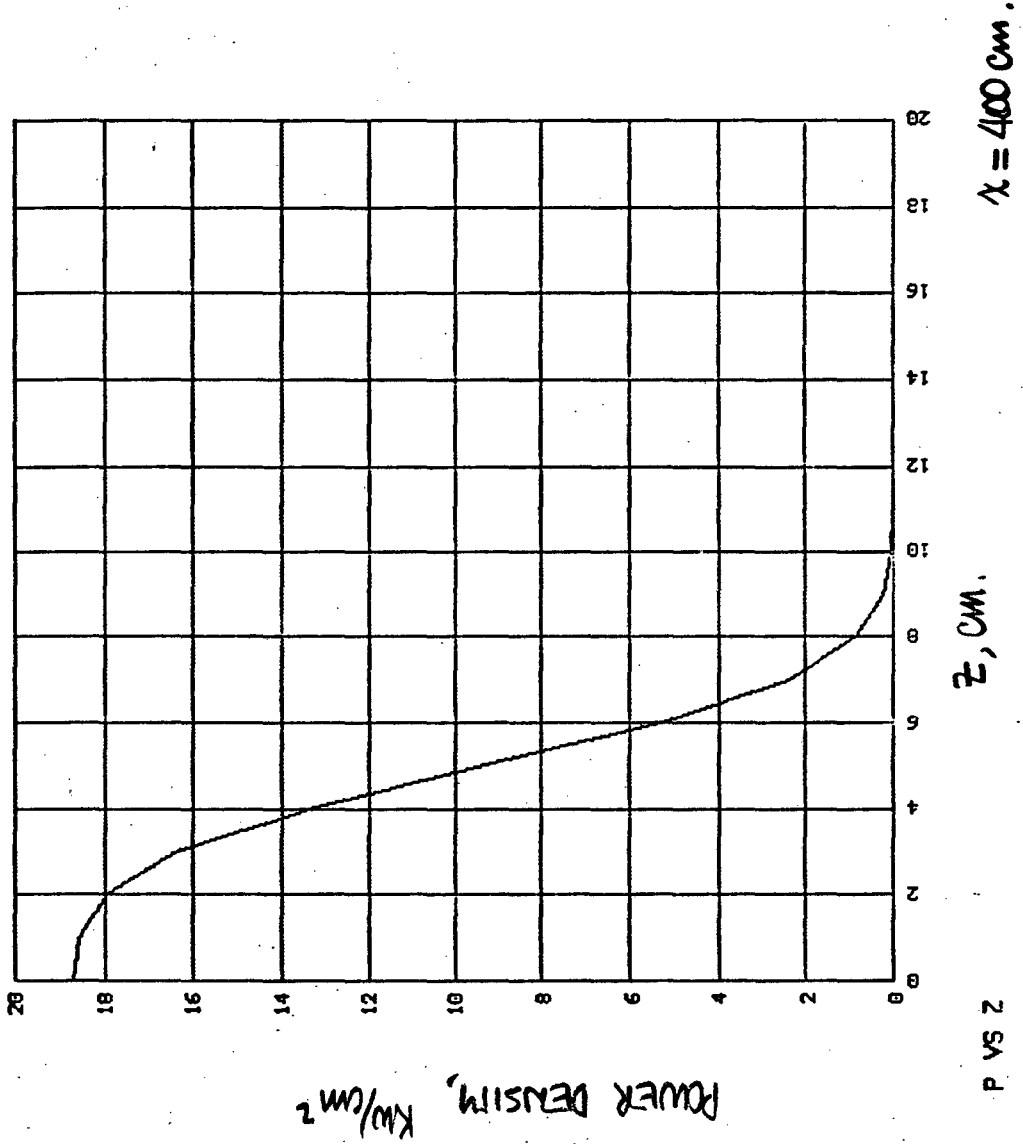
TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

GRID NO. 4 S.I PARALLEL TO: -Z- AXIS

GRID SPECS (X1.Y1.Z1): 400.0 0. 0.
(X2.Y2.Z2): 400.0 0. 20.00
(DS): 1.000

X	Y	Z	S.I	POWER FLUX
400.0	0.	0.	0.	19.71
400.0	0.	1.000	1.000	18.57
400.0	0.	2.000	2.000	17.95
400.0	0.	3.000	3.000	16.36
400.0	0.	4.000	4.000	13.39
400.0	0.	5.000	5.000	9.331
400.0	0.	6.000	6.000	5.296
400.0	0.	7.000	7.000	2.379
400.0	0.	8.000	8.000	0.8300
400.0	0.	9.000	9.000	0.2357
400.0	0.	10.00	10.00	5.6379E-02
400.0	0.	11.00	11.00	1.2768E-02
400.0	0.	12.00	12.00	2.9690E-03
400.0	0.	13.00	13.00	6.9059E-04
400.0	0.	14.00	14.00	1.4863E-04
400.0	0.	15.00	15.00	2.8107E-05
400.0	0.	16.00	16.00	4.5758E-06
400.0	0.	17.00	17.00	6.3720E-07
400.0	0.	18.00	18.00	7.5744E-08
400.0	0.	19.00	19.00	7.6787E-09
400.0	0.	20.00	20.00	6.6349E-10

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BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:23:10 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

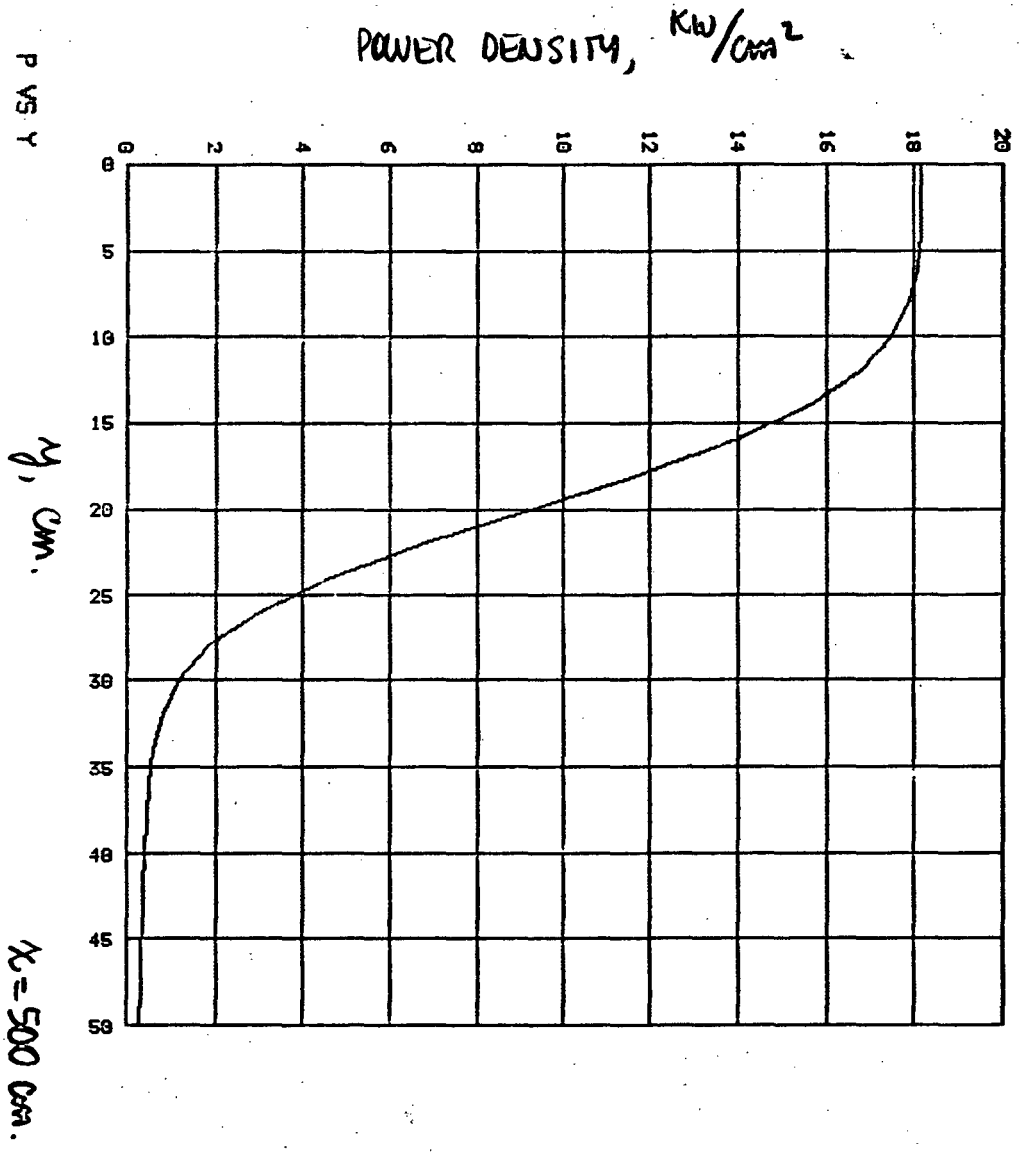
GRID NO. 5 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): 500.0 0. 0.
(X2,Y2,Z2): 500.0 50.00 0.
(DS): 2.000

X	Y	Z	S1	POWER FLUX
500.0	0.	0.	0.	18.19
500.0	2.000	0.	2.000	18.18
500.0	4.000	0.	4.000	18.15
500.0	6.000	0.	6.000	18.08
500.0	8.000	0.	8.000	17.89
500.0	10.00	0.	10.00	17.51
500.0	12.00	0.	12.00	16.80
500.0	14.00	0.	14.00	15.62
500.0	16.00	0.	16.00	13.92
500.0	18.00	0.	18.00	11.73
500.0	20.00	0.	20.00	9.255
500.0	22.00	0.	22.00	6.797
500.0	24.00	0.	24.00	4.644
500.0	26.00	0.	26.00	2.981
500.0	28.00	0.	28.00	1.847
500.0	30.00	0.	30.00	1.159
500.0	32.00	0.	32.00	0.7845
500.0	34.00	0.	34.00	0.5952
500.0	36.00	0.	36.00	0.5002
500.0	38.00	0.	38.00	0.4467
500.0	40.00	0.	40.00	0.4094
500.0	42.00	0.	42.00	0.3779
500.0	44.00	0.	44.00	0.3488
500.0	46.00	0.	46.00	0.3210
500.0	48.00	0.	48.00	0.2944
500.0	50.00	0.	50.00	0.2690

M 5127

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MAY 1967

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MS627

BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:23:10 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

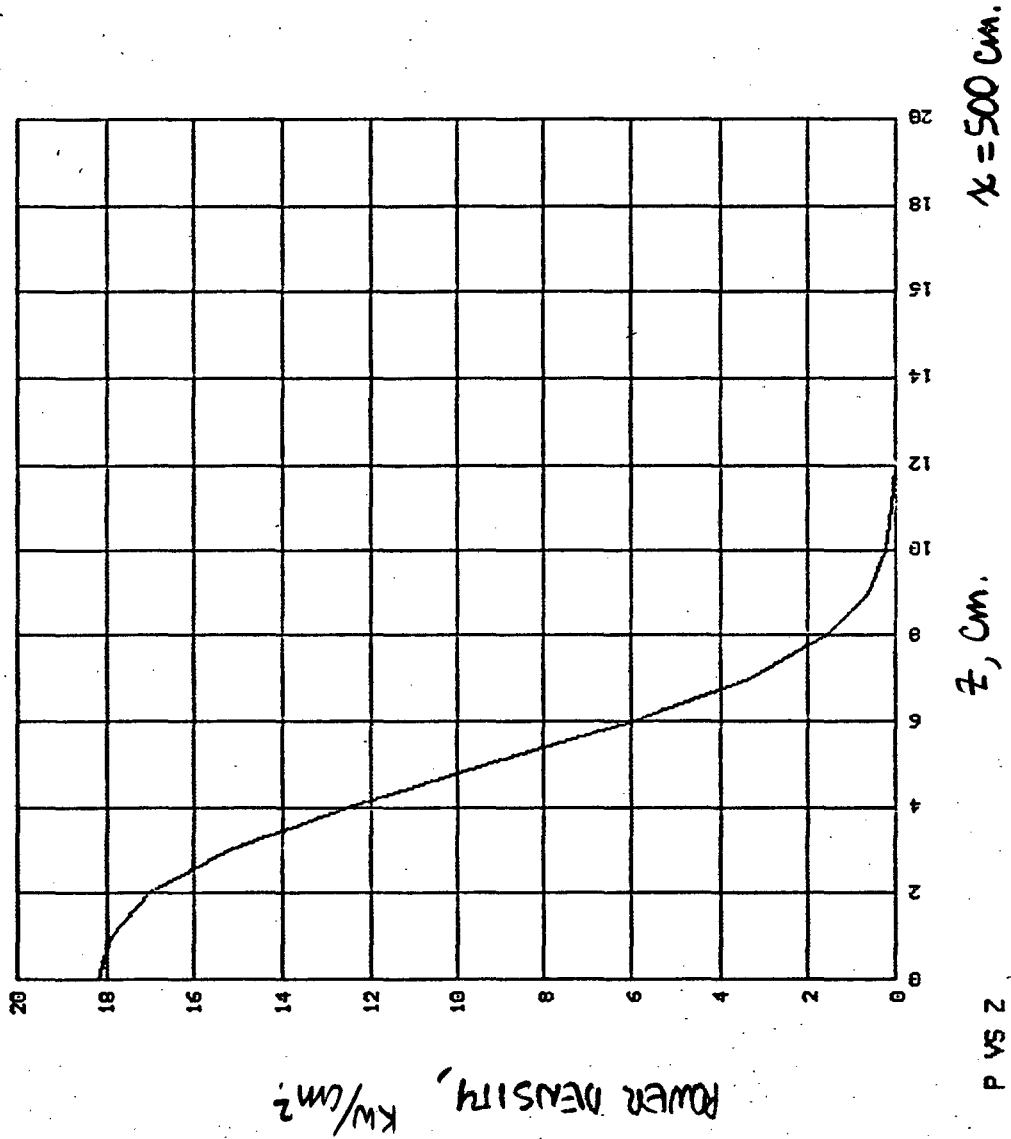
GRID NO. 6 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 500.0 0. 0.
(X2,Y2,Z2): 500.0 0. 20.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
500.0	0.	0.	0.	18.19
500.0	0.	1.000	1.000	17.92
500.0	0.	2.000	2.000	17.00
500.0	0.	3.000	3.000	15.22
500.0	0.	4.000	4.000	12.54
500.0	0.	5.000	5.000	9.249
500.0	0.	6.000	6.000	5.977
500.0	0.	7.000	7.000	3.330
500.0	0.	8.000	8.000	1.584
500.0	0.	9.000	9.000	0.6436
500.0	0.	10.00	10.00	0.2260
500.0	0.	11.00	11.00	7.0834E-02
500.0	0.	12.00	12.00	2.0926E-02
500.0	0.	13.00	13.00	6.1988E-03
500.0	0.	14.00	14.00	1.6909E-03
500.0	0.	15.00	15.00	5.7881E-04
500.0	0.	16.00	16.00	1.5991E-04
500.0	0.	17.00	17.00	4.6280E-05
500.0	0.	18.00	18.00	1.1508E-05
500.0	0.	19.00	19.00	2.5949E-06
500.0	0.	20.00	20.00	5.2925E-07

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BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:23:10 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

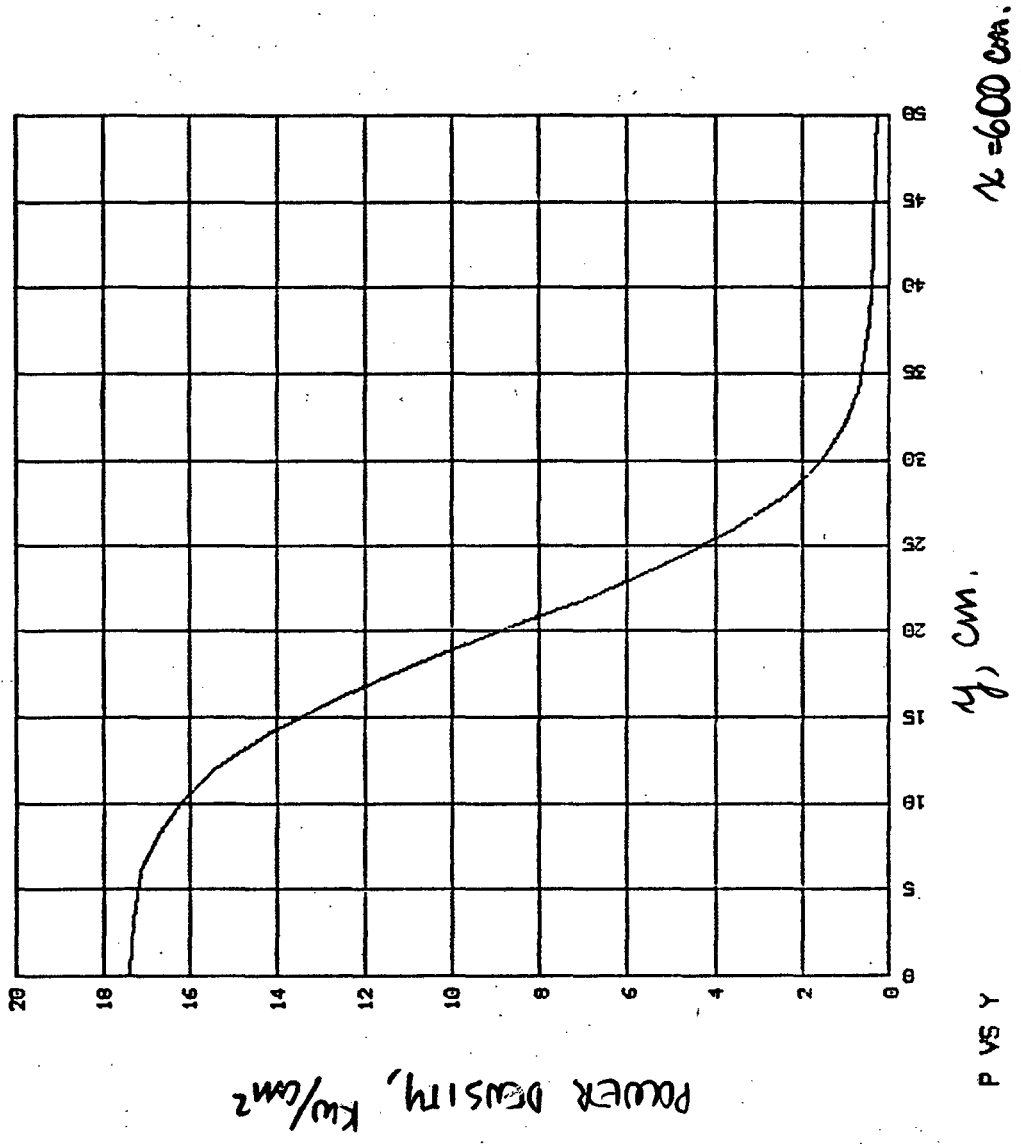
GRID NO. 7 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): 600.0 0. 0.
(X2,Y2,Z2): 600.0 50.00 0.
(DS): 2.000

X	Y	Z	S1	POWER FLUX
600.0	0.	0.	0.	17.40
600.0	2.000	0.	2.000	17.37
600.0	4.000	0.	4.000	17.29
600.0	6.000	0.	6.000	17.12
600.0	8.000	0.	8.000	16.90
600.0	10.00	0.	10.00	16.26
600.0	12.00	0.	12.00	15.42
600.0	14.00	0.	14.00	14.23
600.0	16.00	0.	16.00	12.69
600.0	18.00	0.	18.00	10.85
600.0	20.00	0.	20.00	8.851
600.0	22.00	0.	22.00	6.861
600.0	24.00	0.	24.00	5.048
600.0	26.00	0.	26.00	3.537
600.0	28.00	0.	28.00	2.382
600.0	30.00	0.	30.00	1.573
600.0	32.00	0.	32.00	1.050
600.0	34.00	0.	34.00	0.7375
600.0	36.00	0.	36.00	0.5615
600.0	38.00	0.	38.00	0.4651
600.0	40.00	0.	40.00	0.4108
600.0	42.00	0.	42.00	0.3764
600.0	44.00	0.	44.00	0.3509
600.0	46.00	0.	46.00	0.3289
600.0	48.00	0.	48.00	0.3085
600.0	50.00	0.	50.00	0.2890

M 5627

P22



P VS Y

BEAM/1G CREATED: 09/20/79 EXECUTED: 11/27/79 15:23:10 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

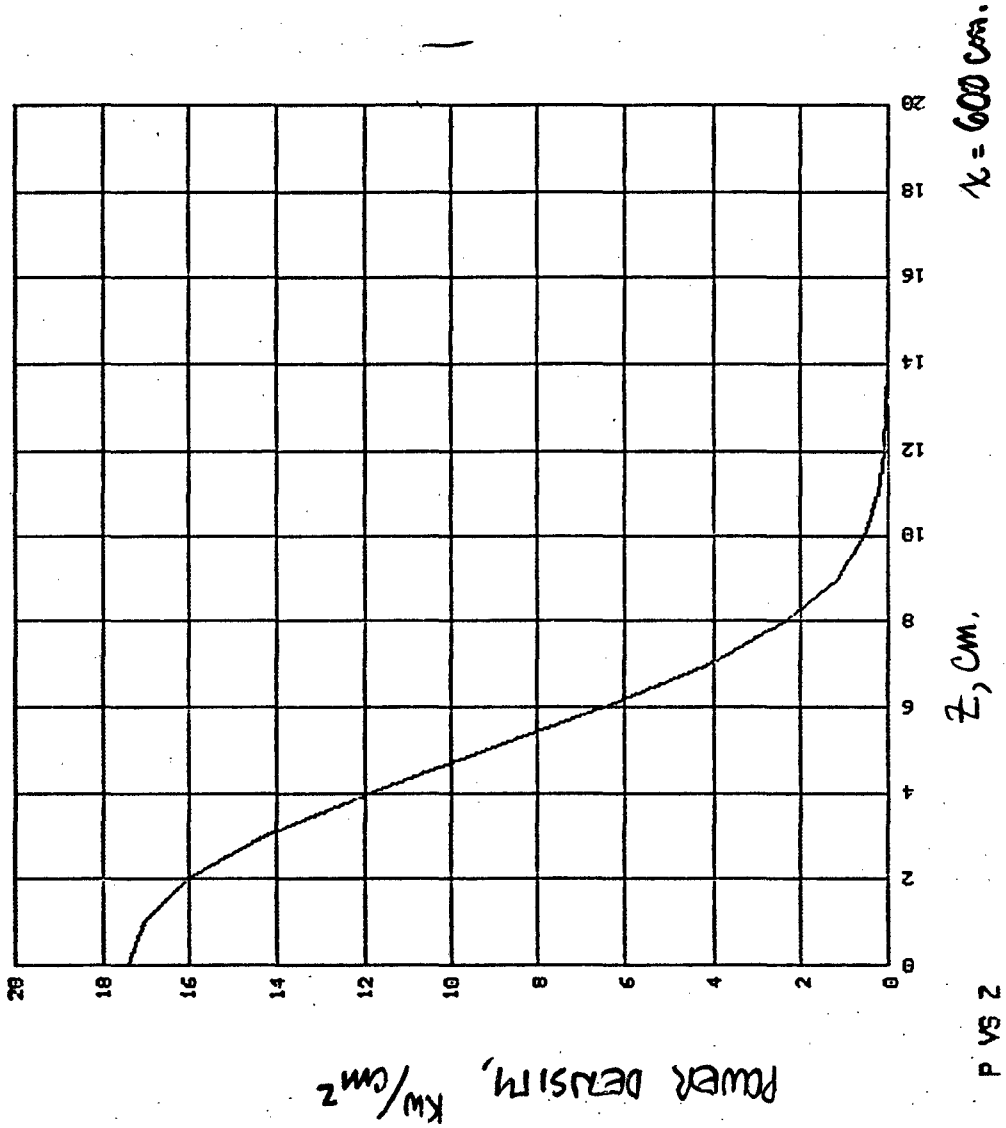
GRID NO. 8 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 600.0 0. 0.
(X2,Y2,Z2): 600.0 0. 20.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
600.0	0.	0.	0.	17.40
600.0	0.	1.000	1.000	17.06
600.0	0.	2.000	2.000	16.03
600.0	0.	3.000	3.000	14.29
600.0	0.	4.000	4.000	11.92
600.0	0.	5.000	5.000	9.171
600.0	0.	6.000	6.000	6.433
600.0	0.	7.000	7.000	4.074
600.0	0.	8.000	8.000	2.313
600.0	0.	9.000	9.000	1.174
600.0	0.	10.00	10.00	0.5332
600.0	0.	11.00	11.00	0.2187
600.0	0.	12.00	12.00	8.2360E-02
600.0	0.	13.00	13.00	2.9369E-02
600.0	0.	14.00	14.00	1.0311E-02
600.0	0.	15.00	15.00	3.6848E-03
600.0	0.	16.00	16.00	1.3501E-03
600.0	0.	17.00	17.00	4.9727E-04
600.0	0.	18.00	18.00	1.7888E-04
600.0	0.	19.00	19.00	6.1443E-05
600.0	0.	20.00	20.00	1.9690E-05

M5627

P14



BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:23:10 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

GRID NO. 9 S1 PARALLEL TO: -Y- AXIS

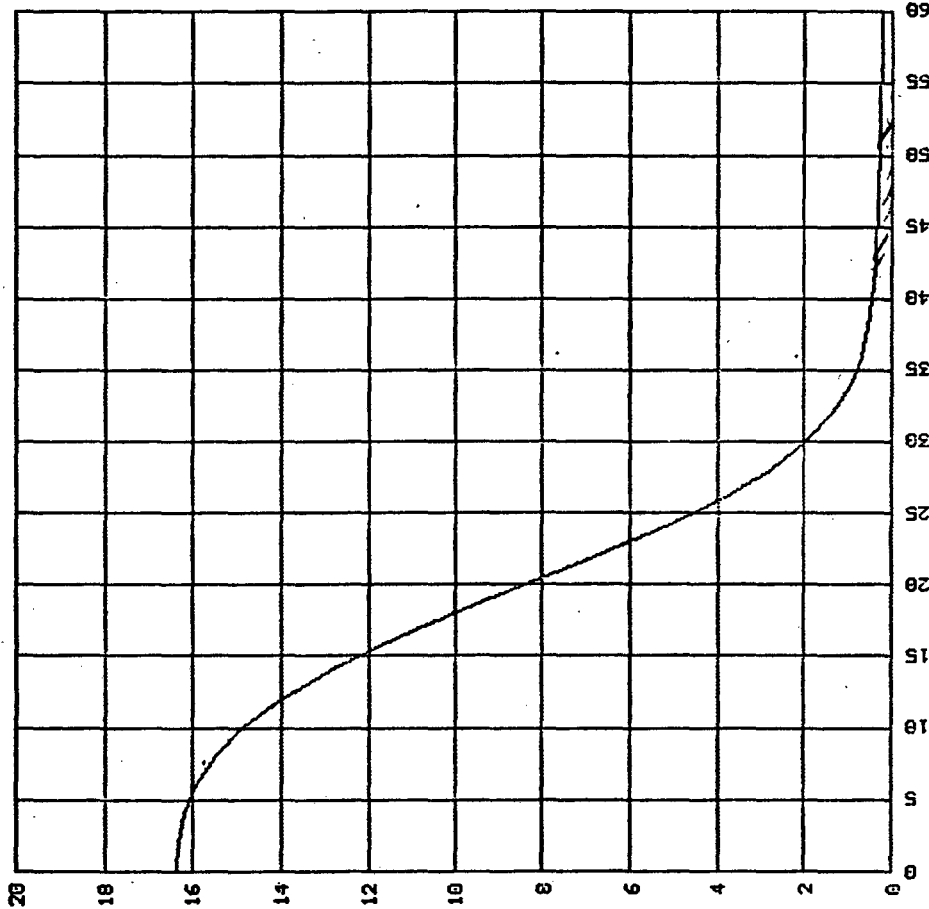
GRID SPECS (X1,Y1,Z1): 700.0 0. 0.
(X2,Y2,Z2): 700.0 60.00 0.
(DS): 2.000

X	Y	Z	S1	POWER FLUX
700.0	0.	0.	0.	16.36
700.0	2.000	0.	2.000	16.32
700.0	4.000	0.	4.000	16.19
700.0	6.000	0.	6.000	15.92
700.0	8.000	0.	8.000	15.50
700.0	10.00	0.	10.00	14.89
700.0	12.00	0.	12.00	14.02
700.0	14.00	0.	14.00	12.90
700.0	16.00	0.	16.00	11.54
700.0	18.00	0.	18.00	10.00
700.0	20.00	0.	20.00	8.364
700.0	22.00	0.	22.00	6.734
700.0	24.00	0.	24.00	5.213
700.0	26.00	0.	26.00	3.883
700.0	28.00	0.	28.00	2.794
700.0	30.00	0.	30.00	1.959
700.0	32.00	0.	32.00	1.355
700.0	34.00	0.	34.00	0.9456
700.0	36.00	0.	36.00	0.6834
700.0	38.00	0.	38.00	0.5235
700.0	40.00	0.	40.00	0.4290
700.0	42.00	0.	42.00	0.3734
700.0	44.00	0.	44.00	0.3391
700.0	46.00	0.	46.00	0.3159
700.0	48.00	0.	48.00	0.2979
700.0	50.00	0.	50.00	0.2822
700.0	52.00	0.	52.00	0.2676
700.0	54.00	0.	54.00	0.2536
700.0	56.00	0.	56.00	0.2400
700.0	58.00	0.	58.00	0.2267
700.0	60.00	0.	60.00	0.2137

M5627

P26

v.v.



$x = 700 \text{ cm.}$

y, cm.

POWER DENSITY, kW/cm²

P VS Y

BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:23:10 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

GRID NO. 10

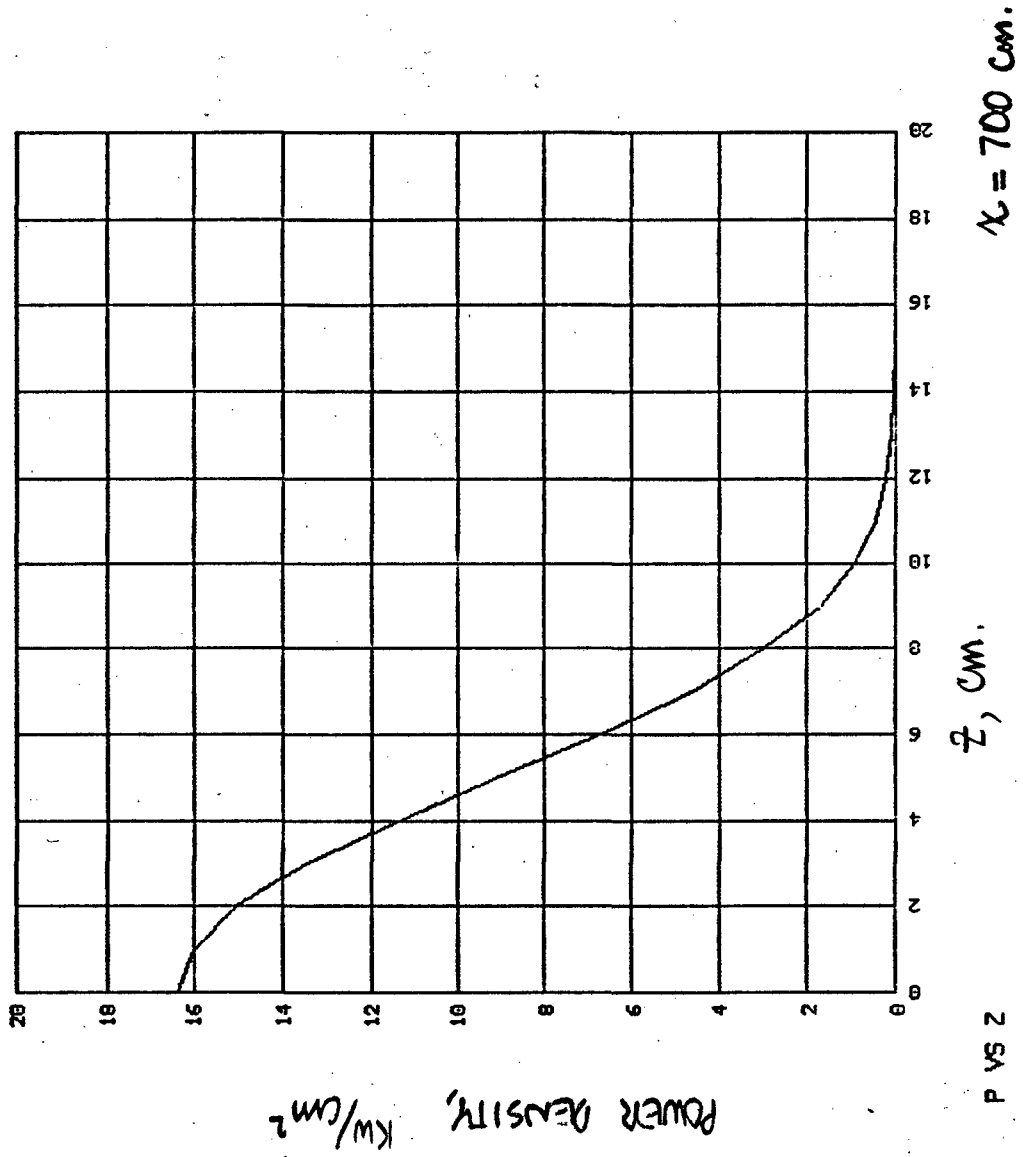
S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1.Y1.Z1): 700.0 0. 0.
(X2.Y2.Z2): 700.0 0. 20.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
700.0	0.	0.	0.	16.36
700.0	0.	1.000	1.000	16.03
700.0	0.	2.000	2.000	15.04
700.0	0.	3.000	3.000	13.44
700.0	0.	4.000	4.000	11.38
700.0	0.	5.000	5.000	9.055
700.0	0.	6.000	6.000	6.724
700.0	0.	7.000	7.000	4.631
700.0	0.	8.000	8.000	2.946
700.0	0.	9.000	9.000	1.725
700.0	0.	10.00	10.00	0.9293
700.0	0.	11.00	11.00	0.4613
700.0	0.	12.00	12.00	0.2121
700.0	0.	13.00	13.00	9.1343E-02
700.0	0.	14.00	14.00	3.7405E-02
700.0	0.	15.00	15.00	1.5023E-02
700.0	0.	16.00	16.00	6.0356E-03
700.0	0.	17.00	17.00	2.4741E-03
700.0	0.	18.00	18.00	1.0353E-03
700.0	0.	19.00	19.00	4.3591E-04
700.0	0.	20.00	20.00	1.8100E-04

MSL27

P2B



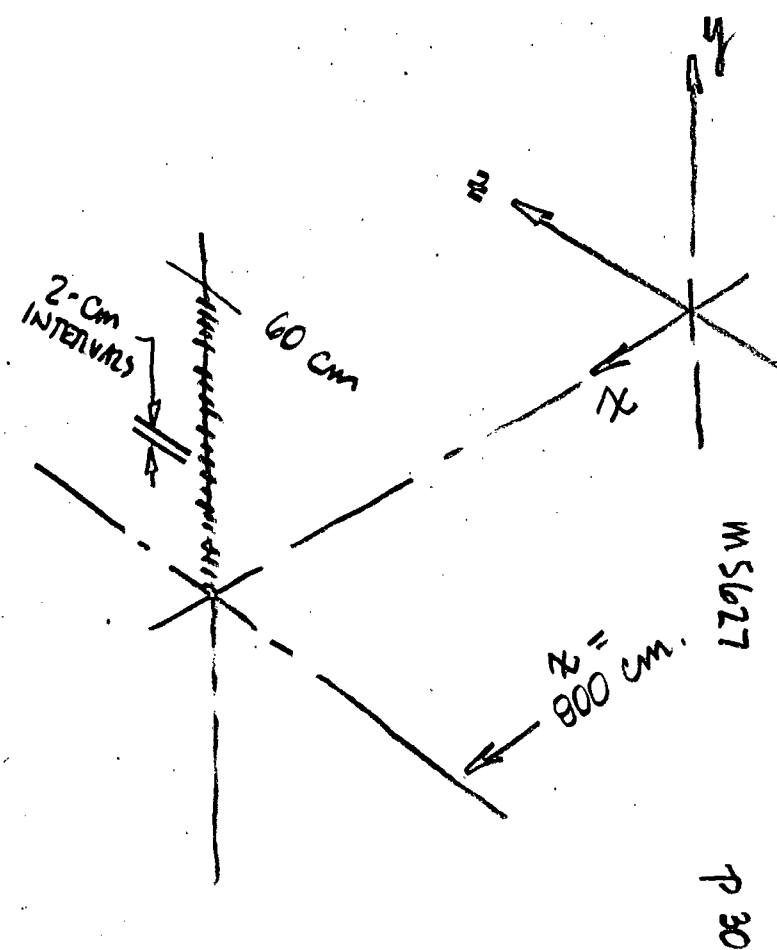
BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE, 10x 0.5.5.0. 90x 0.35..9. 11/27/79

GRID NO. 1 S1 PARALLEL TO: -Y- AXIS

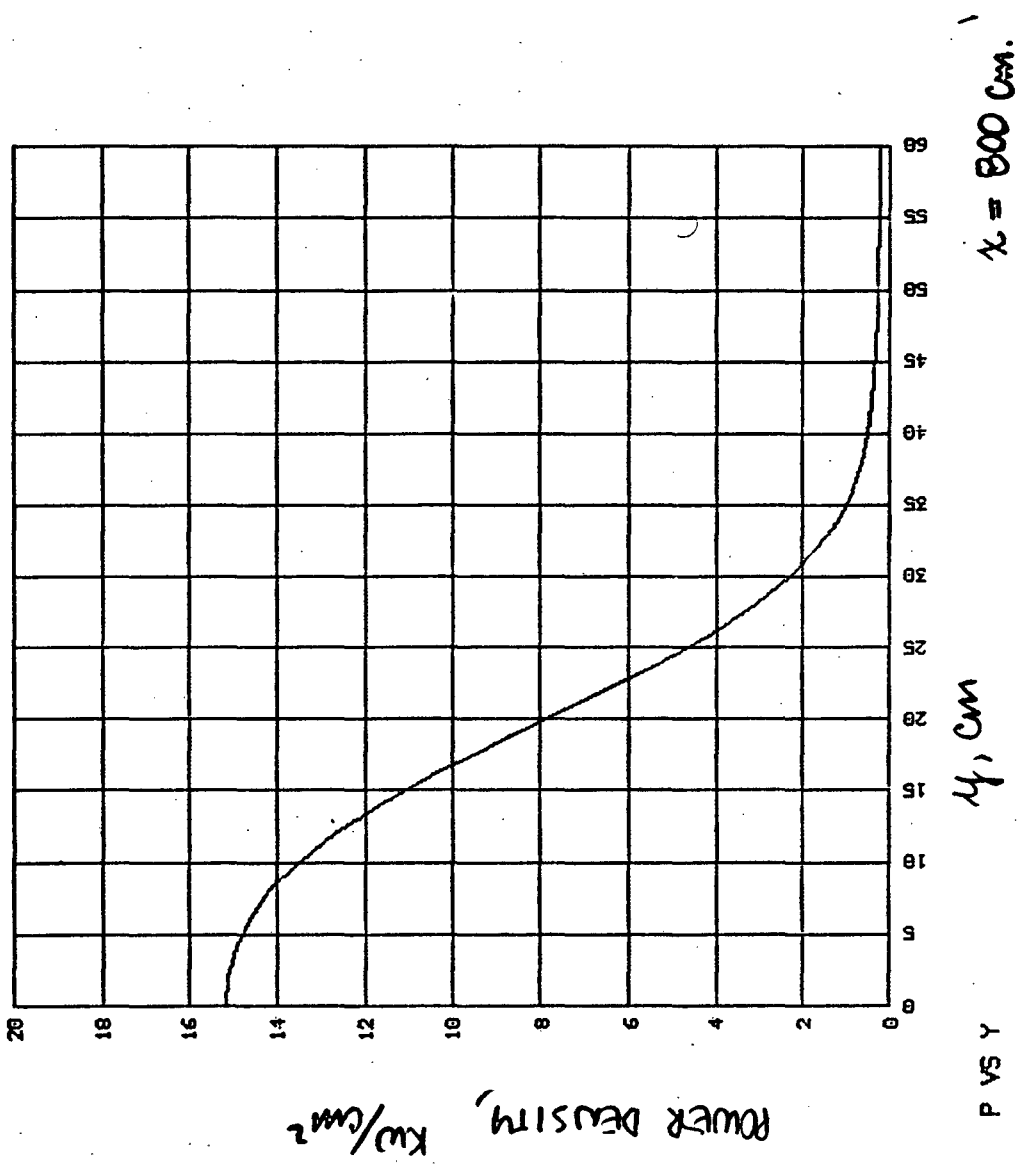
GRID SPECS (X1,Y1,Z1): 000.0 0. 0.
 (X2,Y2,Z2): 000.0 60.00 0.
 (DS): 2.000

X	Y	Z	S1	POWER FLUX
000.0	0.	0.	0.	15.17
000.0	2.000	0.	2.000	15.12
000.0	4.000	0.	4.000	14.94
000.0	6.000	0.	6.000	14.63
000.0	8.000	0.	8.000	14.16
000.0	10.00	0.	10.00	13.52
000.0	12.00	0.	12.00	12.69
000.0	14.00	0.	14.00	11.68
000.0	16.00	0.	16.00	10.50
000.0	18.00	0.	18.00	9.200
000.0	20.00	0.	20.00	7.852
000.0	22.00	0.	22.00	6.501
000.0	24.00	0.	24.00	5.221
000.0	26.00	0.	26.00	4.066
000.0	28.00	0.	28.00	3.077
000.0	30.00	0.	30.00	2.270
000.0	32.00	0.	32.00	1.643
000.0	34.00	0.	34.00	1.179
000.0	36.00	0.	36.00	0.8514
000.0	38.00	0.	38.00	0.6303
000.0	40.00	0.	40.00	0.4867
000.0	42.00	0.	42.00	0.3964
000.0	44.00	0.	44.00	0.3405
000.0	46.00	0.	46.00	0.3054
000.0	48.00	0.	48.00	0.2824
000.0	50.00	0.	50.00	0.2659
000.0	52.00	0.	52.00	0.2520
000.0	54.00	0.	54.00	0.2413
000.0	56.00	0.	56.00	0.2307
000.0	58.00	0.	58.00	0.2205
000.0	60.00	0.	60.00	0.2105



M5627

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P VS Y

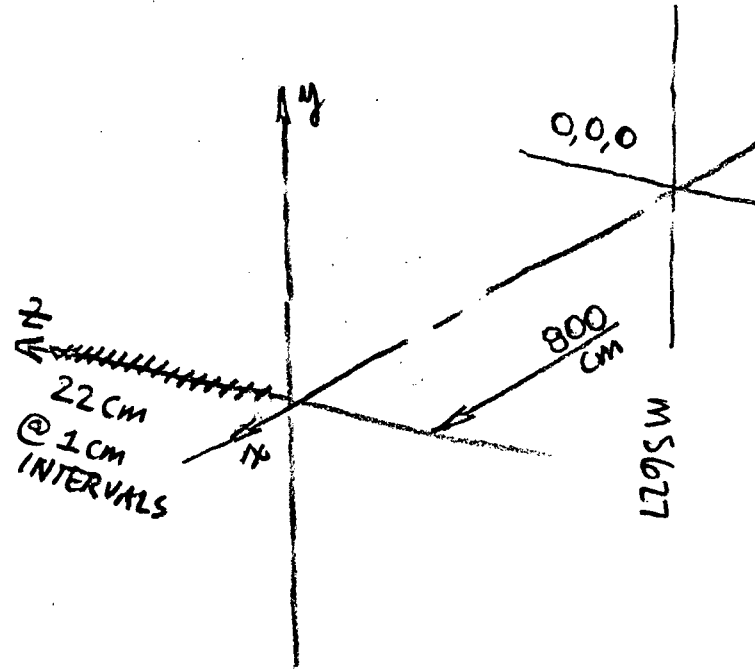
BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE. 10x 0.5-5.0. 90x 0.35-.9. 11/27/79

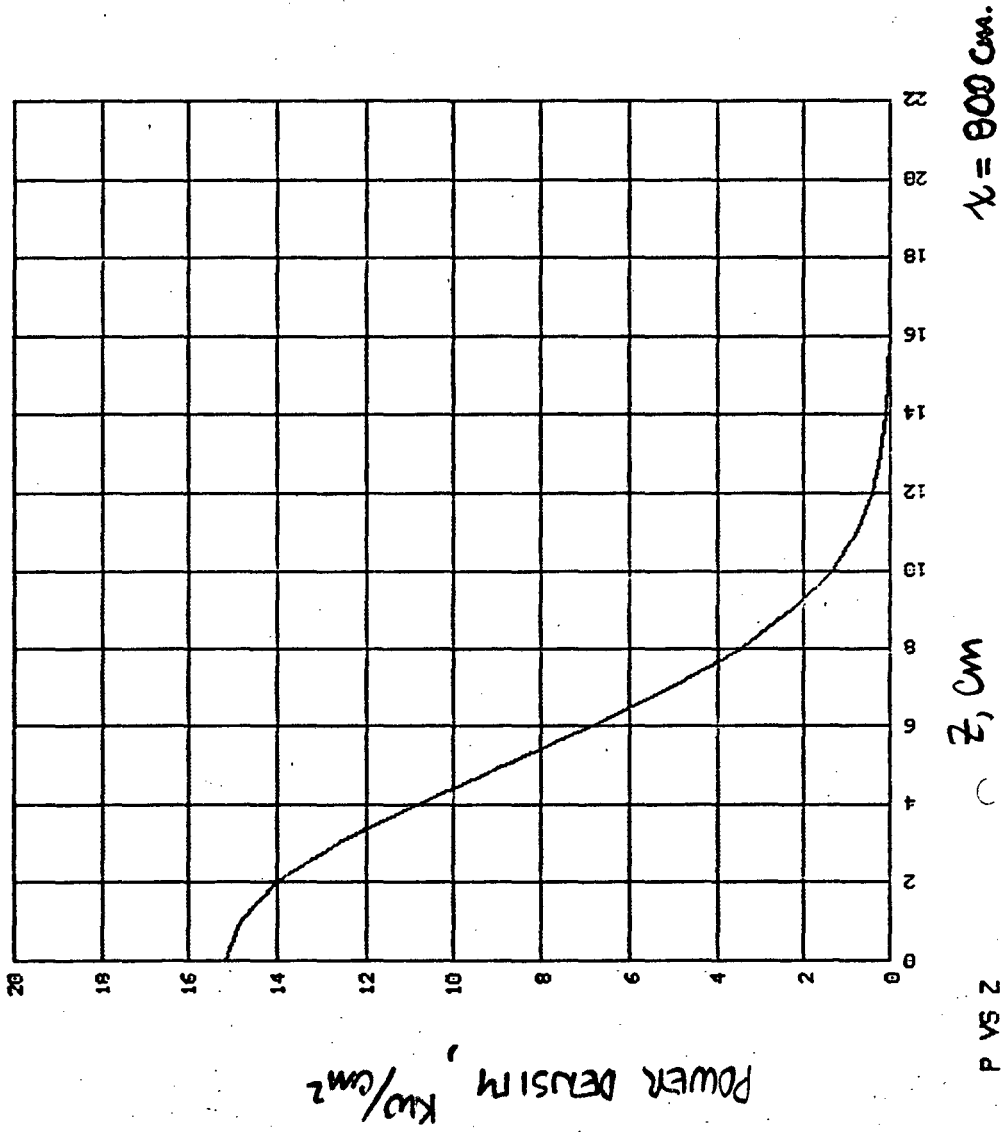
GRID NO. 2 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 000.0 0. 0.
 (X2,Y2,Z2): 000.0 0. 22.00
 (DS): 1.000

X	Y	Z	S1	POWER FLUX
000.0	0.	0.	0.	15.17
000.0	0.	1.000	1.000	14.87
000.0	0.	2.000	2.000	13.99
000.0	0.	3.000	3.000	12.61
000.0	0.	4.000	4.000	10.84
000.0	0.	5.000	5.000	8.868
000.0	0.	6.000	6.000	6.870
000.0	0.	7.000	7.000	5.023
000.0	0.	8.000	8.000	3.455
000.0	0.	9.000	9.000	2.232
000.0	0.	10.00	10.00	1.351
000.0	0.	11.00	11.00	0.7673
000.0	0.	12.00	12.00	0.4091
000.0	0.	13.00	13.00	0.2055
000.0	0.	14.00	14.00	9.8000E-02
000.0	0.	15.00	15.00	4.4833E-02
000.0	0.	16.00	16.00	1.9985E-02
000.0	0.	17.00	17.00	8.8429E-03
000.0	0.	18.00	18.00	3.9504E-03
000.0	0.	19.00	19.00	1.7984E-03
000.0	0.	20.00	20.00	8.3273E-04
000.0	0.	21.00	21.00	3.8795E-04
000.0	0.	22.00	22.00	1.7935E-04



P32



BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

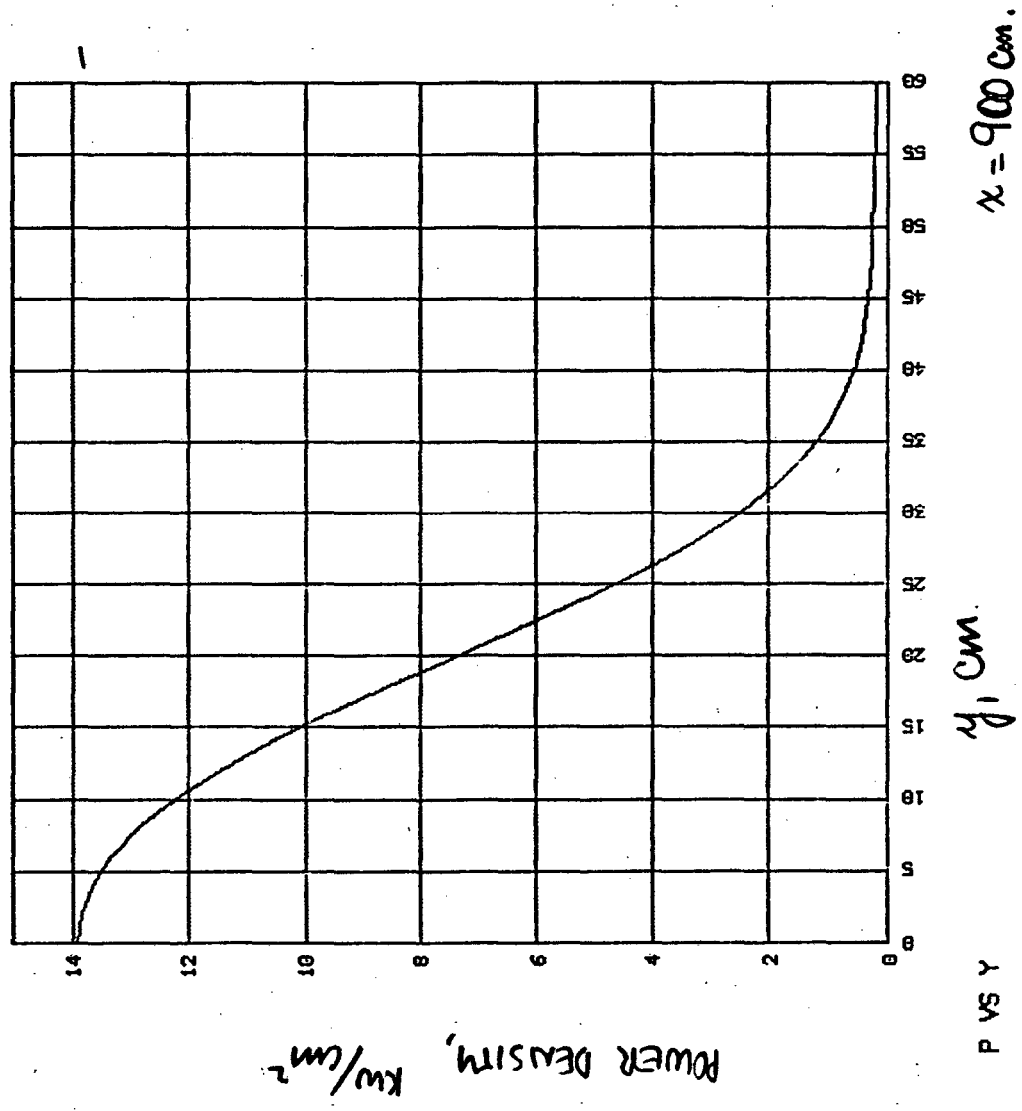
GRID NO. 3 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1.Y1.Z1): 900.0 0. 0.
(X2.Y2.Z2): 900.0 60.00 0.
(DS): 2.000

X	Y	Z	S1	POWER FLUX
900.0	0.	0.	0.	13.92
900.0	2.000	0.	2.000	13.06
900.0	4.000	0.	4.000	13.67
900.0	6.000	0.	6.000	13.34
900.0	8.000	0.	8.000	12.87
900.0	10.00	0.	10.00	12.25
900.0	12.00	0.	12.00	11.49
900.0	14.00	0.	14.00	10.59
900.0	16.00	0.	16.00	9.579
900.0	18.00	0.	18.00	8.485
900.0	20.00	0.	20.00	7.350
900.0	22.00	0.	22.00	6.218
900.0	24.00	0.	24.00	5.134
900.0	26.00	0.	26.00	4.136
900.0	28.00	0.	28.00	3.252
900.0	30.00	0.	30.00	2.501
900.0	32.00	0.	32.00	1.886
900.0	34.00	0.	34.00	1.402
900.0	36.00	0.	36.00	1.036
900.0	38.00	0.	38.00	0.7692
900.0	40.00	0.	40.00	0.5811
900.0	42.00	0.	42.00	0.4531
900.0	44.00	0.	44.00	0.3682
900.0	46.00	0.	46.00	0.3130
900.0	48.00	0.	48.00	0.2773
900.0	50.00	0.	50.00	0.2537
900.0	52.00	0.	52.00	0.2375
900.0	54.00	0.	54.00	0.2254
900.0	56.00	0.	56.00	0.2156
900.0	58.00	0.	58.00	0.2070
900.0	60.00	0.	60.00	0.1990

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P VS Y

BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

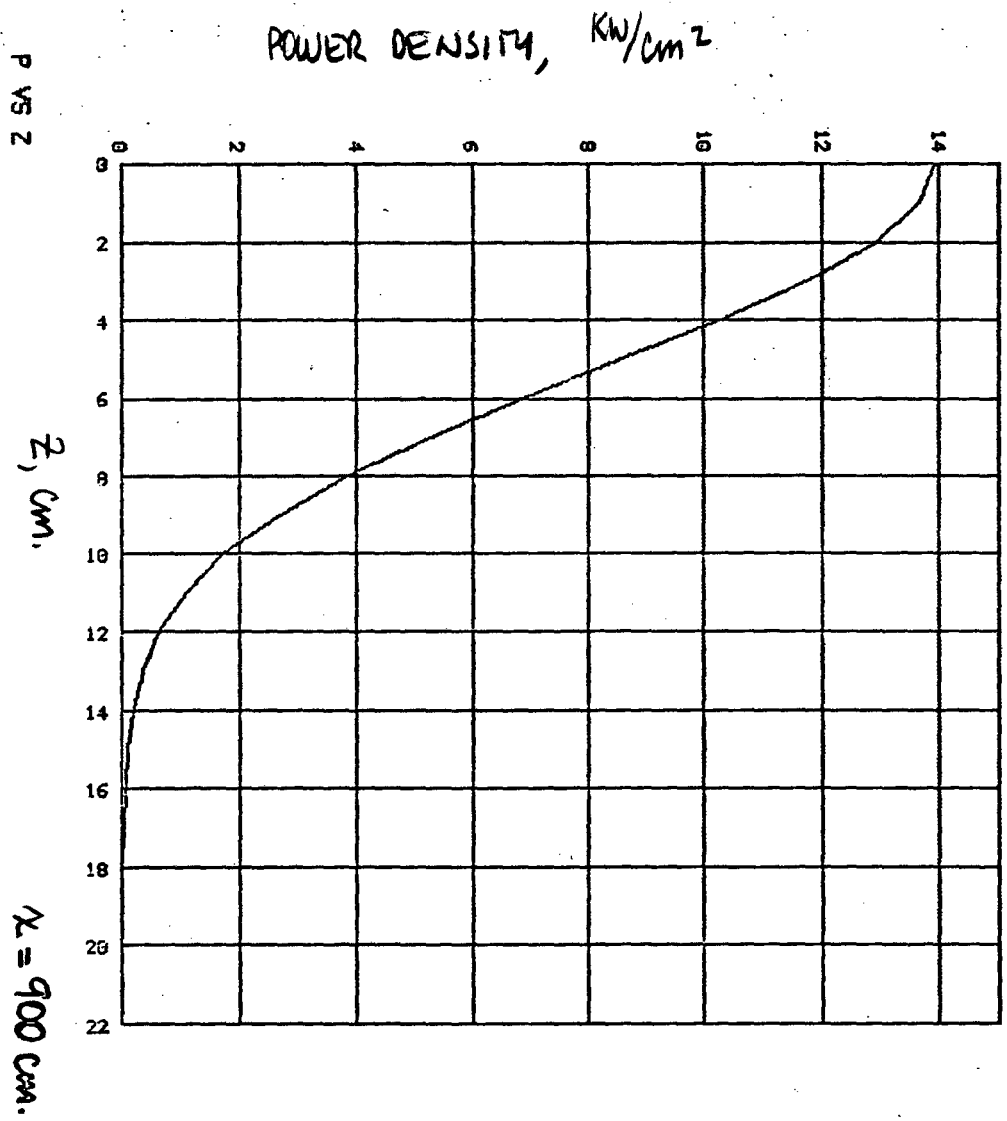
GRID NO. 4 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 900.0 0. 0.
(X2,Y2,Z2): 900.0 0. 22.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
900.0	0.	0.	0.	13.92
900.0	0.	1.000	1.000	13.67
900.0	0.	2.000	2.000	12.92
900.0	0.	3.000	3.000	11.75
900.0	0.	4.000	4.000	10.27
900.0	0.	5.000	5.000	8.599
900.0	0.	6.000	6.000	6.889
900.0	0.	7.000	7.000	5.268
900.0	0.	8.000	8.000	3.838
900.0	0.	9.000	9.000	2.660
900.0	0.	10.00	10.00	1.752
900.0	0.	11.00	11.00	1.096
900.0	0.	12.00	12.00	0.6513
900.0	0.	13.00	13.00	0.3682
900.0	0.	14.00	14.00	0.1985
900.0	0.	15.00	15.00	0.1026
900.0	0.	16.00	16.00	5.1150E-02
900.0	0.	17.00	17.00	2.4871E-02
900.0	0.	18.00	18.00	1.1942E-02
900.0	0.	19.00	19.00	5.7399E-03
900.0	0.	20.00	20.00	2.7919E-03
900.0	0.	21.00	21.00	1.3810E-03
900.0	0.	22.00	22.00	6.9277E-04

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M 5627

BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

GRID NO. 5 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): .1000. 0. 0.
(X2,Y2,Z2): .1000. 66.00 0.
(DS): 2.062

X	Y	Z	S1	POWER FLUX
.1000.	0.	0.	0.	12.69
.1000.	2.063	0.	2.062	12.62
.1000.	4.125	0.	4.125	12.42
.1000.	6.108	0.	6.107	12.00
.1000.	8.250	0.	8.250	11.61
.1000.	10.31	0.	10.31	11.01
.1000.	12.39	0.	12.37	10.20
.1000.	14.44	0.	14.44	9.450
.1000.	16.50	0.	16.50	8.536
.1000.	18.56	0.	18.56	7.566
.1000.	20.63	0.	20.62	6.574
.1000.	22.69	0.	22.69	5.595
.1000.	24.75	0.	24.75	4.661
.1000.	26.81	0.	26.81	3.799
.1000.	28.88	0.	28.87	3.033
.1000.	30.94	0.	30.94	2.373
.1000.	33.00	0.	33.00	1.824
.1000.	35.06	0.	35.06	1.392
.1000.	37.13	0.	37.12	1.039
.1000.	39.19	0.	39.19	0.7799
.1000.	41.25	0.	41.25	0.5912
.1000.	43.31	0.	43.31	0.4575
.1000.	45.38	0.	45.37	0.3654
.1000.	47.44	0.	47.44	0.3034
.1000.	49.50	0.	49.50	0.2622
.1000.	51.56	0.	51.56	0.2348
.1000.	53.63	0.	53.62	0.2164
.1000.	55.69	0.	55.69	0.2034
.1000.	57.75	0.	57.75	0.1937
.1000.	59.81	0.	59.81	0.1858
.1000.	61.88	0.	61.87	0.1790
.1000.	63.94	0.	63.94	0.1726
.1000.	66.00	0.	66.00	0.1666

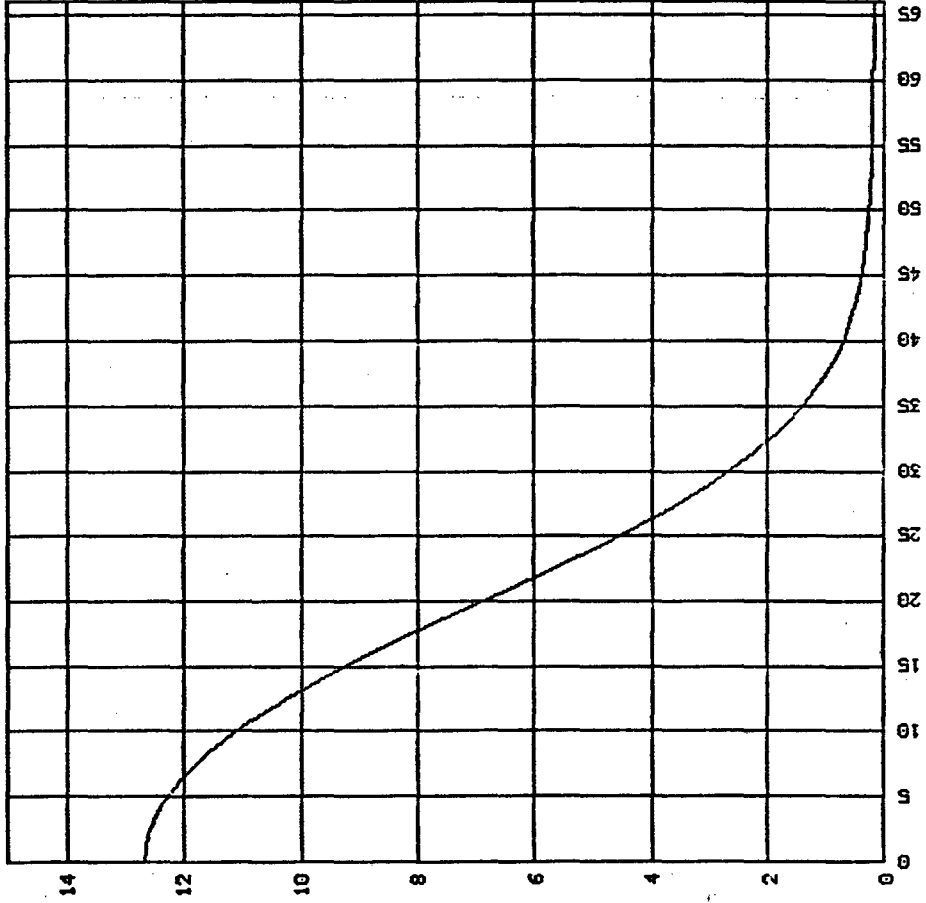
M5627

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M 5627

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$\lambda = 1000 \text{ cm}$

y, cm

POWER DENSITY, kW/cm²

P VS Y

BEAM/1G CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

GRID NO. 6 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 1000. 0. 0.
(X2,Y2,Z2): 1000. 0. 24.00
(DS): 1.000

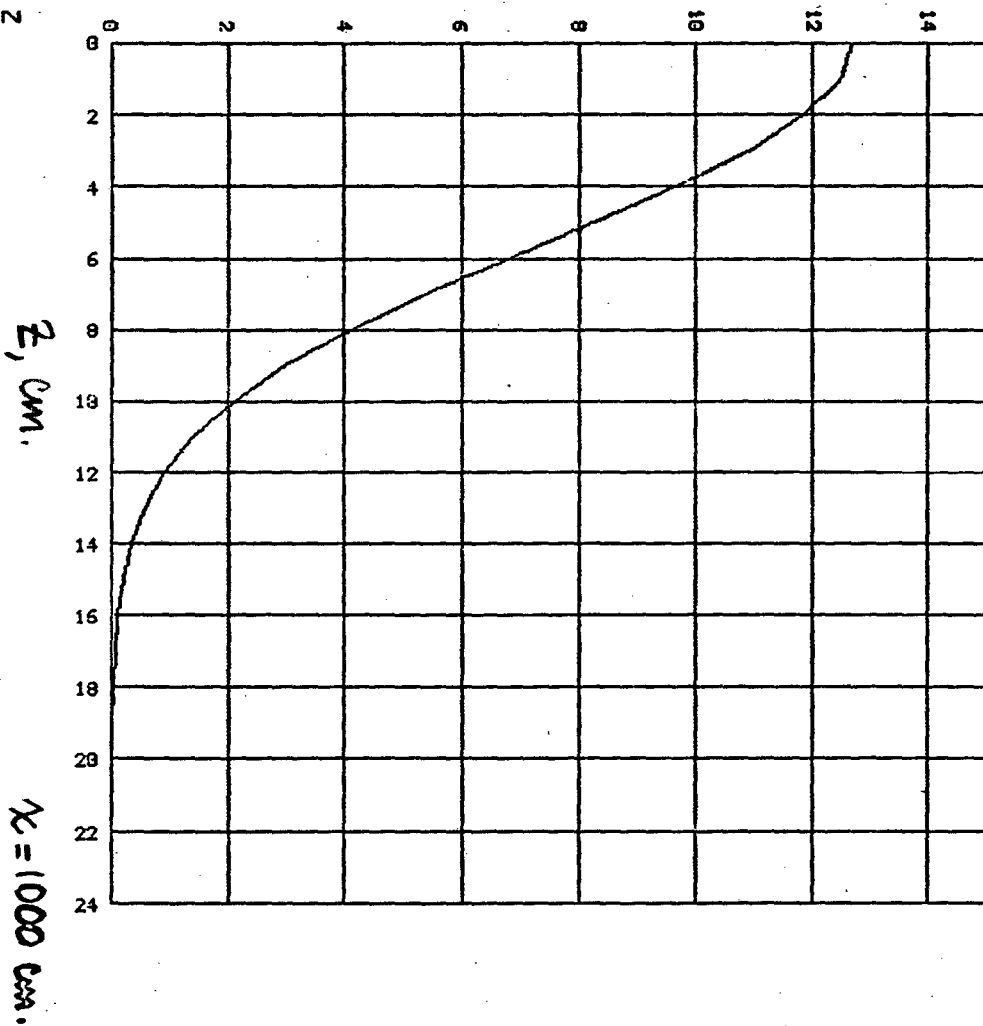
X	Y	Z	S1	POWER FLUX
1000.	0.	0.	0.	12.69
1000.	0.	1.000	1.000	12.47
1000.	0.	2.000	2.000	11.86
1000.	0.	3.000	3.000	10.89
1000.	0.	4.000	4.000	9.654
1000.	0.	5.000	5.000	8.254
1000.	0.	6.000	6.000	6.798
1000.	0.	7.000	7.000	5.387
1000.	0.	8.000	8.000	4.102
1000.	0.	9.000	9.000	2.999
1000.	0.	10.00	10.00	2.103
1000.	0.	11.00	11.00	1.414
1000.	0.	12.00	12.00	0.9116
1000.	0.	13.00	13.00	0.5636
1000.	0.	14.00	14.00	0.3346
1000.	0.	15.00	15.00	0.1911
1000.	0.	16.00	16.00	0.1054
1000.	0.	17.00	17.00	5.6343E-02
1000.	0.	18.00	18.00	2.9432E-02
1000.	0.	19.00	19.00	1.5151E-02
1000.	0.	20.00	20.00	7.7639E-03
1000.	0.	21.00	21.00	3.9994E-03
1000.	0.	22.00	22.00	2.0055E-03
1000.	0.	23.00	23.00	1.1035E-03
1000.	0.	24.00	24.00	5.9079E-04

M 5627

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POWER DENSITY, KW/CM²

P VS Z



$\lambda = 1000 \text{ CM}$

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M5627

BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE. 10X 0.5.5.0. 90X 0.35..9. 11/27/79

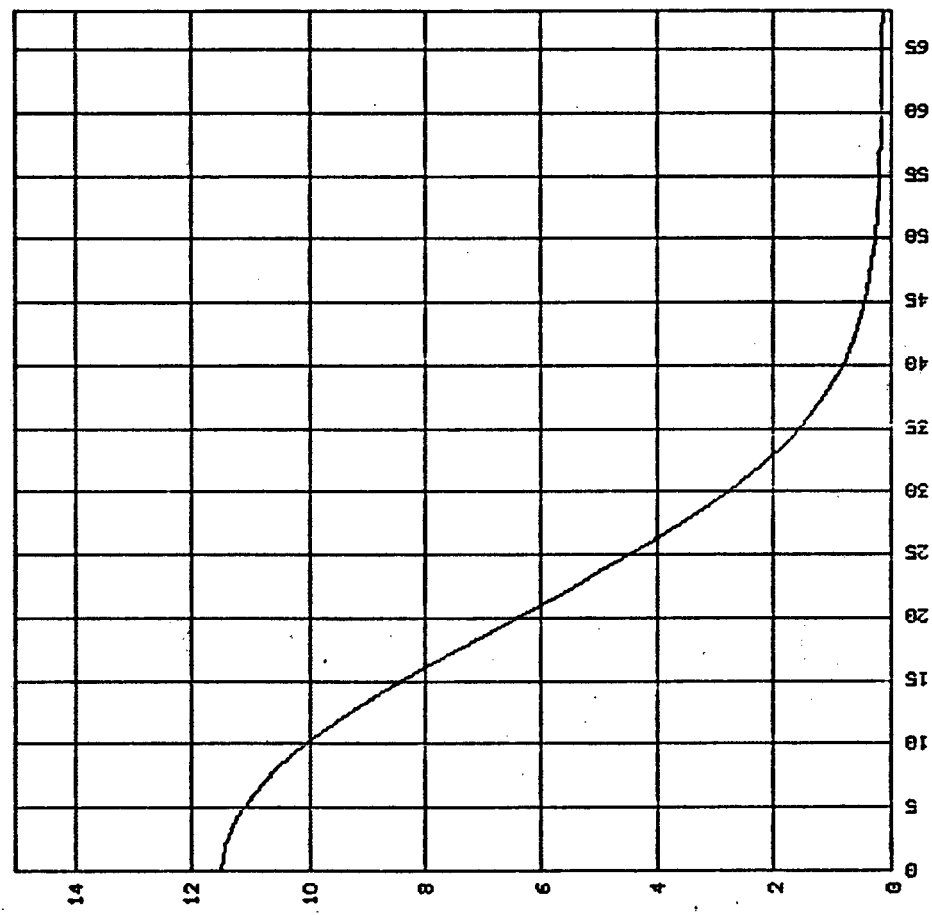
GRID NO. 7 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1.Y1.Z1): 1100. 0. 0.
(X2.Y2.Z2): 1100. 68.00 0.
(DS): 2.000

X	Y	Z	S1	POWER FLUX
1100.	0.	0.	0.	11.51
1100.	2.000	0.	2.000	11.45
1100.	4.000	0.	4.000	11.28
1100.	6.000	0.	6.000	10.99
1100.	8.000	0.	8.000	10.58
1100.	10.00	0.	10.00	10.08
1100.	12.00	0.	12.00	9.476
1100.	14.00	0.	14.00	8.792
1100.	16.00	0.	16.00	8.044
1100.	18.00	0.	18.00	7.251
1100.	20.00	0.	20.00	6.434
1100.	22.00	0.	22.00	5.618
1100.	24.00	0.	24.00	4.824
1100.	26.00	0.	26.00	4.072
1100.	28.00	0.	28.00	3.380
1100.	30.00	0.	30.00	2.759
1100.	32.00	0.	32.00	2.217
1100.	34.00	0.	34.00	1.756
1100.	36.00	0.	36.00	1.374
1100.	38.00	0.	38.00	1.065
1100.	40.00	0.	40.00	0.8228
1100.	42.00	0.	42.00	0.6369
1100.	44.00	0.	44.00	0.4977
1100.	46.00	0.	46.00	0.3959
1100.	48.00	0.	48.00	0.3229
1100.	50.00	0.	50.00	0.2717
1100.	52.00	0.	52.00	0.2361
1100.	54.00	0.	54.00	0.2114
1100.	56.00	0.	56.00	0.1943
1100.	58.00	0.	58.00	0.1821
1100.	60.00	0.	60.00	0.1731
1100.	62.00	0.	62.00	0.1661
1100.	64.00	0.	64.00	0.1602
1100.	66.00	0.	66.00	0.1550
1100.	68.00	0.	68.00	0.1503

MS627

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$\lambda = 1100 \text{ cm}$

D, cm

P VS Y

POWER DENSITY, kW/cm²

BEAM/1G CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

GRID NO. 8 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 1100. 0. 0.
(X2,Y2,Z2): 1100. 0. 26.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
1100.	0.	0.	0.	11.51
1100.	0.	1.000	1.000	11.34
1100.	0.	2.000	2.000	10.83
1100.	0.	3.000	3.000	10.04
1100.	0.	4.000	4.000	9.022
1100.	0.	5.000	5.000	7.854
1100.	0.	6.000	6.000	6.620
1100.	0.	7.000	7.000	5.400
1100.	0.	8.000	8.000	4.260
1100.	0.	9.000	9.000	3.247
1100.	0.	10.00	10.00	2.391
1100.	0.	11.00	11.00	1.700
1100.	0.	12.00	12.00	1.167
1100.	0.	13.00	13.00	0.7731
1100.	0.	14.00	14.00	0.4940
1100.	0.	15.00	15.00	0.3062
1100.	0.	16.00	16.00	0.1834
1100.	0.	17.00	17.00	0.1067
1100.	0.	18.00	18.00	6.0442E-02
1100.	0.	19.00	19.00	3.3518E-02
1100.	0.	20.00	20.00	1.8309E-02
1100.	0.	21.00	21.00	9.9250E-03
1100.	0.	22.00	22.00	5.3814E-03
1100.	0.	23.00	23.00	2.9388E-03
1100.	0.	24.00	24.00	1.6237E-03
1100.	0.	25.00	25.00	9.0846E-04
1100.	0.	26.00	26.00	5.1339E-04

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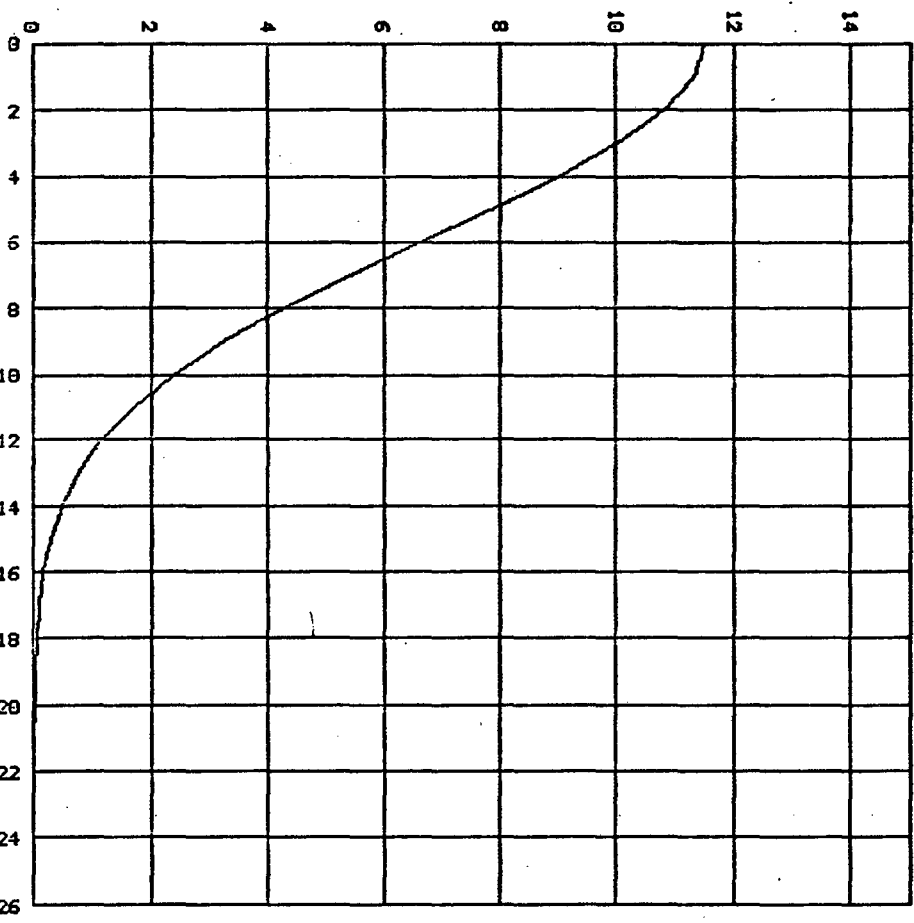
P44

POWER DENSITY, KW/CM^2

P VS Z

Z, CM

$R = 1100 \text{ CM}$



PAS

MS627

BEAM:IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE: 10% 0.5.5.0. 90% 0.35.-.9. 11/27/79

GRID NO. 9 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): 1200. 0. 0.
(X2,Y2,Z2): 1200. 68.00 0.
(DS): 2.000

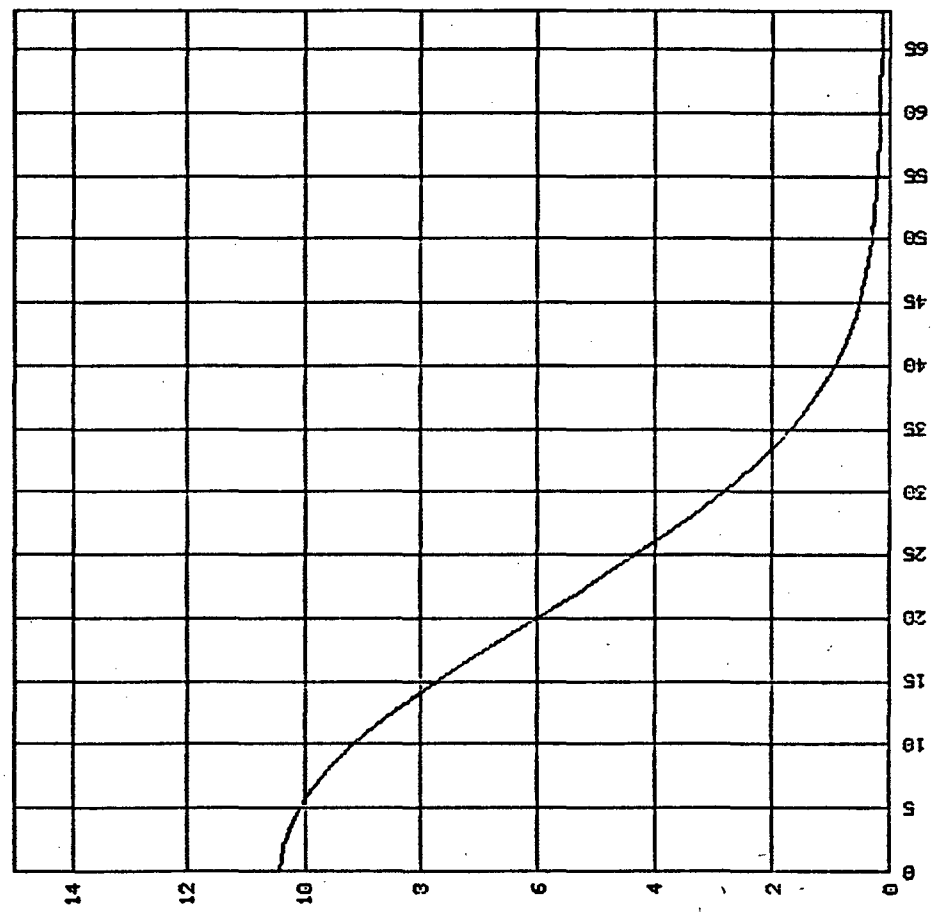
X	Y	Z	S1	POWER FLUX
1200.	0.	0.	0.	10.43
1200.	2.000	0.	2.000	10.37
1200.	4.000	0.	4.000	10.22
1200.	6.000	0.	6.000	9.958
1200.	8.000	0.	8.000	9.604
1200.	10.00	0.	10.00	9.160
1200.	12.00	0.	12.00	8.637
1200.	14.00	0.	14.00	8.048
1200.	16.00	0.	16.00	7.405
1200.	18.00	0.	18.00	6.726
1200.	20.00	0.	20.00	6.027
1200.	22.00	0.	22.00	5.326
1200.	24.00	0.	24.00	4.640
1200.	26.00	0.	26.00	3.984
1200.	28.00	0.	28.00	3.372
1200.	30.00	0.	30.00	2.813
1200.	32.00	0.	32.00	2.314
1200.	34.00	0.	34.00	1.879
1200.	36.00	0.	36.00	1.500
1200.	38.00	0.	38.00	1.198
1200.	40.00	0.	40.00	0.9445
1200.	42.00	0.	42.00	0.7423
1200.	44.00	0.	44.00	0.5841
1200.	46.00	0.	46.00	0.4628
1200.	48.00	0.	48.00	0.3718
1200.	50.00	0.	50.00	0.3047
1200.	52.00	0.	52.00	0.2559
1200.	54.00	0.	54.00	0.2211
1200.	56.00	0.	56.00	0.1963
1200.	58.00	0.	58.00	0.1787
1200.	60.00	0.	60.00	0.1661
1200.	62.00	0.	62.00	0.1569
1200.	64.00	0.	64.00	0.1499
1200.	66.00	0.	66.00	0.1444
1200.	68.00	0.	68.00	0.1397

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POWER DENSITY, kW/cm²

y, cm.

x = 1200 cm.

P VS Y

BEAM/IG CREATED: 09/20/79 EXECUTED: 11/27/79 15:31:16 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5.5.0. 90% 0.35..9. 11/27/79

GRID NO. 10 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 1200. 0. 0.
(X2,Y2,Z2): 1200. 0. 26.00
(DS): 1.000

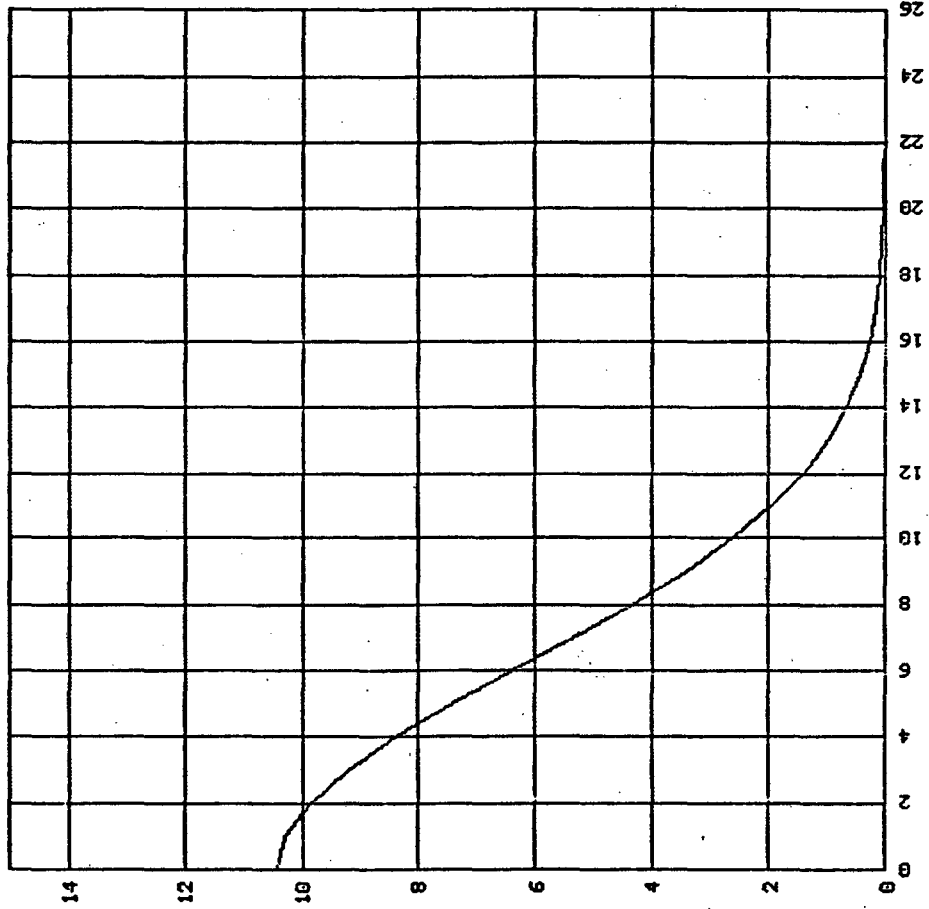
X	Y	Z	S1	POWER FLUX
1200.	0.	0.	0.	10.43
1200.	0.	1.000	1.000	10.29
1200.	0.	2.000	2.000	9.876
1200.	0.	3.000	3.000	9.229
1200.	0.	4.000	4.000	8.390
1200.	0.	5.000	5.000	7.419
1200.	0.	6.000	6.000	6.379
1200.	0.	7.000	7.000	5.331
1200.	0.	8.000	8.000	4.328
1200.	0.	9.000	9.000	3.413
1200.	0.	10.00	10.00	2.613
1200.	0.	11.00	11.00	1.941
1200.	0.	12.00	12.00	1.400
1200.	0.	13.00	13.00	0.9800
1200.	0.	14.00	14.00	0.6658
1200.	0.	15.00	15.00	0.4392
1200.	0.	16.00	16.00	0.2816
1200.	0.	17.00	17.00	0.1757
1200.	0.	18.00	18.00	0.1069
1200.	0.	19.00	19.00	6.3547E-02
1200.	0.	20.00	20.00	3.7061E-02
1200.	0.	21.00	21.00	2.1298E-02
1200.	0.	22.00	22.00	1.2128E-02
1200.	0.	23.00	23.00	6.8851E-03
1200.	0.	24.00	24.00	3.9203E-03
1200.	0.	25.00	25.00	2.2499E-03
1200.	0.	26.00	26.00	1.3052E-03

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$\lambda = 1200 \text{ cm.}$

Z, cm.

POWER DENSITY, kW/cm²

P VS Z

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3. EARLY LAYOUTS SHOWED THE RIGHT SIDE OF THE DUCT NARROWING AT A DISTANCE OF $x = 873.8$ CM. MEASURED DOWNSTREAM FROM THE BEAM EMITTER PLANE.

THE POWER DENSITY DISTRIBUTIONS ALONG THE y - AND x -AXES ARE GIVEN FOR THAT VALUE OF x , IN THE NEXT 4 PAGES.

SEE THE LAYOUT OF 19Q 0924: WITH A DIMENSION OF 13.97 CM BETWEEN THE BEAM EMITTER PLANE & THE SOURCE MOUNTING FACE, THIS CORRESPONDS TO A DIMENSION OF 859.83 CM ($873.8 - 13.97$) DOWNSTREAM OF THE SOURCE FLANGE.

BY COMPARISON, THE LATEST LAYOUT (19N4425) SHOWS THE RESTRICTION OCCURRING AT A DIMENSION OF 860.49 CM.

SINCE 860.49 IS APPROXIMATELY EQUAL TO 859.83, THE CALCULATION WAS NOT DUPLICATED, & IS SO PRESENTED.

TFTR SOURCE. 10% 0.5,5.0. 90% 0.35,.9. 12/13/79

GRID NO. 1 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): 873.8 0. 0.
 (X2,Y2,Z2): 873.8 60.00 0.
 (DS): 2.000

X	Y	Z	S1	POWER FLUX
873.8	0.	0.	0.	14.25
873.8	2.000	0.	2.000	14.19
873.8	4.000	0.	4.000	14.08
873.8	6.000	0.	6.000	13.67
873.8	8.000	0.	8.000	13.26
873.8	10.00	0.	10.00	12.57
873.8	12.00	0.	12.00	11.79
873.8	14.00	0.	14.00	10.86
873.8	16.00	0.	16.00	9.910
873.8	18.00	0.	18.00	8.667
873.8	20.00	0.	20.00	7.472
873.8	22.00	0.	22.00	6.295
873.8	24.00	0.	24.00	5.163
873.8	26.00	0.	26.00	4.126
873.8	28.00	0.	28.00	3.215
873.8	30.00	0.	30.00	2.429
873.8	32.00	0.	32.00	1.827
873.8	34.00	0.	34.00	1.346
873.8	36.00	0.	36.00	0.9777
873.8	38.00	0.	38.00	0.7309
873.8	40.00	0.	40.00	0.5526
873.8	42.00	0.	42.00	0.4352
873.8	44.00	0.	44.00	0.3582
873.8	46.00	0.	46.00	0.3008
873.8	48.00	0.	48.00	0.2779
873.8	50.00	0.	50.00	0.2559
873.8	52.00	0.	52.00	0.2410
873.8	54.00	0.	54.00	0.2294
873.8	56.00	0.	56.00	0.2197
873.8	58.00	0.	58.00	0.2109
873.8	60.00	0.	60.00	0.2025

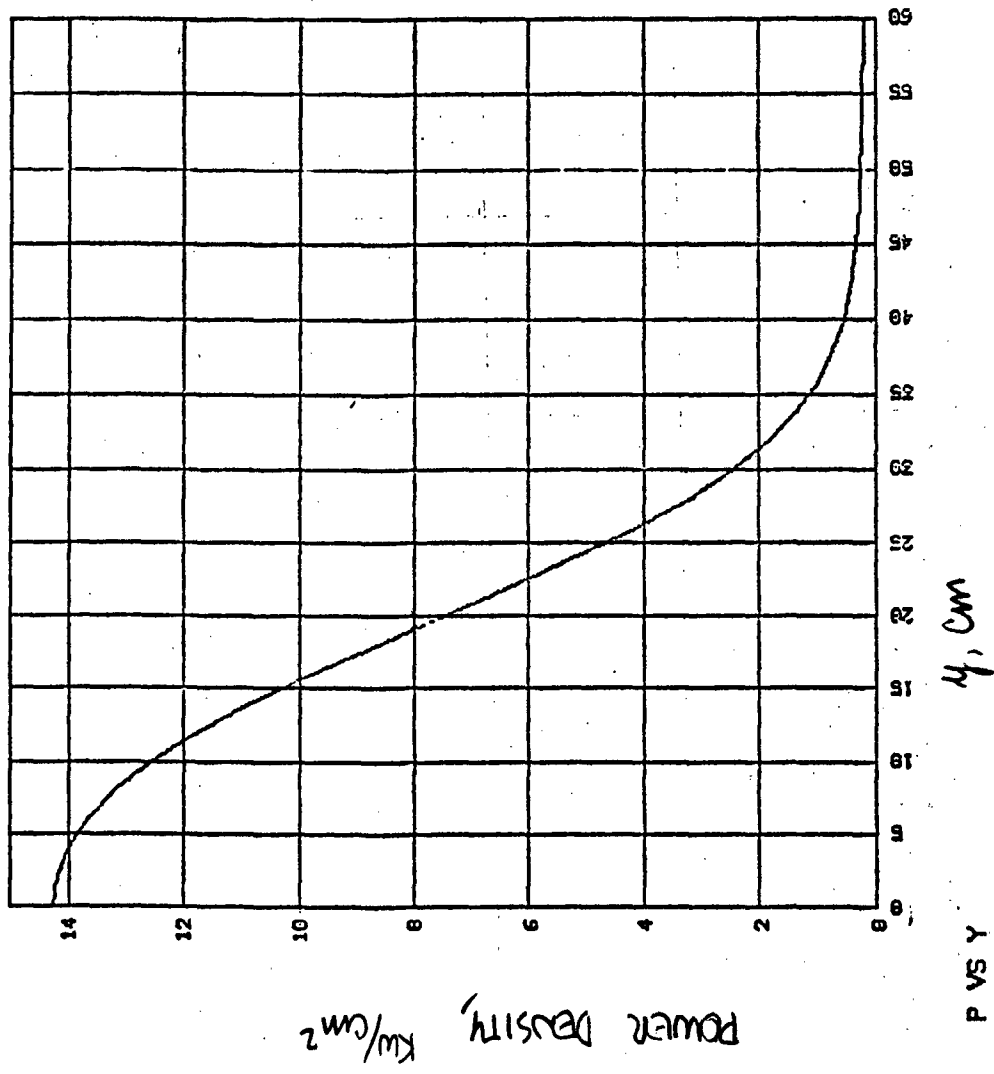
MS627

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↑ THIS X DIMENSION IS MEASURED FROM THE BEAM EMITTER PLATE.
 IT IS EQUIVALENT TO AN X = 859.83 cm, MEASURED FM. THE SOURCE MTG. FLANGE.
 IT IS APPROXIMATELY EQUAL TO X = 860.49 cm, SHOWN ON PQ0924.

W 5627

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FOR $N_c = 873.8 \text{ cm}^2/\text{fm}$. BEAM EMITTER PLATE
= 859.83 — — SOURCE MOUNTING FLANGE
 ≈ 860.49 — — — — —

BEAM/IG CREATED: 09/20/79 EXECUTED: 12/13/79 13:38:58 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 0 S1 PARALLEL TO: -Z- AXIS

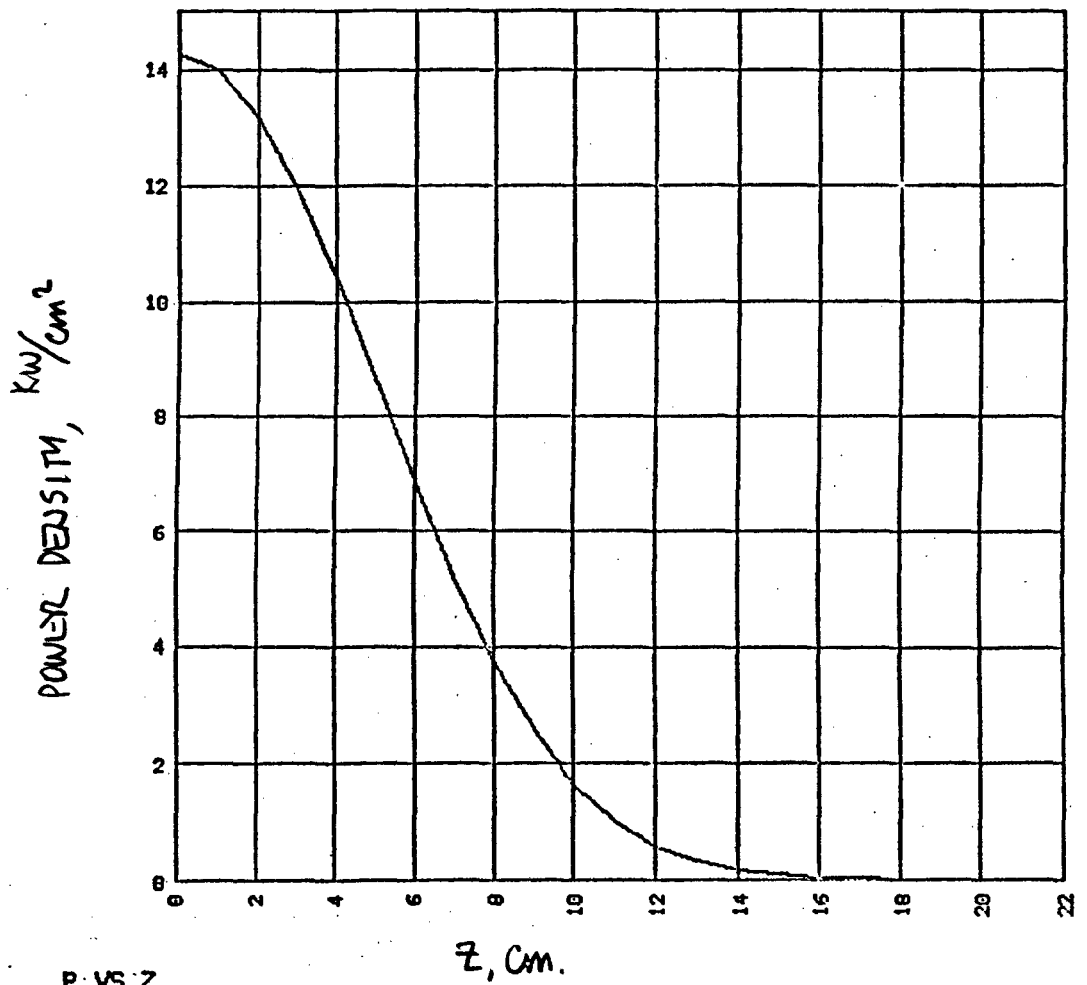
GRID SPECS (X1,Y1,Z1): 073.0 0. 0.
(X2,Y2,Z2): 073.8 0. 22.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
073.0	0.	0.	0.	14.25
073.0	0.	1.000	1.000	13.90
073.0	0.	2.000	2.000	13.20
073.0	0.	3.000	3.000	11.90
073.0	0.	4.000	4.000	10.42
073.0	0.	5.000	5.000	8.677
073.0	0.	6.000	6.000	6.895
073.0	0.	7.000	7.000	5.217
073.0	0.	8.000	8.000	3.750
073.0	0.	9.000	9.000	2.557
073.0	0.	10.00	10.00	1.651
073.0	0.	11.00	11.00	1.010
073.0	0.	12.00	12.00	0.5850
073.0	0.	13.00	13.00	0.3216
073.0	0.	14.00	14.00	0.1684
073.0	0.	15.00	15.00	8.4440E-02
073.0	0.	16.00	16.00	4.0916E-02
073.0	0.	17.00	17.00	1.9392E-02
073.0	0.	18.00	18.00	9.1203E-03
073.0	0.	19.00	19.00	4.3166E-03
073.0	0.	20.00	20.00	2.0752E-03
073.0	0.	21.00	21.00	1.0146E-03
073.0	0.	22.00	22.00	5.0153E-04

↑ THIS X DIMENSION IS MEASURED FROM THE BEAM EMITTER PLANE.
IT IS EQUIVALENT TO AN X = 859.83 CM. MEASURED FM. THE SOURCE MOUNTING FLANGE
IT IS APPROXIMATELY EQUAL TO X = 860.49 CM., SHOWN ON 19Q 0924

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P VS Z

FOR $\lambda = 873.8 \text{ cm}$. FM. BEAM EMITTER PLATE
 = 859.83 cm FM SOURCE MOUNTING FLANGE
 \therefore
 $\approx 860.49 \checkmark \checkmark \checkmark \checkmark \checkmark$

ENGINEERING NOTE

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4. EARLY LAYOUTS SHOWED THE FLOOR & CEILING OF THE DUCT NARROWING AT $x = 890.0$ CM. MEASURED DOWNSTREAM FROM THE BEAM EMITTER PLANE.

THE POWER DENSITY DISTRIBUTIONS ALONG THE y - AND z -AXES ARE GIVEN FOR THAT VALUE OF x , ON THE NEXT 4 PAGES.

SEE THE LAYOUT OF 19Q0924: WITH A DIMENSION OF 13.97 CM BETWEEN THE BEAM EMITTER PLANE & THE SOURCE MOUNTING FACE, THIS CORRESPONDS TO A DIMENSION OF 876.03 CM ($890.0 - 13.97$) DOWNSTREAM OF THE SOURCE FLANGE.

BY COMPARISON, THE LATEST LAYOUT (19N4425) SHOWS THE RESTRICTION OF FLOOR AND CEILING OCCURRING AT A DIMENSION OF 876.82 CM.

SINCE 876.82 IS APPROXIMATELY EQUAL TO 876.03, THE CALCULATION WAS NOT DUPLICATED, & IS SO PRESENTED.

BEAM/1G CREATED: 09/20/79 EXECUTED: 12/13/79 13:38:53 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 3 S1 PARALLEL TO: -Y- AXIS

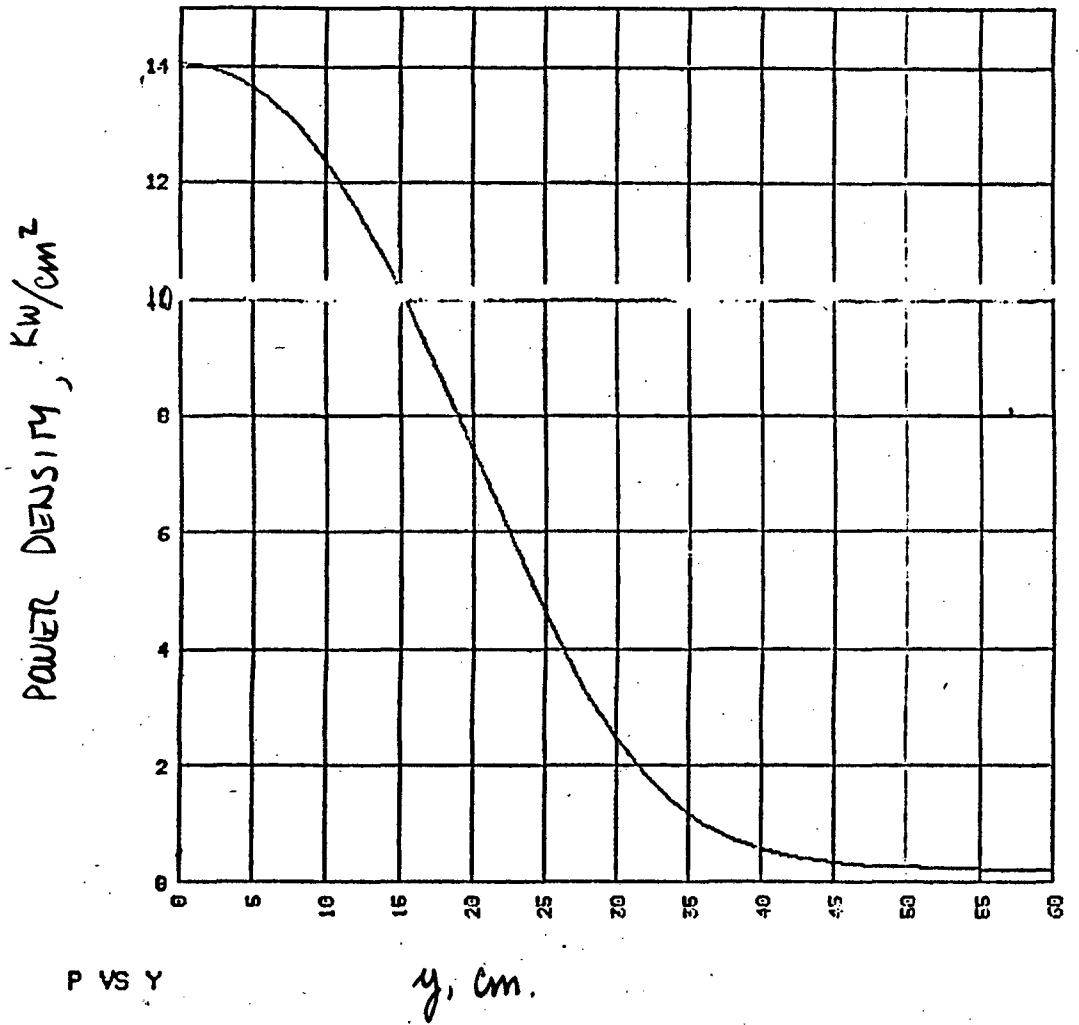
GRID SPECS (X1,Y1,Z1): 890.0 0. 0.
(X2,Y2,Z2): 890.0 60.00 0.
(DS): 2.000

X	Y	Z	S1	POWER FLUX
890.0	0.	0.	0.	14.05
890.0	2.000	0.	2.000	13.99
890.0	4.000	0.	4.000	13.79
890.0	6.000	0.	6.000	13.47
890.0	8.000	0.	8.000	12.99
890.0	10.00	0.	10.00	12.37
890.0	12.00	0.	12.00	11.60
890.0	14.00	0.	14.00	10.69
890.0	16.00	0.	16.00	9.666
890.0	18.00	0.	18.00	8.554
890.0	20.00	0.	20.00	7.399
890.0	22.00	0.	22.00	6.247
890.0	24.00	0.	24.00	5.145
890.0	26.00	0.	26.00	4.133
890.0	28.00	0.	28.00	3.239
890.0	30.00	0.	30.00	2.481
890.0	32.00	0.	32.00	1.864
890.0	34.00	0.	34.00	1.381
890.0	36.00	0.	36.00	1.018
890.0	38.00	0.	38.00	0.7545
890.0	40.00	0.	40.00	0.5785
890.0	42.00	0.	42.00	0.4460
890.0	44.00	0.	44.00	0.3642
890.0	46.00	0.	46.00	0.3112
890.0	48.00	0.	48.00	0.2770
890.0	50.00	0.	50.00	0.2545
890.0	52.00	0.	52.00	0.2387
890.0	54.00	0.	54.00	0.2269
890.0	56.00	0.	56.00	0.2171
890.0	58.00	0.	58.00	0.2085
890.0	60.00	0.	60.00	0.2004

↑ THIS X DIMENSION IS MEASURED FROM THE BEAM EMITTER PLANE
IT IS EQUIVALENT TO AN X = 876.03 CM., MEASURED FM. THE SOURCE MTG. FLANGE
IT IS APPROXIMATELY EQUAL TO X = 876.82 CM. SHOWN ON 1900924.

MS627

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FOR $\lambda = 890.0$ cm. FM. BEAM EMITTER PLANE
 = 876.03 ✓ - SOURCE MFG. PLANE
 $\approx 876:82$ - - - - -

BEAM/IG CREATED: 09/20/79 EXECUTED: 12/13/79 13:38:58 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 4 S1 PARALLEL TO: -Z- AXIS

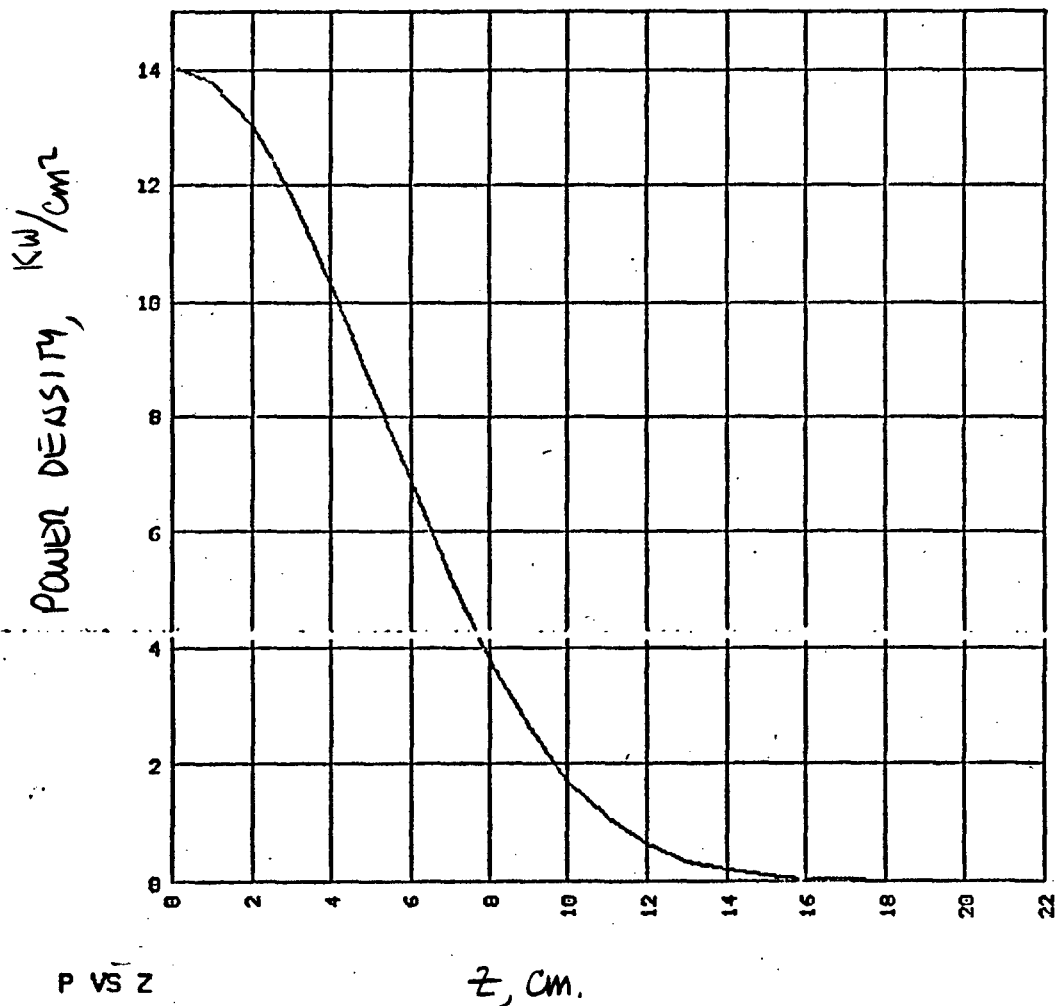
GRID SPECS (X1,Y1,Z1): 890.0 0. 0.
(X2,Y2,Z2): 890.0 0. 22.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
890.0	0.	0.	0.	14.05
890.0	0.	1.000	1.000	13.79
890.0	0.	2.000	2.000	13.03
890.0	0.	3.000	3.000	11.84
890.0	0.	4.000	4.000	10.33
890.0	0.	5.000	5.000	8.629
890.0	0.	6.000	6.000	6.892
890.0	0.	7.000	7.000	5.250
890.0	0.	8.000	8.000	3.806
890.0	0.	9.000	9.000	2.622
890.0	0.	10.00	10.00	1.714
890.0	0.	11.00	11.00	1.063
890.0	0.	12.00	12.00	0.6259
890.0	0.	13.00	13.00	0.3502
890.0	0.	14.00	14.00	0.1867
890.0	0.	15.00	15.00	9.5415E-02
890.0	0.	16.00	16.00	4.7076E-02
890.0	0.	17.00	17.00	2.2665E-02
890.0	0.	18.00	18.00	1.0796E-02
890.0	0.	19.00	19.00	5.1579E-03
890.0	0.	20.00	20.00	2.4976E-03
890.0	0.	21.00	21.00	1.2302E-03
890.0	0.	22.00	22.00	6.1391E-04

↑ THIS X DIMENSION IS MEASURED FROM THE BEAM EMITTER PLANE.
IT IS EQUIVALENT TO AN X = 876.03 CM., MEASURED FM. THE SOURCE MTO FLANGE
IT IS APPROXIMATELY EQUAL TO X = 876.82 CM., SHOWN ON 1900924

MS627

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FOR $z = 890.0$ cm: FM. BEAM EMITTER PLANE
 = 876.03 - ✓ SOURCE MFG. FLANGE
 OR 876.82 - ✓ - ✓ - ✓ - ✓

ENGINEERING NOTE

MS627

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DATE

5. THE COMPUTER RUN FOR THE POWER DENSITY DISTRIBUTION OF THE TARGET CHAMBER BEAMDUMP WAS MADE WITH THE BEAM EMITTER PLANE AS THE POINT OF ORIGIN.

THIS GAVE THE DOWNSTREAM DISTANCE FOR THE INTERSECTION OF THE BEAMDUMP WITH THE NO. 3, NO. 2, AND NO. 1 \bar{L} 'S AS $x = 1070.29$ CM, 1089.77 CM, AND 1119.97 CM., RESPECTIVELY.

THE COMPUTER USED THE VALUES OF 1070 , 1090 , & 1120 CM.

THESE POINTS CORRESPOND TO THOSE SHOWN ON THE LAYOUT 19Q 0924 OF $x = 1056.32$ CM, 1075.80 CM, & 1106.00 CM, ALL MEASURED DOWNSTREAM OF THE SOURCE MOUNTING FLANGE.

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 5 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): 1070. 0. 0.
 (X2,Y2,Z2): 1070. 66.00 0.
 (DS): 2.062

X	Y	Z	S1	POWER FLUX
1070.	0.	0.	0.	11.86
1070.	2.063	0.	2.062	11.79
1070.	4.125	0.	4.125	11.60
1070.	6.188	0.	6.187	11.28
1070.	8.250	0.	8.250	10.84
1070.	10.31	0.	10.31	10.28
1070.	12.38	0.	12.37	9.620
1070.	14.44	0.	14.44	8.868
1070.	16.50	0.	16.50	8.047
1070.	18.56	0.	18.56	7.180
1070.	20.63	0.	20.62	6.294
1070.	22.69	0.	22.69	5.418
1070.	24.75	0.	24.75	4.576
1070.	26.81	0.	26.81	3.792
1070.	28.88	0.	28.87	3.084
1070.	30.94	0.	30.94	2.463
1070.	33.00	0.	33.00	1.935
1070.	35.06	0.	35.06	1.498
1070.	37.13	0.	37.12	1.147
1070.	39.19	0.	39.19	0.8741
1070.	41.25	0.	41.25	0.6671
1070.	43.31	0.	43.31	0.5144
1070.	45.38	0.	45.37	0.4347
1070.	47.44	0.	47.44	0.3278
1070.	49.50	0.	49.50	0.2748
1070.	51.56	0.	51.56	0.2388
1070.	53.63	0.	53.62	0.2144
1070.	55.69	0.	55.69	0.1977
1070.	57.75	0.	57.75	0.1859
1070.	59.81	0.	59.81	0.1770
1070.	61.88	0.	61.87	0.1700
1070.	63.94	0.	63.94	0.1640
1070.	66.00	0.	66.00	0.1585

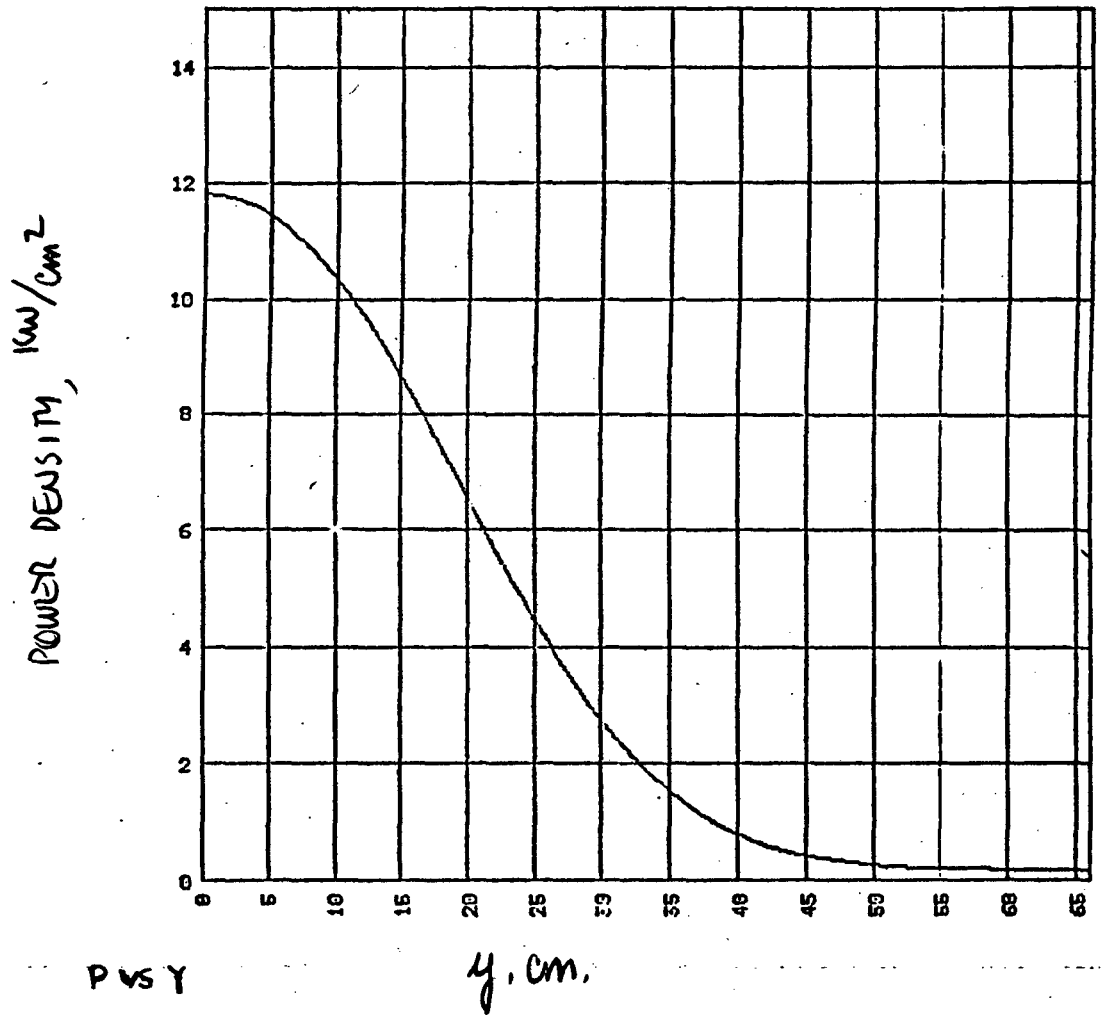
INTERSECTION OF
 NO. 3 BEAM E
 WITH TARGET
 CHAMBER BEAMDUMP.

↑
 ≈ 1070.29 cm. MEASURED DOWNSTREAM FM. BEAM EMITTER PLATE
 ≈ 1056.32 - - - - - SOURCE MOUNTING FLANGE

M5627

PL1

INTERSECTION OF NO. 3 BEAM &
WITH TARGET CHAMBER BEAMDUMP.



PWSY

y, cm.

1070 cm. DOWNSTREAM OF BEAM EMITTER PLATE
1056.32 - - - SOURCE MOUNTING RANGE

BEAM/IG CREATED: 09/20/79 EXECUTED: 12/13/79 13:38:58 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 6 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 1070. 0. 0.
(X2,Y2,Z2): 1070. 0. 24.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
1070.	0.	0.	0.	11.86
1070.	0.	1.000	1.000	11.67
1070.	0.	2.000	2.000	11.14
1070.	0.	3.000	3.000	10.29
1070.	0.	4.000	4.000	9.212
1070.	0.	5.000	5.000	7.978
1070.	0.	6.000	6.000	6.681
1070.	0.	7.000	7.000	5.406
1070.	0.	8.000	8.000	4.222
1070.	0.	9.000	9.000	3.182
1070.	0.	10.00	10.00	2.311
1070.	0.	11.00	11.00	1.619
1070.	0.	12.00	12.00	1.092
1070.	0.	13.00	13.00	0.7098
1070.	0.	14.00	14.00	0.4450
1070.	0.	15.00	15.00	0.2693
1070.	0.	16.00	16.00	0.1577
1070.	0.	17.00	17.00	8.9545E-02
1070.	0.	18.00	18.00	4.9554E-02
1070.	0.	19.00	19.00	2.6878E-02
1070.	0.	20.00	20.00	1.4394E-02
1070.	0.	21.00	21.00	7.6752E-03
1070.	0.	22.00	22.00	4.1084E-03
1070.	0.	23.00	23.00	2.2218E-03
1070.	0.	24.00	24.00	1.2174E-03

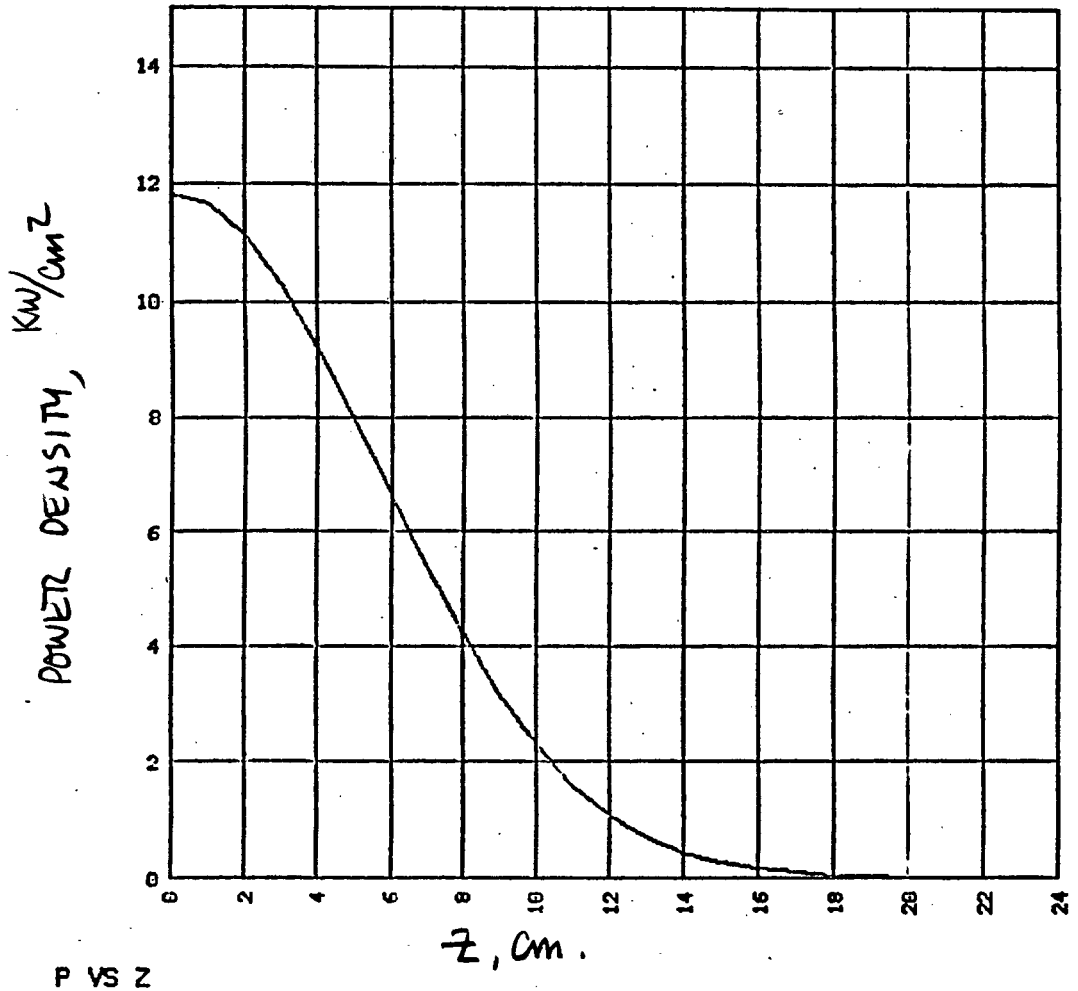
INTERSECTION OF
NO. 3 BEAM &
WITH TARGET
CHAMBER BEAM DUMP.

↑
≈ 1070.29 cm., MEASURED DOWNSTREAM FM. BEAM EMITTER PLANE
≈ 1056.32 - , - - - SOURCE MOUNTING PLANE

MS627

P63

INTERSECTION OF NO. 3 BEAM &
WITH TARGET CHAMBER BEAMDUMP.



P VS Z

1070. CM. DOWNSTREAM OF BEAM EMITTER PLATE
1056.32 - - - SOURCE MTC. FLANGE.

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 7 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): 1090. 0. 0.
 (X2,Y2,Z2): 1090. 68.00 0.
 (DS): 2.000

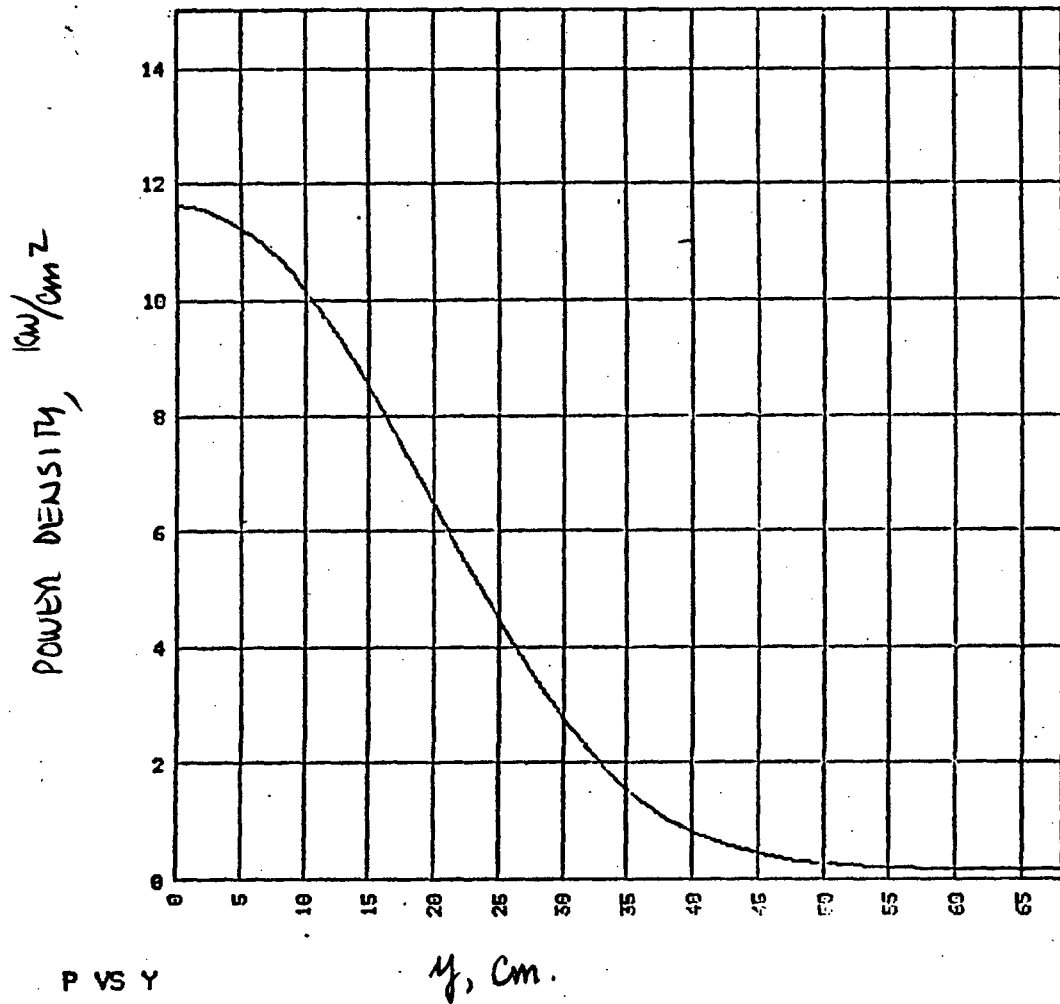
X	Y	Z	S1	POWER FLUX
1090.	0.	0.	0.	11.63
1090.	2.000	0.	2.000	11.57
1090.	4.000	0.	4.000	11.39
1090.	6.000	0.	6.000	11.10
1090.	8.000	0.	8.000	10.69
1090.	10.00	0.	10.00	10.18
1090.	12.00	0.	12.00	9.569
1090.	14.00	0.	14.00	8.875
1090.	16.00	0.	16.00	8.115
1090.	18.00	0.	18.00	7.309
1090.	20.00	0.	20.00	6.479
1090.	22.00	0.	22.00	5.649
1090.	24.00	0.	24.00	4.842
1090.	26.00	0.	26.00	4.080
1090.	28.00	0.	28.00	3.378
1090.	30.00	0.	30.00	2.751
1090.	32.00	0.	32.00	2.204
1090.	34.00	0.	34.00	1.741
1090.	36.00	0.	36.00	1.358
1090.	38.00	0.	38.00	1.051
1090.	40.00	0.	40.00	0.8098
1090.	42.00	0.	42.00	0.6260
1090.	44.00	0.	44.00	0.4992
1090.	46.00	0.	46.00	0.3896
1090.	48.00	0.	48.00	0.3187
1090.	50.00	0.	50.00	0.2691
1090.	52.00	0.	52.00	0.2340
1090.	54.00	0.	54.00	0.2111
1090.	56.00	0.	56.00	0.1947
1090.	58.00	0.	58.00	0.1829
1090.	60.00	0.	60.00	0.1742
1090.	62.00	0.	62.00	0.1673
1090.	64.00	0.	64.00	0.1614
1090.	66.00	0.	66.00	0.1562
1090.	68.00	0.	68.00	0.1514

INTERSECTION OF
 NO. 2 BEAM &
 WITH TARGET
 CHAMBER BEARDUMP

1090 CM. MEASURED DOWNSTREAM FM. BEAM EMITTER PLATE
 ~1075.80 - SOURCE MOUNTING FLANGE

M 5627
 plus

INTERSECTION OF NO. 2 BEAM &
WITH TARGET CHAMBER BEAMDUMP.



1090. cm. DOWNSTREAM OF BEAM EMITTER PLATE
1075.80 — — — SOURCE MOUNTING FLANGE.

BEAM/IG CREATED: 09/20/79 EXECUTED: 12/13/79 13:38:58 TIME LEFT: 0.983

TFTR SOURCE: 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 8 S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 1090. 0. 0.
 (X2,Y2,Z2): 1090. 0. 26.00
 (DS): 1.000

X	Y	Z	S1	POWER FLUX
1090.	0.	0.	0.	11.63
1090.	0.	1.000	1.000	11.45
1090.	0.	2.000	2.000	10.94
1090.	0.	3.000	3.000	10.13
1090.	0.	4.000	4.000	9.088
1090.	0.	5.000	5.000	7.898
1090.	0.	6.000	6.000	6.642
1090.	0.	7.000	7.000	5.403
1090.	0.	8.000	8.000	4.248
1090.	0.	9.000	9.000	3.225
1090.	0.	10.00	10.00	2.364
1090.	0.	11.00	11.00	1.672
1090.	0.	12.00	12.00	1.141
1090.	0.	13.00	13.00	0.7511
1090.	0.	14.00	14.00	0.4773
1090.	0.	15.00	15.00	0.2931
1090.	0.	16.00	16.00	0.1743
1090.	0.	17.00	17.00	0.1085
1090.	0.	18.00	18.00	5.6494E-02
1090.	0.	19.00	19.00	3.1090E-02
1090.	0.	20.00	20.00	1.6865E-02
1090.	0.	21.00	21.00	9.0893E-03
1090.	0.	22.00	22.00	4.9057E-03
1090.	0.	23.00	23.00	2.6697E-03
1090.	0.	24.00	24.00	1.4708E-03
1090.	0.	25.00	25.00	8.2051E-04
1090.	0.	26.00	26.00	4.6198E-04

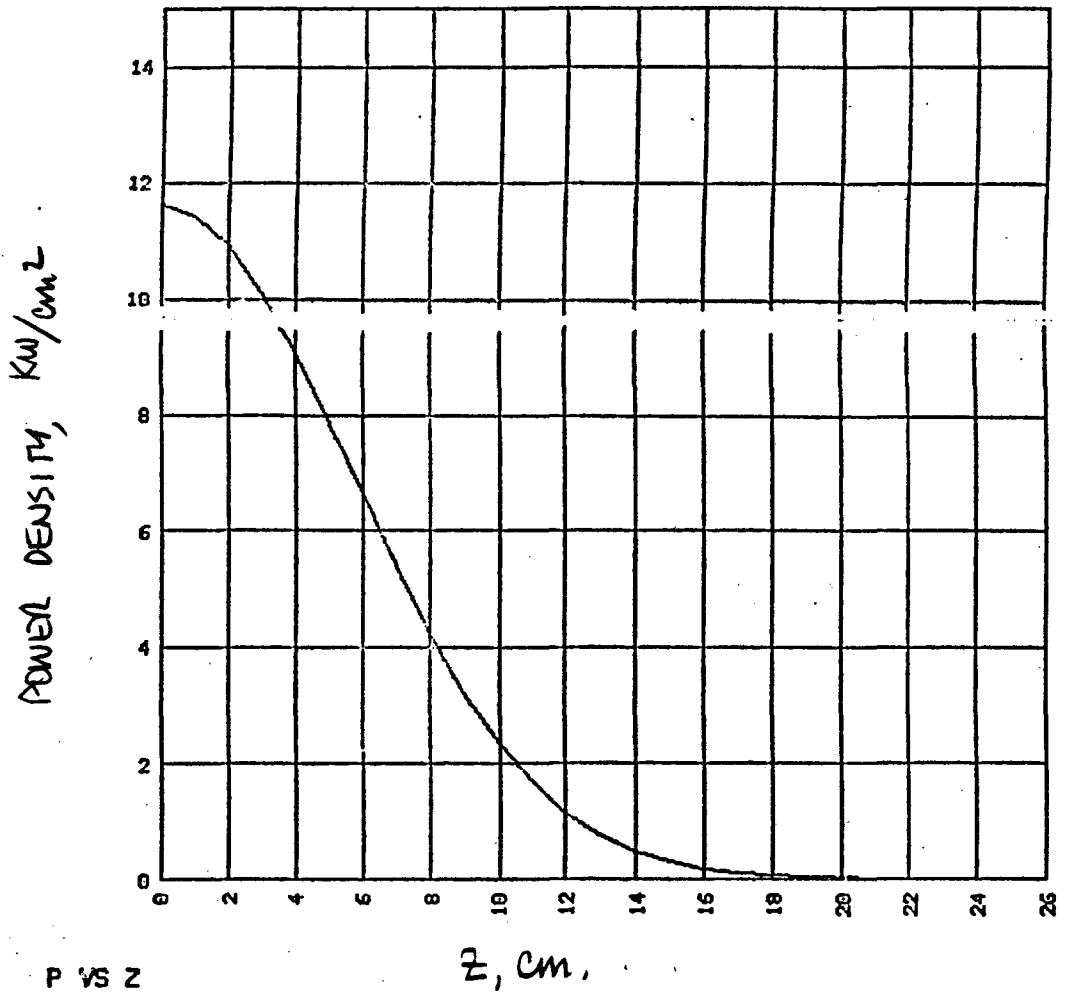
INTERSECTION OF
 NO. 2 BEAM &
 WITH TARGET
 CHAMBER BEAMDUMP.

↑ 1090. cm. MEASURED DOWNSTREAM FROM BEAM EMITTER PLANE
 ~ 1075.80 — — — — SOURCE MOUNTING FLANGE.

MS627

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INTERSECTION OF NO. 2 BEAM &
WITH TARGET CHAMBER BEAMDUMP.



P VS Z

Z, cm.

1090. cm. DOWNSTREAM OF BEAM EMITTER PLATE
 1075.80 — — — SOURCE MOUNTING FLANGE

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 9 S1 PARALLEL TO: -Y- AXIS

GRID SPECS (X1,Y1,Z1): 1120. 0. 0.
 (X2,Y2,Z2): 1120. 68.00 0.
 (DS): 2.000

X	Y	Z	S1	POWER FLUX
1120.	0.	0.	0.	11.28
1120.	2.000	0.	2.000	11.22
1120.	4.000	0.	4.000	11.05
1120.	6.000	0.	6.000	10.77
1120.	8.000	0.	8.000	10.37
1120.	10.00	0.	10.00	9.881
1120.	12.00	0.	12.00	9.296
1120.	14.00	0.	14.00	8.633
1120.	16.00	0.	16.00	7.907
1120.	18.00	0.	18.00	7.139
1120.	20.00	0.	20.00	6.348
1120.	22.00	0.	22.00	5.557
1120.	24.00	0.	24.00	4.787
1120.	26.00	0.	26.00	4.056
1120.	28.00	0.	28.00	3.381
1120.	30.00	0.	30.00	2.773
1120.	32.00	0.	32.00	2.240
1120.	34.00	0.	34.00	1.784
1120.	36.00	0.	36.00	1.403
1120.	38.00	0.	38.00	1.094
1120.	40.00	0.	40.00	0.8482
1120.	42.00	0.	42.00	0.6582
1120.	44.00	0.	44.00	0.5146
1120.	46.00	0.	46.00	0.4085
1120.	48.00	0.	48.00	0.3317
1120.	50.00	0.	50.00	0.2772
1120.	52.00	0.	52.00	0.2398
1120.	54.00	0.	54.00	0.2124
1120.	56.00	0.	56.00	0.1939
1120.	58.00	0.	58.00	0.1808
1120.	60.00	0.	60.00	0.1712
1120.	62.00	0.	62.00	0.1639
1120.	64.00	0.	64.00	0.1579
1120.	66.00	0.	66.00	0.1527
1120.	68.00	0.	68.00	0.1480

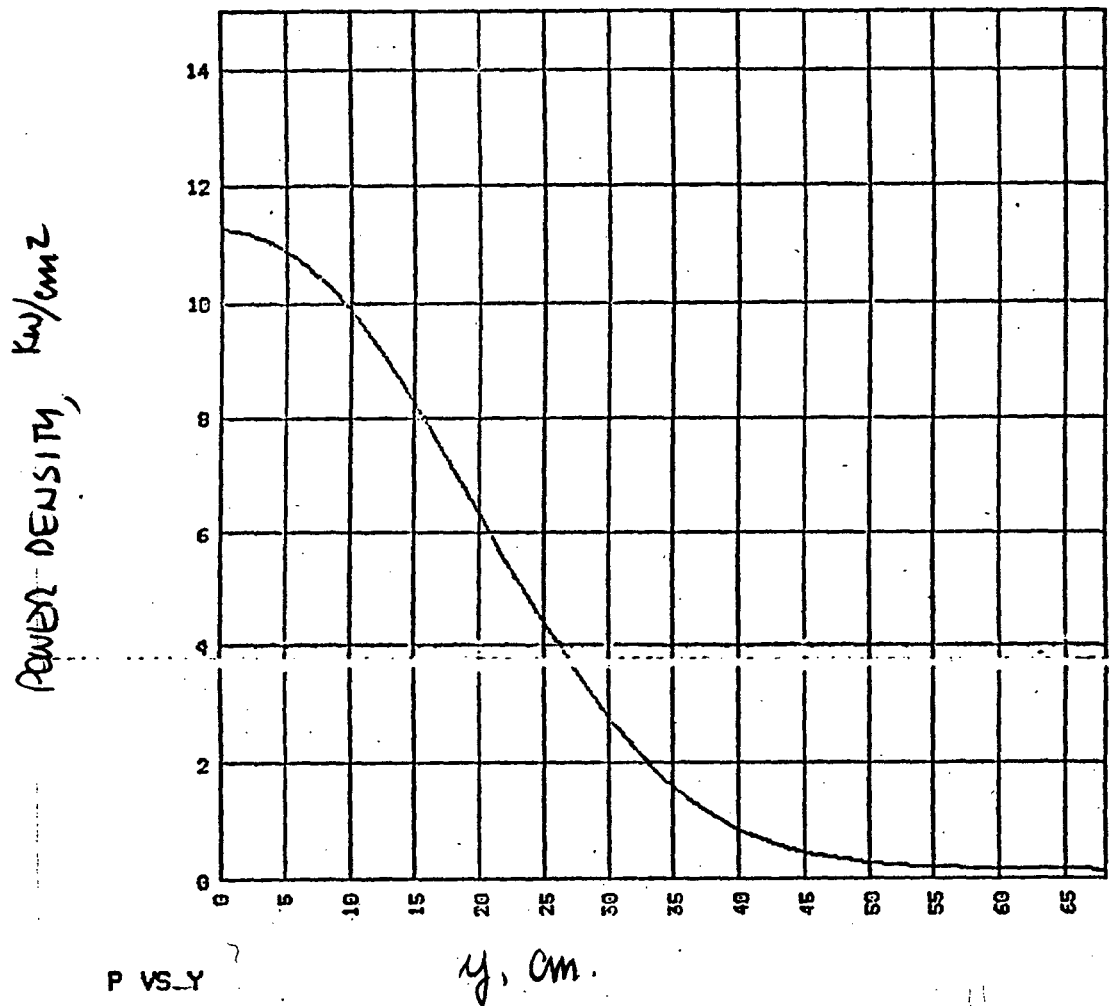
INTERSECTION OF
 NO. 1 BEAM &
 WITH TARGET
 CHAMBER BEAMDUMP

M 5627

P 69

↑ 1120. CM. MEASURED DOWNSTREAM FM. BEAM EMITTER PLATE
 1106.00 — — — — SOURCE MTO. FLANGE

INTERSECTION OF NO. 1 BEAM &
WITH TARGET CHAMBER BEAMDUMP.



P VS Y

y, cm.

1120. cm. DOWNSTREAM FM. BEAM EMITTER PLATE
1106.00 ✓ — : — ✓ SOURCE MTG. FLANGE

BEAM1G CREATED: 09/20/79 EXECUTED: 12/13/79 13:38:58 TIME LEFT: 0.983

TFTR SOURCE. 10% 0.5,5.0, 90% 0.35,.9. 12/13/79

GRID NO. 10

S1 PARALLEL TO: -Z- AXIS

GRID SPECS (X1,Y1,Z1): 1120. 0. 0.
(X2,Y2,Z2): 1120. 0. 26.00
(DS): 1.000

X	Y	Z	S1	POWER FLUX
1120.	0.	0.	0.	11.28
1120.	0.	1.000	1.000	11.12
1120.	0.	2.000	2.000	10.63
1120.	0.	3.000	3.000	9.872
1120.	0.	4.000	4.000	8.892
1120.	0.	5.000	5.000	7.767
1120.	0.	6.000	6.000	6.576
1120.	0.	7.000	7.000	5.392
1120.	0.	8.000	8.000	4.280
1120.	0.	9.000	9.000	3.287
1120.	0.	10.00	10.00	2.442
1120.	0.	11.00	11.00	1.753
1120.	0.	12.00	12.00	1.217
1120.	0.	13.00	13.00	0.8160
1120.	0.	14.00	14.00	0.5293
1120.	0.	15.00	15.00	0.3322
1120.	0.	16.00	16.00	0.2020
1120.	0.	17.00	17.00	0.1193
1120.	0.	18.00	18.00	6.0657E-02
1120.	0.	19.00	19.00	3.8642E-02
1120.	0.	20.00	20.00	2.1396E-02
1120.	0.	21.00	21.00	1.1734E-02
1120.	0.	22.00	22.00	6.4218E-03
1120.	0.	23.00	23.00	3.5321E-03
1120.	0.	24.00	24.00	1.9625E-03
1120.	0.	25.00	25.00	1.1040E-03
1120.	0.	26.00	26.00	6.2791E-04

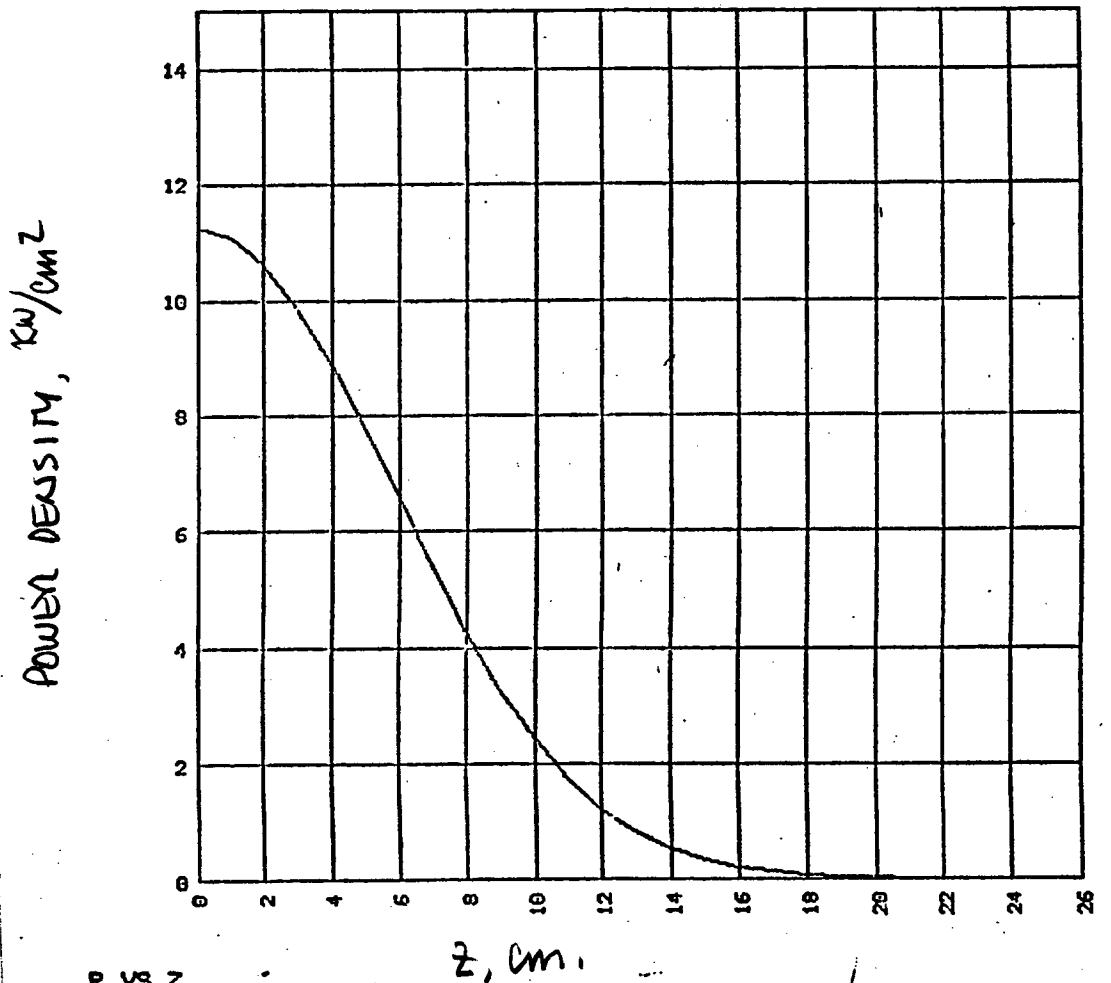
INTERSECTION OF
NO. 1 BEAM &
WITH TARGET
CHAMBER BEAMDUMP

↑
1120. cm. MEASURED DOWNSTREAM FROM BEAM EMITTER PLATE
~ 1106.00 SOURCE MOUNT FLANGE.

MS627

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INTERSECTION OF NO. 1 BEAM &
WITH TARGET CHAMBER BEAMDUMP



P VS Z

z, cm.

1120.0 cm

1120. cm. DOWNSTREAM FROM BEAM EMITTER PLATE
 ~ 1106.00 ——— SOURCE MTO. PLATE.

AUTHOR

DEPARTMENT

LOCATION

DATE

AGAIN, IT SHOULD BE STATED THAT THE
POWER DENSITIES GIVEN IN THIS NOTE
ARE FOR TOTAL BEAM ; I.E., IONS PLUS
NEUTRALS.

TO AID IN CALCULATIONS WHERE ONLY
THE NEUTRAL FRACTIONS ARE CONSIDERED,
THE READER MAY WISH TO REFER TO
AN EARLIER NOTE :

M 5506

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