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Fast 4-8 GHz Debuncher Betatron Stochastic Cooling for the TEVATRON Upgrade

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FAST 4-8 GHZ DEBUNCHER BETATRON STOCHASTIC COOLING for the TEVATRON UPGRADE

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Abstract

The present 2–4 Ghz Debuncher betatron stochastic cooling systems are designed to cool 7×10^7 antiprotons with initial transverse emittances of 20π mm-mrad down to 7π mm-mrad in 2 seconds. For the Tevatron upgrade, it would be advantageous to cool twice the number of antiprotons from 20π mm-mrad to 1π mm-mrad in half the time. We explore the possibility of achieving this goal with 4–8 Ghz stochastic cooling systems. Since the transverse beam size is initially more than twice the width of the cooling electrodes, we compare the effectiveness of one, two, and three plate pairs spaced strategically along the transverse beam direction. We also compare constant gap size electrodes with that for gap sizes which track the beam size as the emittance is reduced. We find that the three plate pair variable gap geometry performs the best, closely followed by the two plate pair variable gap geometry. Because of lower production costs we would suggest use of the latter.

I. Introduction

The Debuncher Accelerator Ring of the Antiproton Source is designed so that every 2 seconds, 7×10^7 antiprotons with a momentum spread of 0.2% and horizontal and vertical emittances of 20π mm-mrad are stochastically cooled to $7\pi \times 7\pi$ mm-mrad before being transferred to the Accumulator. The horizontal and vertical stochastic cooling systems are each composed of 128 pickup loop pairs and 128 kicker loop pairs. The corresponding pickup and kicker arrays are placed an odd multiple of 90^0 apart in betatron phase so that a position error measured at the pickup can be corrected by an angular electromagnetic kick at the kicker. The cross-section of a single electrode plate pair is shown in *Fig. 1* and a single array which contains 32 loop pairs is shown in *Fig. 2*. The present system operates over the frequency band 2–4 Ghz, with an electrode plate effective width of 22.5 mm. The length of each electrode plate along the beam direction is nominally set to a quarter wavelength of the central frequency. The parameters of the present Debuncher stochastic cooling systems are given in *Table I*.

An excellent discussion of the theory of betatron stochastic cooling is given by B. Autin in *Ref. 1*. We briefly summarize the important formulae here.

In each transverse direction, the rate at which the emittance ε is reduced

is given by

$$\frac{d\varepsilon}{dt} = \sum_{n=-\infty}^{\infty} \frac{-4G_n\varepsilon + B_n}{(1+S_n)^2}. \tag{1}$$

G_n is the nth harmonic's contribution to the overall system gain and is given by

$$G_n = \frac{1}{4}\sqrt{n_p n_k \beta_p \beta_k}(ef_0^2)\frac{Z}{2}\frac{\sin^2(kl)}{(kl)} l g_A \frac{d_p d_k}{h_p h_k}\frac{(1+\beta)}{\beta(\frac{pc}{e})}, \tag{2}$$

where n_p (n_k) is the number of pickup (kicker) loop pairs, β_p (β_k) is the lattice beta function at the pickup (kicker), $-e$ is the antiproton charge, Z is the characteristic impedance of the pickups and kickers, l is the effective length of the electrode plates, g_A is the amplifier gain, h_p (h_k) is the full gap between the pickup (kicker) plates, f_0 is the antiproton revolution frequency, β is the particle velocity divided by the speed of light c, p is the antiproton momentum, and d_p (d_k) is the difference mode sensitivity of the pickup (kicker) plate pair to the beam. It is useful to know the mean values of $\sin^2(kl)$, $\frac{\sin^2(kl)}{kl}$, and $\frac{\sin^2(kl)}{(kl)^2}$ which are respectively 0.913, 0.603, and 0.413.

B_n gives the emittance blowup from thermal noise via

$$\frac{d\varepsilon}{dt}\Big|_{\text{noise}} = \sum_{n=-\infty}^{\infty} B_n, \tag{3}$$

with

$$B_n = \frac{3}{4}\beta_k n_k \frac{Z}{2} k_B (T_A + T_S)[g_A \frac{(1+\beta)}{\beta(\frac{pc}{e})}\frac{d_k}{h_k} l f_0 \frac{\sin(kl)}{(kl)}]^2, \tag{4}$$

where $k_B = 1.381 \times 10^{-23}$ Joules/^{0}K is Boltzmann's constant, and T_A and T_S are the amplifier and resistor noise temperatures.

Schottky noise and feedback effects are contained in

$$S_n = \frac{dN}{df}\frac{G_n}{n}, \tag{5}$$

where N is the number of antiprotons.

The total Schottky signal power from all the particles is

$$P_S = \frac{1}{2}g_A^2 N n_p W f_0 \overline{\sin^2}(kl)\frac{Z}{2}[d_p e\frac{\hat{a}}{h_p}]^2, \tag{6}$$

where W is the system bandwidth, and $\hat{a}$ is the maximum betatron excursion of the antiprotons which have the amplitude distribution function

$$f(a) = \frac{2a}{\hat{a}^2}. \tag{7}$$

The noise power is given by

$$P_N = g_A^2 k_B W(T_A + T_S). \tag{8}$$

By suitable approximations, *Equation (1)* can be turned into

$$\frac{1}{\varepsilon}\frac{d\varepsilon}{dt} = \frac{2W}{\varepsilon f_0}Y(u)[-4G\varepsilon + B], \tag{9}$$

where G and B are G_n and B_n taken to be constant, and

$$u = \frac{NG}{W\eta\frac{\delta p}{p}} \tag{10}$$

$$Y(u) = 1 - 2u\ln\frac{u+2}{u+1} + \frac{u^2}{(u+1)(u+2)}, \tag{11}$$

with η being the ratio of frequency spread to momentum spread. The cooling system is generally optimized whenever $uY(u) \sim 0.35$. We can integrate *Equation (9)* to get the total time required to reduce the emittance from an initial value of ε_0 to a final value of ε_f:

$$t = -\frac{f_0}{8W}\int_{\varepsilon_0}^{\varepsilon_f} \frac{d\varepsilon}{G(\varepsilon)[\varepsilon - \frac{B(\varepsilon)}{4G(\varepsilon)}]Y(u(\varepsilon))}. \tag{12}$$

The pickup and kicker electrode sensitivity has been discussed extensively. For a good summary, see *Ref. 2.* More detailed discussions can be found in *Refs. 3-5.* Here we only summarize the important formulae. The sensitivity for a single electrode plate is [4]

$$\begin{aligned} e(x,y) &= \frac{1}{2\pi}\{\tan^{-1}[\frac{\sinh\frac{\pi}{h}(x+\frac{w}{2})}{\cosh(\frac{\pi y}{h})}] - \tan^{-1}[\frac{\sinh\frac{\pi}{h}(x-\frac{w}{2})}{\cosh(\frac{\pi y}{h})}] \\ &\quad + \tan^{-1}[\tan(\frac{\pi y}{h})\tanh\frac{\pi}{h}(x+\frac{w}{2})] \\ &\quad - \tan^{-1}[\tan(\frac{\pi y}{h})\tanh\frac{\pi}{h}(x-\frac{w}{2})]\}, \end{aligned} \tag{13}$$

where h, w, x, y are defined in *Fig. 1.* The sum mode sensitivity used in momentum cooling is defined by

$$\begin{aligned} s(x,y) &= e(x,y) + e(x,-y) \\ &= \frac{1}{\pi}\{\tan^{-1}[\frac{\sinh\frac{\pi}{h}(x+\frac{w}{2})}{\cosh(\frac{\pi y}{h})}] - \tan^{-1}[\frac{\sinh\frac{\pi}{h}(x-\frac{w}{2})}{\cosh(\frac{\pi y}{h})}]\}. \end{aligned} \tag{14}$$

The difference mode sensitivity used in betatron cooling is given by

$$d(x,y) = \frac{h}{y}[e(x,y) - e(x,-y)]$$

$$= \frac{h}{\pi y}\{\tan^{-1}[\tan(\frac{\pi y}{h})\tanh\frac{\pi}{h}(x+\frac{w}{2})]$$
$$-\tan^{-1}[\tan(\frac{\pi y}{h})\tanh\frac{\pi}{h}(x-\frac{w}{2})]\}. \tag{15}$$

An often stated approximation is

$$d(0,y) \simeq 2\tanh(\frac{\pi w}{2h}). \tag{16}$$

We have summarized above all of the formulae which were used to analyze the 4-8 Ghz Debuncher stochastic cooling systems. In subsequent sections we report on work done during the May, 1986 Tevatron upgrade studies. At that time we proposed that since the beam size is large compared to the width of the electrode plates it would be better to go to a multiplate geometry transverse to the beam direction of motion [cf. *Fig. 3*]. We investigate single, double, and triple plate pair geometries. In the next section, we analyze electrode sensitivities for different geometrical configurations for the electrode plates.

II. Electrode Sensitivities for Various Plate Geometries

In this section we discuss the sensitivities of the electrode plates for finite beam sizes. We consider nine *Cases*:

(1) Single plate pair geometry with constant gap size as shown in *Fig. 1*;

(2) Single plate pair geometry where the gap size tracks the beam (almost scraping) from 20π mm-mrad down to 1π mm-mrad;

(3) Single plate pair geometry where the gap size tracks the beam from 20π mm-mrad down to 4π mm-mrad and then is constant as the beam emittance is further reduced to 1π mm-mrad. The reason is that after the beam emittance is reduced to about 4π mm-mrad, you may not really gain that much by letting the electrode gap track the beam size below 4π mm-mrad;

(4)–(6) Same as *Cases (1)-(3)* but with a 2 plate pair geometry as shown in *Fig. 3*;

(7)–(9) Same as *Cases (1)-(3)* but with a 3 plate pair geometry as shown in *Fig. 3*.

First, we need to determine the initial electrode gap size. For this, we note that the maximum betas in the region of the stochastic cooling devices

as measured during the summer of 1985 are (in meters)

$$(\beta_x^{\max}, \beta_y^{\max}) = (11.284, 9.487). \tag{17}$$

These values were determined by first measuring the betas in the quads surrounding the stochastic cooling vacuum tanks by the standard method of varying the current in the magnet coils. We show the results in *Table II.* Starting with the differential equation for $\beta(s)$ in the drifts containing the stochastic cooling tanks

$$\frac{1}{2}\beta\beta'' - \frac{1}{4}\beta'^2 = 1, \tag{18}$$

we look for solutions of the form

$$\beta(s) = \beta_0 + \beta_1 s + \beta_2 s^2. \tag{19}$$

To obtain the constants $\beta_0, \beta_1, \beta_2$ we use *Equation (18)* together with the boundary conditions

$$\beta_0 = \beta(0) = \beta \text{ measured at upstream quad} \tag{20}$$

$$\beta(s = \text{distance between quads}) = \beta \text{ measured at next downstream quad.} \tag{21}$$

In addition to giving the beta functions at the upstream, center, and downstream position of each array, *Table III* also gives the acceptance at each position. The numbers for the gap sizes are taken from the production data. It can be seen that the as-built overall acceptances of the stochastic cooling

arrays (ignoring alignment errors) are

$$A_x = 23\pi \text{ mm-mrad} \tag{22}$$

$$A_y = 25.2\pi \text{ mm-mrad.} \tag{23}$$

If the 4-8 Ghz system is to handle a $20\pi \times 20\pi$ mm-mrad beam, it is wise to use the betas in *Equation (17)* and set the gap sizes for 25π mm-mrad giving

$$\text{(hor. gap, vert. gap)=(33.6 mm, 30.8 mm).} \tag{24}$$

Another point needs to be folded into our discussion of electrode sensitivities. If one takes the simple particle distribution function [1]

$$f(x) = \frac{2x}{\hat{a}_x^2}, \tag{25}$$

in the horizontal direction and similarly in the vertical direction, where $\hat{a}_x$ is the maximum amplitude, then one can compute the average sensitivity

$$\bar{d}_{\text{Theory}} = \int_0^{\hat{a}_y} \int_0^{\hat{a}_x} f(x) f(y) d(x,y) dx dy, \tag{26}$$

where $d(x,y)$ is defined in *Equation (15)*. Comparing this number to the Argonne measurements on the 2-4 Ghz arrays [6], one finds

$$\bar{d}_{\substack{\text{Argonne}\\ \text{Measurement}}} = 0.8592 \bar{d}_{\text{Theory}} \simeq 1.0. \tag{27}$$

The present Debuncher stochastic cooling systems' performances have been shown to be consistent with $\bar{d}_{\substack{\text{Argonne}\\ \text{Measurement}}}$ given above [7]. So, we will always include the factor 0.8592 in the difference mode sensitivities computed below.

In the region of the vertical cooling systems the design average betas for the present $\eta = 0.006$ lattice are

$$(\bar{\beta}_x, \bar{\beta}_y) = (10.6m, 6.994m). \tag{28}$$

For the Tevatron upgrade, a new $\eta = 0.009$ lattice has been proposed by G. Dugan which should help to optimize the cooling. If you consider the design betas at the quads surrounding the stochastic cooling tanks and compare the $\eta = 0.006$ and $\eta = 0.009$ lattices, you have

$$(\bar{\beta}_x^{\text{Quads}}, \bar{\beta}_y^{\text{Quads}}) = (10.5\ m, 9.0\ m) \text{ for } \eta = 0.006 \tag{29}$$

$$(\bar{\beta}_x^{\text{Quads}}, \bar{\beta}_y^{\text{Quads}}) = (10.6\ m, 9.7\ m) \text{ for } \eta = 0.009. \tag{30}$$

Since the betas are practically the same, we use the same average betas from *Equation (28)* at the vertical cooling arrays for the new lattice. Similar arguments hold for the horizontal cooling arrays. Of course, if the 4-8 Ghz arrays are to be placed in new locations, new $\bar{\beta}$'s would be necessary.

We only consider vertical cooling below, since horizontal cooling is analogous. First, take the 1 plate pair geometry of *Cases (1)–(3)* discussed above. For simplicity, we assume that the horizontal and vertical beam emittances shrink at the same rate from 20π mm-mrad to 1π mm-mrad. We compute the average difference mode sensitivity for the 4-8 Ghz electrodes which have an effective width of 11.25 mm:

$$\bar{d} = 0.8592 \int_0^{\hat{a}_y} \int_0^{\hat{a}_x} f(x) f(y) d(x,y) dx dy, \tag{31}$$

where

$$\hat{a}_x = \sqrt{\frac{\varepsilon_x \bar{\beta}_x}{\pi}} \tag{32}$$

$$\hat{a}_y = \sqrt{\frac{\varepsilon_y \bar{\beta}_y}{\pi}} \tag{33}$$

and just out of curiosity we also compute the average sum mode sensitivity:

$$\bar{s} = \int_0^{\hat{a}_y} \int_0^{\hat{a}_x} f(x) f(y) s(x,y) dx dy, \tag{34}$$

The results for the average sensitivities versus beam emittance for *Cases (1)–(3)* are contained in *Tables IV–VI.* Recall that for *Case (1)* we take a constant gap size of 30.8 mm [cf. *Equation (24)*] as the beam emittance shrinks from 20π to 1π mm-mrad. In *Case (2)* we set the gap

$$h = 2\sqrt{\frac{\varepsilon(7 \text{ m})}{\pi}} + 0.001 \text{ mm}$$

as the emittance shrinks. The extra term, 0.001 mm, is only for calculational convenience. In *Case (3)*, we stop shrinking the gap at $\varepsilon = 4\pi$ mm-mrad, or $h = 10.584$ mm.

For the 2 plate pair geometry defined by *Fig. 3*, we let $\tilde{c}$ vary for a 20π mm-mrad beam and look for the $\tilde{c}$ which optimizes the electrode sensitivity. In this geometry, the sensitivity formulae to be averaged *à* la *Equation (31)* are

$$d(x,y)^{2 \text{ Plate Pair}} = \frac{h}{\sqrt{2}y}[e(x-\tilde{c},y) + e(x+\tilde{c},y)$$

$$-e(x-\tilde{c},-y)-e(x+\tilde{c},-y)] \qquad (35)$$

$$s(x,y)^{2\text{ Plate Pair}} = \frac{1}{\sqrt{2}}[e(x-\tilde{c},y)+e(x+\tilde{c},y)$$
$$+e(x-\tilde{c},-y)+e(x+\tilde{c},-y)]. \qquad (36)$$

The results are given in *Table VII* and in *Figs. 4 and 5.* We let $\tilde{c}$ vary from the situation where the plates are just touching out to the unwanted situation where the plates are half a center frequency (6 Ghz) wavelength apart. In the difference mode, we choose $\tilde{c} = 9$ mm. In the sum mode, there is a region of $\tilde{c}$ over which $\bar{s} \sim 0.3$, so the largest $\tilde{c}$ at this value, 7 mm, is chosen since it would probably be easier to maintain during production. The results for the average sensitivities versus beam emittance at these optimal values of $\tilde{c}$ for *Cases (4)-(6)* are given in *Tables VIII-X.*

For the 3 plate pair geometry defined by *Fig. 3*, we let $\tilde{c}$ vary for a 20π mm-mrad beam and again look for the $\tilde{c}$ which optimizes the electrode sensitivity. In this geometry, the sensitivity formulae to be averaged are

$$d(x,y)^{3\text{ Plate Pair}} = \frac{h}{\sqrt{3}y}[e(x-\tilde{c},y)+e(x,y)+e(x+\tilde{c},y)$$
$$-e(x-\tilde{c},-y)-e(x,-y)-e(x+\tilde{c},-y)] \quad (37)$$

$$s(x,y)^{3\text{ Plate Pair}} = \frac{1}{\sqrt{3}}[e(x-\tilde{c},y)+e(x,y)+e(x+\tilde{c},y)$$
$$+e(x-\tilde{c},-y)+e(x,-y)+e(x+\tilde{c},-y)]. \quad (38)$$

The results are shown in *Table XI* and in *Figs. 6 and 7.* Again we let $\tilde{c}$ vary

between the situation of the plates touching to the situation of having half a 6 Ghz wavelength between the plates. There is a region of $\tilde{c}$ over which $\bar{d} \sim 0.8$, so as before we choose the largest $\tilde{c}$ for this value of $\bar{d}$, which is $\tilde{c} = 13.5$ mm. For the sum mode we choose this same value for $\tilde{c}$. The results for the average sensitivities versus beam emittance for $\tilde{c} = 13.5$ mm for *Cases (7)–(9)* are shown in *Tables XII–XIV.*

In the betatron cooling formalism described in the Introduction, we need to have formulae for $\bar{d}$ as a function of emittance as the transverse beam size shrinks. To do this we fitted the various $\bar{d}$'s to 12th degree polynomials

$$\bar{d}(\varepsilon) = \sum_{i=0}^{12} \alpha_i \varepsilon^i \tag{39}$$

using the computer code *LSQFIT* from the *CERN Computer Centre Program Library.* The results are shown in *Tables XV–XXIII.*

Now that we have all of the necessary sensitivity formulae for the nine electrode geometries which we want to study, in the next section we summarize the results for the cooling rates, cooling times, Schottky and noise power, etc., for the various *Cases.*

III. Results and Conclusions

In Tables XXIV–XXXVII we give the final results of our calculations. They are listed in the order of decreasing quality of performance. The columns are labelled as follows:

NP = Number of pickup pairs

NK = Number of kicker pairs

GA = Amplifier gain

GAINDB = Amplifier gain in dB

TA = Amplifier noise temperature

TS = Resistor noise temperature

ETA = η (frequency spread divided by momentum spread)

DELPOP = $\frac{\delta p}{p}$

EMIT = Emittance in π mm-mrad

DSEN = Average difference mode electrode sensitivity to the beam

U = (Defined by *Equation (10)*)

G = (Defined by *Equation (2)*)

B = (Defined by *Equation (4)*)

Y(U) = (Defined by *Equation (11)*)

UY(U) = U times Y(U)

RATE = (Defined by *Equation (9)*) in $\sec^{-1}$

SCHOTPR = Schottky power [cf. *Equation (6)*] in watts

NOISEPR = Noise power [cf. *Equation (8)*] in watts

SCHOT/NOIS = Ratio of Schottky power to Noise power

PRTOTAL = Schottky power plus noise power in watts

TIME = Time in seconds to produce the specified emittance

To determine the characteristic impedance, one should solve the Poisson equation *à* la *Ref. 5.* For the 2-4 Ghz system, we found $Z = 80\Omega$. Without doing another such calculation we take 80Ω as the nominal 4-8 Ghz characteristic impedance. Other quantities used in the calculations are as follows:

$\beta_p = \beta_k = 6.994$ m

$f_0 = 590$ kHz

$l = 12.5$ mm

$\beta = 0.99452$

$\frac{pc}{e} = 8.9 \times 10^9$ Volts

$N = 15 \times 10^7$.

As stated in the Introduction, the cooling system is optimized when $uY(u) \sim 0.35$. As can be seen, through most of the cooling period the system is far from optimal. So, there is room for further improvement. In most

cases, the systems are close to being optimized when the emittance reaches $\sim 4\pi$ mm-mrad. That is why we let 4π mm-mrad determine the final gap size in the electrodes corresponding to *Cases (3),(6),and (9)*. Some tables with $\eta = 0.0055$ were included for comparison of the present and Dugan's newly proposed lattices.

We generated many calculations with all possible permutations of

$$\text{ETA} = 0.0055,\ 0.009$$

$$\text{NP} = 128,\ 256$$

$$\text{NK} = 128,\ 256$$

$$\text{GA} = 1.0 \times 10^7, 1.5 \times 10^7, 2.0 \times 10^7, 2.5 \times 10^7, 3.0 \times 10^7, 1.0 \times 10^8.$$

Note that the present 2-4 Ghz Debuncher systems have 128 pickup and kicker loop pairs. Since the length of each loop of the 4-8 Ghz system would be half that of the present system, we could utilize 256 4-8 Ghz single or multiloop pairs within the same physical space in the accelerator ring. The calculations displayed in the tables correspond to the lowest cooling times for the various geometries considered, together with the requirement that we keep the total power on the order of 10^3 watts. During the prototype testing stage of the present stochastic cooling systems, we drove about 10 watts of microwave power into a single resistor without catastrophic effects [8] on the resistor and vacuum. For 256 ($\times 1$ or $\times 2$ or $\times 3$) pairs of resistors, such as we are consid-

ering for the upgraded system, this corresponds to $\sim 5 - 15 \times 10^3$ watts of total power. Therefore, in *Tables XXIV–XXXVII* we have chosen to display the results only for systems with total power levels $\sim 10^3 - 10^4$ watts.

In conclusion, we think that it is feasible to reduce 15×10^7 antiprotons' horizontal and vertical emittances from 20π to 1π mm-mrad in well under 1 second by going to a 4-8 Ghz bandwidth stochastic cooling system. J. Peoples has also independently come to this conclusion. The fastest cooling time which we found was 0.71 seconds, achieved with the 3 plate pair geometry with the electrode gap size tracking the beam size all the way down to 1π mm-mrad. The 2 plate pair geometry with the electrode plates tracking the beam all the way to 1π mm-mrad was the next best system, having a time of 0.77 seconds. We feel that the times of these two best systems are so close that the lower cost of the 2 plate pair system would favor its implementation. Finally, the noncooling part of the 1 second cycle would be used for Rf beam manipulations as well as for moving the electrodes back to their 20π mm-mrad gap size.

The author appreciates helpful comments from S. Hsueh.

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FIGURE CAPTIONS

Fig. 1 A single electrode (pickup or kicker) loop pair cross-section.

Fig. 2 An assembled pickup or kicker array containing 32 2-4 Ghz loop pairs.

Fig. 3 Two and three plate pair electrode geometries. The beam direction is perpendicular to the page.

Fig. 4 Average difference mode electrode sensitivity vs. $\bar{c}$ for 2 plate pairs, constant gap = 30.8 mm, emittance = 20π mm-mrad.

Fig. 5 Average sum mode electrode sensitivity vs. $\bar{c}$ for 2 plate pairs, constant gap = 30.8 mm, emittance = 20π mm-mrad.

Fig. 6 Average difference mode electrode sensitivity vs. $\bar{c}$ for 3 plate pairs, constant gap = 30.8 mm, emittance = 20π mm-mrad.

Fig. 7 Average sum mode electrode sensitivity vs. $\bar{c}$ for 3 plate pairs, constant gap = 30.8 mm, emittance = 20π mm-mrad.

TABLE I

Debuncher

BETATRON-COOLING SYSTEM PARAMETERS (EACH SYSTEM)

Frequency band	2-4 GHz
Number of pickup pairs (loops)	128
Pickup Characteristic Impedance (odd mode)	83Ω
Pickup Sensitivity d(0,0)	1.0
Pickup resistor noise temperature (θ_R)	80K
Amplifier equivalent noise temperature (θ_A)	40K
Amplifier gain (net) (variable)	138 dB (variable)
Output Power	
-Schottky	100 W (typical)
-Thermal	400 W (typical)
-Total	500 W
Number of TWT's	8
Number of kicker pairs (loops)	128
Kicker characteristic impedance	83Ω
Kicker sensitivity d(0,0)	1.59
Spare time delay with foam heliax (β=0.89)	45 ns

TABLE II

β_x and β_y in meters Near stochastic Cooling Tanks

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	Quad	BETAX	BETAY
1	D6Q5	19.860	3.185
2	D6Q4	2.916	11.064
3	D6Q3	9.750	3.688
4	D6Q2	3.145	15.057
5	D10Q	17.047	6.945
6	D1Q2	4.236	16.811
7	D1Q3	11.067	4.974
8	D1Q4	4.542	12.394
9	D1Q5	15.685	2.594
10	D1Q6	5.124	12.877
11	D6Q6	4.187	13.738
12	D2Q6	4.641	12.491
13	D2Q4	3.520	13.622
14	D2Q3	12.505	5.877
15	D2Q2	5.475	14.938
16	D30Q	15.860	4.501
17	D3Q2	3.927	17.769
18	D3Q3	11.375	4.750
19	D3Q4	3.291	11.708
20	D3Q5	19.304	2.904
21	D3Q6	6.607	12.000
22	D2Q5	17.154	4.419
23	D4Q6	5.933	12.000
24	D4Q4	4.852	11.474
25	D4Q3	10.063	4.250
26	D4Q2	5.421	15.860
27	D50Q	19.833	5.432
28	D5Q2	5.110	16.811
29	D5Q3	7.947	5.069
30	D5Q4	3.270	11.939
31	D5Q5	19.430	4.815
32	D5Q6	4.019	12.458
33	D4Q5	17.596	4.432

TABLE III

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	ARRAY	S(M) meters	GAP(IN)	BETA0(M) β_0	BETA1 β_1	BETA2(1/M) β_2	BETA(M)	ACCEPTANCE
	D60-V1 US	1.934	1.162	11.064	-3.151	.3148	6.147	35.4 π mm-mrad
	D60-V1 CL	2.579	1.077	11.064	-3.151	.3148	5.031	37.2
	D60-V1 DS	3.224	.991	11.064	-3.151	.3148	4.177	37.9
TANK D60-V2/H1	D60-V2 US	.473	1.045	3.688	1.481	.4198	4.483	39.3
	D60-V2 CL	1.118	1.154	3.688	1.481	.4198	5.869	36.6
	D60-V2 DS	1.763	1.263	3.688	1.481	.4198	7.605	33.8
	D60-H1 US	1.694	1.094	9.750	-3.033	.3384	5.220	37.0
	D60-H1 CL	2.539	1.022	9.750	-3.033	.3384	4.231	39.8
	D60-H1 DS	3.184	.949	9.750	-3.033	.3384	3.524	41.2
	D60-H2 US	.543	1.050	3.145	1.691	.5453	4.223	42.1
	D60-H2 CL	1.188	1.171	3.145	1.691	.5453	5.923	37.3
	D60-H2 DS	1.833	1.292	3.145	1.691	.5453	8.076	33.3
	D10-V3 US	1.870	1.065	12.394	-4.400	.4712	5.814	31.5
	D10-V3 CL	2.515	.959	12.394	-4.400	.4712	4.309	34.4
	D10-V3 DS	3.160	.852	12.394	-4.400	.4712	3.195	36.6
TANK D10-V4/H3	D10-V4 US	.493	.860	2.594	1.068	.4954	3.241	36.8
	D10-V4 CL	1.138	.973	2.594	1.068	.4954	4.451	34.3
	D10-V4 DS	1.783	1.085	2.594	1.068	.4954	6.074	31.3
	D10-H3 US	1.915	1.260	15.685	-4.149	.3381	8.979	28.5
	D10-H3 CL	2.560	1.166	15.685	-4.149	.3381	7.279	30.2
	D10-H3 DS	3.205	1.075	15.685	-4.149	.3381	5.860	31.8
	D10-H4 US	.601	1.042	5.124	1.506	.3058	6.140	28.5
	D10-H4 CL	1.247	1.144	5.124	1.506	.3058	7.477	28.2
	D10-H4 DS	1.892	1.245	5.124	1.506	.3058	9.067	27.6
	D20-V1 US	1.969	1.170	13.622	-2.943	.2323	8.729	25.3
	D20-V1 CL	2.614	1.089	13.622	-2.943	.2323	7.517	25.4
	D20-V1 DS	3.259	1.008	13.622	-2.943	.2323	6.499	25.2
TANK D20-V2/H1	D20-V2 US	.570	1.050	5.877	1.457	.2604	6.791	26.2
	D20-V2 CL	1.215	1.160	5.877	1.457	.2604	8.031	27.0
	D20-V2 DS	1.660	1.270	5.877	1.457	.2604	9.487	27.4
	D20-H1 US	1.993	1.102	12.505	-2.744	.2305	7.952	24.6
	D20-H1 CL	2.638	1.063	12.505	-2.744	.2305	6.870	26.5
	D20-H1 DS	3.283	1.023	12.505	-2.744	.2305	5.980	28.2
	D20-H2 US	.585	1.034	5.475	1.646	.3063	6.543	26.4
	D20-H2 CL	1.230	1.155	5.475	1.646	.3063	7.963	27.0
	D20-H2 DS	1.875	1.276	5.475	1.646	.3063	9.639	27.2
	D30-V3 US	1.902	1.092	11.708	-3.912	.4122	5.759	33.4
	D30-V3 CL	2.547	.976	11.708	-3.912	.4122	4.418	34.8
	D30-V3 DS	3.192	.859	11.708	-3.912	.4122	3.421	34.8
TANK D30-V4/H3	D30-V4 US	.538	.841	2.904	.983	.4275	3.557	32.1
	D30-V4 CL	1.183	.957	2.904	.983	.4275	4.666	31.7
	D30-V4 DS	1.828	1.072	2.904	.983	.4275	6.131	30.2
	D30-H3 US	1.959	1.269	19.304	-4.773	.3468	11.284	23.0
	D30-H3 CL	2.604	1.156	19.304	-4.773	.3468	9.226	23.4
	D30-H3 DS	3.249	1.042	19.304	-4.773	.3468	7.457	23.5
	D30-H4 US	.639	1.047	6.607	1.397	.2252	7.592	23.3
	D30-H4 CL	1.284	1.145	6.607	1.397	.2252	8.772	24.1
	D30-H4 DS	1.929	1.243	6.607	1.397	.2252	10.140	24.6

US = Upstream end of array
CL = Middle or centerline of array
DS = Downstream end of array

$$\beta(s) = \beta_0 + \beta_1 s + \beta_2 s^2$$

D60-V1 means the 1st vertical cooling array in the 60 section of the Debuncher, etc.

TABLE IV

THESE DATA ARE THE AVERAGE DIFFERENCE AND SUM MODE SENSITIVITIES FOR 4--8 GHZ ARRAYS FOR EMITTANCES FROM 20 TO 1 PI AND CONSTANT GAP SIZE = 30.8 MM.

1 AVG D(EMIT) 4--8 GHZ 1 PLATE PAIR CONST GAP

ϵ	$\bar{d}$
20.	.4278775708338
19.	.444651869572
18.	.4621246606126
17.	.4803135228246
16.	.4992324016341
15.	.5188907562591
14.	.5392927054958
13.	.5604362347063
12.	.5823125427139
11.	.6049056167645
10.	.6281921208239
9.	.6521416621612
8.	.6767174615168
7.	.701877396853
6.	.7275753298915
5.	.7537625727923
4.	.7803893232096
3.	.8074058970253
2.	.8347636173019
1.	.8624152652468

2 AVG S(EMIT) 4--8 GHZ 1 PLATE PAIR CONST GAP

ϵ	$\bar{s}$
20.	.2245641921182
19.	.2275950424717
18.	.2307829313092
17.	.2341416407208
16.	.2376866542605
15.	.2414354289331
14.	.2454077204829
13.	.2496259742122
12.	.2541157966752
11.	.258906527513
10.	.2640319355878
9.	.2695310695525
8.	.2754493000468
7.	.2818395984765
6.	.2887641046234
5.	.2962960391414
4.	.3045220104832
3.	.3135447341065
2.	.3234860938036
1.	.3344902677781

TABLE V

THESE DATA ARE AVERAGE DIFFERENCE AND SUM MODE SENSITIVITIES FOR 4--8 GHZ ARRAYS FOR VARIABLE GAP AND EMITTANCES FROM 20 TO 1 PI.

1 AVG D(EMIT) 4--8 GHZ 1 PLATE PAIR VAR GAP

ϵ	$\bar{d}$
20.	.3630823116165
19.	.3762905839077
18.	.3918356327553
17.	.4083914375181
16.	.4260281851802
15.	.4458041254218
14.	.4694155974857
13.	.4953906121588
12.	.5255105354046
11.	.5605852121137
10.	.6025686469646
9.	.6512924985704
8.	.7135847611858
7.	.7885378596195
6.	.8863810855169
5.	1.016552072526
4.	1.19501794421
3.	1.426790940841
2.	1.602429592009
1.	1.702129602627

2 AVG S(EMIT) 4--8 GHZ 1 PLATE PAIR VAR GAP

ϵ	$\bar{s}$
20.	.2494397380915
19.	.2555797523401
18.	.2621982122046
17.	.2693609033701
16.	.2771470690072
15.	.2856531868647
14.	.2949981355094
13.	.3053304004587
12.	.3168383522927
11.	.3297652865596
10.	.3444320956031
9.	.3612726602797
8.	.3808914483146
7.	.404162109481
6.	.4324071177858
5.	.4677518929392
4.	.5138971614144
3.	.5780368690928
2.	.6763625649384
1.	.8472364386298

TABLE VI

THESE DATA ARE AVERAGE DIFFERENCE AND SUM MODE SENSITIVITIES
FOR 4-8 GHZ ARRAYS FOR 1 PLATE PAIR, VARIABLE GAP DOWN TO 4 PI
AND CONSTANT GAP=10.584 MM DOWN TO 1 PI.

1 AVG D(EMIT) 4-8 GHZ 1 PLATE PAIR VAR + CONST GAP

ϵ	$\bar{d}$
20.	.3630823116165
19.	.3762905839077
18.	.3918356327553
17.	.4083914375181
16.	.4260281851802
15.	.4458041254218
14.	.4694155974857
13.	.4953906121588
12.	.5255105354046
11.	.5605852121137
10.	.6025686469646
9.	.6512924985704
8.	.7135847611858
7.	.7885378596195
6.	.8863810855169
5.	1.016552072526
4.	1.19501794421
3.	1.337276124375
2.	1.437104597986
1.	1.521906403404

2 AVG S(EMIT) 4-8 GHZ 1 PLATE PAIR VAR + CONST GAP

ϵ	$\bar{s}$
20.	.2494397380915
19.	.2555797523401
18.	.2621982122046
17.	.2693609033701
16.	.2771470690072
15.	.2856531868647
14.	.2949981355094
13.	.3053304004587
12.	.3168383522927
11.	.3297652865596
10.	.3444320956031
9.	.3612726602797
8.	.3808914483146
7	.404162109481
6	.4324071177858
5.	.4677518929392
4	.5138971614144
3.	.5555940139417
2.	.610119407695
1.	.680536801247

TABLE VII

THESE DATA ARE THE AVERAGE DIFFERENCE AND SUM MODE SENSITIVITIES
FOR 4--8 GHZ ARRAYS FOR 2 PLATE PAIRS G=30.8 MM, EMIT=20 PI,
AND LETTING $\tilde{c}$ VARY.

1 AVG D(X,Y) FOR 4--8 GHZ 2 PLATE PAIRS G=30.8 MM EMIT=20 PI

$\tilde{c}$ (mm)	$\bar{d}$	
5.625	.6906155731849	← plates touch
6.	.698701853589	
6.5	.7088061722535	
7.	.7178065435945	
7.5	.725352017516	
8.	.7311140881674	
8.5	.7348013175369	
9.	.7361731847148	← choose this $\tilde{c} = 9$ mm
9.5	.7350506542562	
10.	.7313211521138	
10.5	.724937123235	
11.	.7159093668173	
11.5	.7042976312338	
12.	.6902009335874	
12.5	.6737491995635	
13.	.655096848424	
13.5	.6344182914991	
14.	.6119050056322	
14.5	.5877637619959	
15.	.5622156103225	
15.5	.5354952600651	
16.	.5078505235849	
16.5	.4795414777985	
17.	.4508389586716	
17.5	.4220219343258	
18.125	.3862703833503	← half wavelength (6GHz) between plates

2 AVG S(X,Y) FOR 4--8 GHZ 2 PLATE PAIRS G=30.8MM EMIT=20 PI

$\tilde{c}$ (mm)	$\bar{s}$	
5.625	.30315642658	
6.	.3012918006414	
6.5	.298665836284	
7.	.2958898457444	← choose this $\tilde{c} = 7$ mm
7.5	.2929743419895	
8.	.2899295783114	
8.5	.2867654146346	
9.	.283491198866	
9.5	.2801156656231	
10.	.2766468542222	
10.5	.2730920473231	
11.	.2694577311035	
11.5	.265749577304	
12.	.2619724469417	
12.5	.2581304149621	
13.	.2542268145944	
13.5	.2502642997032	
14.	.2462449230162	
14.5	.2421702277427	
15.	.2380413498148	
15.5	.2338591277701	
16.	.2296242171659	
16.5	.2253372063769	
17.	.2209987306693	
17.5	.2166095815743	
18.125	.2110535170513	

TABLE VIII

THESE DATA ARE THE DIFFERENCE AND SUM MODE SENSITIVITIES FOR 4--8 GHZ ARRAYS FOR 2 PLATE PAIRS, $\tilde{C}$ OPTIMAL, GAP=30.8, AND VARIABLE EMITTANCES.

1 AVG D(EMIT) FOR 4-8 GHZ, 2 PLATE PAIRS, GAP=30.8MM, $\tilde{C}$=9.0MM

ϵ	$\bar{d}$
20.	.7362039473443
19.	.7398907425267
18.	.742915759844
17.	.7452905034199
16.	.7470241802132
15.	.748123743243
14.	.7485943453672
13.	.748440053846
12.	.7476647362329
11.	.7462730630438
10.	.7442715873466
9.	.741669861928
8.	.7384815464251
7.	.7347254449191
6.	.730426404337
5.	.7256160009784
4.	.7203329508951
3.	.7146232011026
2.	.7085396895958
1.	.7021417950717

2 AVG S(EMIT) FOR 4-8 GHZ, 2 PLATE PAIRS, GAP=30.8MM, $\tilde{C}$=7.0MM

ϵ	$\bar{s}$
20.	.2958789123098
19.	.2995501277331
18.	.3033712081812
17.	.3073497204896
16.	.3114933479826
15.	.3158097772059
14.	.3203065401733
13.	.3249907985008
12.	.3298690521052
11.	.334946750649
10.	.3402277805832
9.	.3457137944651
8.	.3514033422959
7.	.3572907569509
6.	.3633647370747
5.	.3696065595961
4.	.3759878356802
3.	.3824676865647
2.	.3889891315896
1.	.3954742889789

TABLE IX

THESE DATA ARE DIFFERENCE AND SUM MODE SENSITIVITIES FOR 4-8 GHZ ARRAYS FOR 2 PLATE PAIRS, OPTIMAL $\tilde{C}$, VARIABLE GAP, AND EMITTANCES VARYING FROM 20 TO 1 PI.

1 AVG D(EMIT) FOR 4-8 GHZ, 2 PLATE PAIRS, $\tilde{C}$=9MM, VAR GAP

ϵ	$\bar{d}$
20.	.8841282460933
19.	.9016606554332
18.	.9170435702725
17.	.9307152254845
16.	.9426896800004
15.	.9530082084418
14.	.9616040637357
13.	.9680824947058
12.	.9719571162017
11.	.9736697936005
10.	.9723914841867
9.	.9666206915495
8.	.9562350504443
7.	.9404032047516
6.	.9146543125124
5.	.8772974046973
4.	.8200441488949
3.	.7256543425137
2.	.5505997422758
1.	.1733300100484

2 AVG S(EMIT) FOR 4-8 GHZ, 2 PLATE PAIRS, $\tilde{C}$=7MM, VAR GAP

ϵ	$\bar{s}$
20.	.3203002434217
19.	.3269911155874
18.	.3341394188509
17.	.3418009276385
16.	.3500412231411
15.	.3589378277472
14.	.3685827984751
13.	.379085786658
12.	.3905774237796
11.	.4032125168742
10.	.4171716234998
9.	.432657402268
8.	.4498769891713
7.	.4689895298357
6.	.4899700451997
5.	.5122807598091
4.	.5341356777886
3.	.5510313487224
2.	.5528961396229
1.	.5134041682013

TABLE X

THESE DATA ARE AVERAGE DIFFERENCE AND SUM MODE SENSITIVITIES FOR 4-8 GHZ ARRAYS FOR 2 PLATE PAIRS, $\tilde{C}$=9MM , VARIABLE GAP DOWN TO 4 PI AND CONSTANT GAP=10.584 MM DOWN TO 1 PI.

1 AVG D(EMIT) 4-8 GHZ 2 PLATE PAIRS VAR + CONST GAP

ϵ	$\bar{J}$
20.	.8841282460933
19.	.9016606554332
18.	.9170435702725
17.	.9307152254845
16.	.9426896800004
15.	.9530082084418
14.	.9616040637357
13.	.9680824947058
12.	.9719571162017
11.	.9736697936005
10.	.9723914841867
9.	.9666206915495
8.	.9562350504443
7.	.9404032047516
6.	.9146543125124
5.	.8772974046973
4.	.8200441488949
3.	.7100633956751
2.	.574532504862
1.	.4299071661737

2 AVG S(EMIT) 4-8 GHZ 2 PLATE PAIRS VAR + CONST GAP

ϵ	$\bar{S}$
20.	.3203002434217
19.	.3269911155874
18.	.3341394188509
17.	.3418009276385
16.	.3500412231411
15.	.3589378277472
14.	.3685827984751
13.	.379085786658
12.	.3905774237796
11.	.4032125168742
10.	.4171716234998
9.	.432657402268
8.	.4498769891713
7.	.4689895298357
6.	.4899700451997
5.	.5122807598091
4.	.5341356777886
3.	.5430342039152
2.	.5455703031178
1.	.5377845273545

TABLE XI

THESE DATA ARE DIFFERENCE AND SUM MODE SENSITIVITIES FOR 4-8 GHZ ARRAYS, 3 PLATE PAIRS, GAP=30.8MM, EMIT=20 PI, AND VARIABLE $\tilde{C}$.

1 AVG D(X,Y) FOR 4-8 GHZ		2 AVG S(X,Y) FOR 4-8 GHZ		
$\tilde{C}$ (mm)	$\tilde{d}$	$\tilde{C}$ (mm)	$\tilde{S}$	
11.25	.8271064876003	11.25	.3481612923214	← plates touch
11.5	.8221066788502	11.5	.3466401722784	
12.	.8105967734195	12.	.3435561582518	
12.5	.7971639888387	12.5	.3404191522767	
13.	.781934407907	13.	.3372318759231	
* 13.5	.7650504368794	* 13.5	.3339964960626	
14.	.7466684159436	14.	.3307146887402	
14.5	.7269571730552	14.5	.327387713981	
15.	.7060971945648	15.	.3240164992699	
15.5	.6842801199385	15.5	.3206017292697	
16.	.6617082871217	16.	.3171439392408	
16.5	.6385940480278	16.5	.3136436095892	
17.	.6151585392966	17.	.3101012590075	
17.5	.5916295374458	17.5	.3065175337782	
18.	.5682379749141	18.	.3028932909798	
18.5	.5452127020626	18.5	.2992296735622	
19.	.5227732511602	19.	.2955281755421	
19.5	.5011208147205	19.5	.2917906958851	
20.	.4804284307591	20.	.2880195799949	
20.5	.4608322332497	20.5	.284217648099	
21.	.4424259848427	21.	.2803882101913	
21.5	.4252604106915	21.5	.2765350675634	
22.	.4093472759892	22.	.2726625013026	
22.5	.3946666613324	22.5	.268775248457	
23.	.3811753502733	23.	.2648784668526	
23.5	.3688146637529	23.5	.260977689789	
24.	.3575168763717	24.	.2570787720339	
24.5	.3472100197166	24.5	.253187828685	
25.	.3378212493481	25.	.2493111685607	
25.5	.3292790811557	25.5	.2454552238349	
26.	.3215147993937	26.	.2416264776303	
26.5	.3144632844835	26.5	.23783139125	
27.	.3080634463963	27.	.2340763326491	
27.5	.302258395974	27.5	.2303675076406	
28.	.2969954457817	28.	.2267108951882	
28.5	.2922260028281	28.5	.2231121879753	
29.	.2879053951595	29.	.2195767392552	
29.5	.2839926604459	29.5	.2161095167837	
30.	.2804503152841	30.	.2127150644265	
30.5	.2772441175955	30.5	.2093974718128	
31.	.274342830223	31.	.2061603521941	
31.5	.2717179909305	31.5	.2030068284522	
32.	.2693436920551	32.	.1999395270077	
32.5	.2671963717244	32.5	.196960579199	
33.	.2652546176506	33.	.1940716295496	
33.5	.263498983896	33.5	.1912738502145	
34.	.2619118205931	34.	.1885679608032	
34.5	.2604771163255	34.5	.1859542527158	
35.	.2591803526952	35.	.1834326170992	
35.5	.2580083704935	35.5	.181002575533	← half 6 GHz wavelength between plates
36.25	.2564585911773	36.25	.1775273843902	

TABLE XII

THESE DATA ARE DIFFERENCE AND SUM MODE SENSITIVITIES FOR 4-8 GHZ ARRAYS, 3 PLATE PAIRS, $\tilde{C}$ OPTIMAL, GAP=30.8MM, VARIABLE EMITTANCES.

1 AVG D(EMIT) FOR 4-8 GHZ, 3 PLATE PAIRS, $\tilde{C}$=13.5MM, GAP=30.8MM

ϵ	$\bar{d}$
20.	.7650621286175
19.	.7658853624624
18.	.7667253898463
17.	.7676061901053
16.	.7685534372511
15.	.7695938547312
14.	.770754312013
13.	.7720606902664
12.	.7735365912005
11.	.7752020095698
10.	.7770721217229
9.	.7791563459323
8.	.7814577981323
7.	.7839732036921
6.	.78669324767
5.	.7896032737143
4.	.7926841934711
3.	.7959134528354
2.	.7992659164691
1.	.8027145676437

2 AVG S(EMIT) FOR 4-8 GHZ, 3 PLATE PAIRS, GAP=30.8MM, $\tilde{C}$=13.5MM

ϵ	$\bar{s}$
20	.3339856859468
19	.3373454006468
18	.3407680131847
17	.3442500634496
16	.3477872403632
15	.3513743109763
14	.3550050650062
13	.3586722846579
12	.3623677526583
11	.3660823152217
10	.3698060213787
9	.3735283661226
8	.3772386728059
7	.3809266612411
6	.3845832635266
5	.3882017715488
4	.3917794295145
3	.3953196194608
2	.3988348150531
1	.4023504616533

TABLE XIII

THESE DATA ARE DIFFERENCE AND SUM MODE SENSITIVITIES FOR 4-8 GHZ ARRAYS, 3 PLATE PAIRS, VARIABLE GAP, OPTIMAL $\tilde{C}$, VARIABLE EMITTANCES.

1 AVG D(EMIT) FOR 4-8 GHZ, 3 PLATE PAIRS, VAR GAP, $\tilde{C}$=13.5MM

ϵ	$\bar{d}$
20.	.8126431682469
19.	.8123205857539
18.	.812408231989
17.	.8110025101927
16.	.8067034259711
15.	.8026702301668
14.	.7979049922473
13.	.7894029842088
12.	.781097681415
11.	.7693542501195
10.	.7559701372387
9.	.7390328989704
8.	.7211413268385
7.	.7012740921792
6.	.6879243334029
5.	.7037866811818
4.	.7601181798703
3.	.8575910643705
2.	.9352053886447
1.	.9833746543135

2 AVG S(EMIT) FOR 4-8 GHZ, 3 PLATE PAIRS, VAR GAP, $\tilde{C}$=13.5MM

ϵ	$\bar{s}$
20.	.358661850268
19.	.3650894270814
18.	.3718478035698
17.	.3789529801389
16.	.3864172603506
15.	.3942465114421
14.	.402436141426
13.	.4109653124471
12.	.4197888309893
11.	.428826181522
10.	.4379474458972
9.	.4469565789154
8.	.4555738558442
7.	.4634212671079
6.	.4700177326756
5.	.4748018798313
4.	.4772601111074
3.	.4775840270814
2.	.480415315815
1.	.5140727845514

TABLE XIV

THESE DATA ARE AVERAGE DIFFERENCE AND SUM MODE SENSITIVITIES
FOR 4-8 GHZ ARRAYS FOR 3 PLATE PAIRS, VARIABLE GAP DOWN TO 4 PI
AND CONSTANT GAP=10.584 MM FROM 4 PI DOWN TO 1 PI.

1 AVG D(EMIT) 4-8 GHZ 3 PLATE PAIRS VAR + CONST GAP, $\tilde{c} = 13.5\,mm$

ϵ	$\bar{d}$
20.	.8126431682469
19.	.8123205857539
18.	.812408231989
17.	.8110025101927
16.	.8067034259711
15.	.8026702301668
14.	.7979049922473
13.	.7894029842088
12.	.781097681415
11.	.7693542501195
10.	.7559701372387
9.	.7390328989704
8.	.7211413268385
7.	.7012740921792
6.	.6879243334029
5.	.7037866811818
4.	.7601181798703
3.	.8302707819175
2.	.8746862988667
1.	.910191938371

2 AVG S(EMIT) 4-8 GHZ 3 PLATE PAIRS VAR + CONST GAP, $\tilde{c} = 13.5\,mm$

ϵ	$\bar{s}$
20.	.358661850268
19.	.3650894270814
18.	.3718478035698
17.	.3789529801389
16.	.3864172603506
15.	.3942465114421
14.	.402436141426
13.	.4109653124471
12.	.4197888309893
11.	.428826181522
10.	.4379474458972
9.	.4469565789154
8.	.4555738558442
7.	.4634212671079
6.	.4700177326756
5.	.4748018798313
4.	.4772601111074
3	.4765379151108
2.	.4791463953222
1.	.4893037542095

TABLE XV

THIS IS THE OUTPUT FILE FOR LSQFIT FOR 1 PLATE PAIR, CONSTANT GAP=30.8MM.
FOR EMITTANCE FROM 1 TO 20 PI.
4-8 GHz

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	.89012239E+00
1	-.28086000E-01
2	.80929103E-03
3	-.69929432E-03
4	.32841869E-03
5	-.88131451E-04
6	.14945947E-04
7	-.16716231E-05
8	.12513791E-06
9	-.62096901E-08
10	.19606031E-09
11	-.35662393E-11
12	.28447194E-13

ϵ ($\times\pi$ mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.862400E+00	.862400E+00
.2000E+01	.834800E+00	.834799E+00
.3000E+01	.807400E+00	.807403E+00
.4000E+01	.780400E+00	.780396E+00
.5000E+01	.753800E+00	.753800E+00
.6000E+01	.727600E+00	.727612E+00
.7000E+01	.701900E+00	.701884E+00
.8000E+01	.676700E+00	.676699E+00
.9000E+01	.652100E+00	.652122E+00
.1000E+02	.628200E+00	.628183E+00
.1100E+02	.604900E+00	.604899E+00
.1200E+02	.582300E+00	.582299E+00
.1300E+02	.560400E+00	.560418E+00
.1400E+02	.539300E+00	.539284E+00
.1500E+02	.518900E+00	.518892E+00
.1600E+02	.499200E+00	.499223E+00
.1700E+02	.480300E+00	.480281E+00
.1800E+02	.462100E+00	.462108E+00
.1900E+02	.444700E+00	.444698E+00
.2000E+02	.427900E+00	.427900E+00

TABLE XVI

THIS IS THE OUTPUT FROM LSQFIT FOR 1 PLATE PAIR, 4-8 GHZ, VARIABLE GAP, FOR EMITTANCES FROM 1 TO 20 PI.

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	.27427521E+01
1	-.26323671E+01
2	.26583299E+01
3	-.14457987E+01
4	.46188024E+00
5	-.94645491E-01
6	.13071689E-01
7	-.12453723E-02
8	.82095872E-04
9	-.36797424E-05
10	.10706749E-06
11	-.18239966E-08
12	.13809497E-10

ϵ ($\times\pi$ mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.170210E+01	.170206E+01
.2000E+01	.160240E+01	.160280E+01
.3000E+01	.142680E+01	.142534E+01
.4000E+01	.119500E+01	.119772E+01
.5000E+01	.101660E+01	.101434E+01
.6000E+01	.886400E+00	.886025E+00
.7000E+01	.788500E+00	.790450E+00
.8000E+01	.713600E+00	.713072E+00
.9000E+01	.651300E+00	.650763E+00
.1000E+02	.602600E+00	.601830E+00
.1100E+02	.560600E+00	.561690E+00
.1200E+02	.525500E+00	.526120E+00
.1300E+02	.495400E+00	.494603E+00
.1400E+02	.469400E+00	.468523E+00
.1500E+02	.445800E+00	.446886E+00
.1600E+02	.426000E+00	.426422E+00
.1700E+02	.408400E+00	.407155E+00
.1800E+02	.391800E+00	.392627E+00
.1900E+02	.376300E+00	.376050E+00
.2000E+02	.363100E+00	.363130E+00

TABLE XVII

THIS IS THE OUTPUT FILE FOR LSQFIT FOR 4-8 GHZ, 1 PLATE PAIR, VARIABLE GAP FROM 20 TO 4 PI AND THEN CONSTANT GAP=10.584 MM FROM 4 TO 1 PI.

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	.17129787E+01
1	-.22416893E+00
2	-.48059902E-01
3	.14855118E+00
4	-.89911158E-01
5	.26869009E-01
6	-.47841297E-02
7	.54769390E-03
8	-.41493603E-04
9	.20738555E-05
10	-.65852545E-07
11	.12049763E-08
12	-.96806349E-11

ϵ ($\times\pi$ mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.152190E+01	.152198E+01
.2000E+01	.143710E+01	.143634E+01
.3000E+01	.133730E+01	.134026E+01
.4000E+01	.119500E+01	.118901E+01
.5000E+01	.101660E+01	.102271E+01
.6000E+01	.886400E+00	.884902E+00
.7000E+01	.788500E+00	.786169E+00
.8000E+01	.713600E+00	.713860E+00
.9000E+01	.651300E+00	.653965E+00
.1000E+02	.602600E+00	.601867E+00
.1100E+02	.560600E+00	.559047E+00
.1200E+02	.525500E+00	.525399E+00
.1300E+02	.495400E+00	.496819E+00
.1400E+02	.469400E+00	.469578E+00
.1500E+02	.445800E+00	.444784E+00
.1600E+02	.426000E+00	.425645E+00
.1700E+02	.408400E+00	.409771E+00
.1800E+02	.391800E+00	.390823E+00
.1900E+02	.376300E+00	.376608E+00
.2000E+02	.363100E+00	.363062E+00

TABLE XVIII

THIS IS THE OUTPUT FILE FOR LSQFIT FOR 2 PLATE PAIRS, CONSTANT GAP=30.8MM, 4-8 GHZ, EMITTANCES FROM 1 TO 20 PI, $\tilde{C}$=9MM. THIS IS FIT TO AVG D(EMIT).

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	.69505211E+00
1	.78333776E-02
2	-.12597692E-02
3	.66282424E-03
4	-.23390309E-03
5	.52294288E-04
6	-.78415464E-05
7	.80709668E-06
8	-.57241820E-07
9	.27519473E-08
10	-.85679010E-10
11	.15585269E-11
12	-.12572241E-13

ϵ ($\times\pi$mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.702100E+00	.702100E+00
.2000E+01	.708500E+00	.708501E+00
.3000E+01	.714600E+00	.714594E+00
.4000E+01	.720300E+00	.720311E+00
.5000E+01	.725600E+00	.725589E+00
.6000E+01	.730400E+00	.730399E+00
.7000E+01	.734700E+00	.734712E+00
.8000E+01	.738500E+00	.738490E+00
.9000E+01	.741700E+00	.741698E+00
.1000E+02	.744300E+00	.744307E+00
.1100E+02	.746300E+00	.746303E+00
.1200E+02	.747700E+00	.747678E+00
.1300E+02	.748400E+00	.748434E+00
.1400E+02	.748600E+00	.748574E+00
.1500E+02	.748100E+00	.748103E+00
.1600E+02	.747000E+00	.747014E+00
.1700E+02	.745300E+00	.745286E+00
.1800E+02	.742900E+00	.742907E+00
.1900E+02	.739900E+00	.739898E+00
.2000E+02	.736200E+00	.736200E+00

TABLE XIX

THIS IS THE OUTPUT FILE FOR D(EMIT) FOR LSQFIT FOR 4-8 GHZ, 2 PLATE PAIRS, VARIABLE GAP, FOR EMITTANCES FROM 1 TO 20 PI. $\bar{C}$=9MM.

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	-.72145734E+00
1	.13511575E+01
2	-.60340052E+00
3	.17905850E+00
4	-.36966865E-01
5	.54490336E-02
6	-.58125553E-03
7	.44949386E-04
8	-.24937423E-05
9	.96671468E-07
10	-.24847277E-08
11	.38028008E-10
12	-.26223346E-12

ϵ ($\times\pi$mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.173300E+00	.173302E+00
.2000E+01	.550600E+00	.550585E+00
.3000E+01	.725700E+00	.725759E+00
.4000E+01	.820000E+00	.819891E+00
.5000E+01	.877300E+00	.877344E+00
.6000E+01	.914700E+00	.914907E+00
.7000E+01	.940400E+00	.939976E+00
.8000E+01	.956200E+00	.956476E+00
.9000E+01	.966600E+00	.966718E+00
.1000E+02	.972400E+00	.972142E+00
.1100E+02	.973700E+00	.973724E+00
.1200E+02	.972000E+00	.972174E+00
.1300E+02	.968100E+00	.968004E+00
.1400E+02	.961600E+00	.961553E+00
.1500E+02	.953000E+00	.953055E+00
.1600E+02	.942700E+00	.942707E+00
.1700E+02	.930700E+00	.930669E+00
.1800E+02	.917000E+00	.917018E+00
.1900E+02	.901700E+00	.901695E+00
.2000E+02	.884100E+00	.884100E+00

TABLE XX

THIS IS THE OUTPUT FILE FOR LSQFIT FOR 4-8 GHZ, 2 PLATE PAIRS, $\tilde{c}=9mm$, VARIABLE GAP FROM 20 TO 4 PI AND THEN CONST GAP=10.584 MM FROM 4 TO 1 PI.

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	.89339732E-02
1	.90744752E+00
2	-.83916100E+00
3	.49112439E+00
4	-.17120187E+00
5	.37836202E-01
6	-.55625944E-02
7	.55795887E-03
8	-.38385582E-04
9	.17831370E-05
10	-.53472734E-07
11	.93467408E-09
12	-.72341666E-11

ϵ ($\times\pi$mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.429900E+00	.429938E+00
.2000E+01	.574500E+00	.574155E+00
.3000E+01	.710100E+00	.711410E+00
.4000E+01	.820000E+00	.817442E+00
.5000E+01	.877300E+00	.879655E+00
.6000E+01	.914700E+00	.914677E+00
.7000E+01	.940400E+00	.938723E+00
.8000E+01	.956200E+00	.956663E+00
.9000E+01	.966600E+00	.967660E+00
.1000E+02	.972400E+00	.972177E+00
.1100E+02	.973700E+00	.972948E+00
.1200E+02	.972000E+00	.971947E+00
.1300E+02	.968100E+00	.968653E+00
.1400E+02	.961600E+00	.961873E+00
.1500E+02	.953000E+00	.952438E+00
.1600E+02	.942700E+00	.942471E+00
.1700E+02	.930700E+00	.931442E+00
.1800E+02	.917000E+00	.916487E+00
.1900E+02	.901700E+00	.901859E+00
.2000E+02	.884100E+00	.884081E+00

TABLE XXI

THIS IS THE OUTPUT FILE FOR LSQFIT FOR AVG D(EMIT) FOR 4-8 GHZ,
3 PLATE PAIRS, $\tilde{C}$=13.5MM, CONSTANT GAP=30.8 MM, EMITTANCES 1 TO 20 PI.

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	.80249632E+00
1	.58166638E-02
2	-.92481623E-02
3	.49496542E-02
4	-.16133106E-02
5	.34383861E-03
6	-.49640906E-04
7	.49381490E-05
8	-.33868970E-06
9	.15728751E-07
10	-.47226075E-09
11	.82728628E-11
12	-.64212606E-13

ϵ ($\times\pi$mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.802700E+00	.802700E+00
.2000E+01	.799300E+00	.799300E+00
.3000E+01	.795900E+00	.795901E+00
.4000E+01	.792700E+00	.792696E+00
.5000E+01	.789600E+00	.789609E+00
.6000E+01	.786700E+00	.786693E+00
.7000E+01	.784000E+00	.783997E+00
.8000E+01	.781500E+00	.781509E+00
.9000E+01	.779200E+00	.779203E+00
.1000E+02	.777100E+00	.777088E+00
.1100E+02	.775200E+00	.775193E+00
.1200E+02	.773500E+00	.773531E+00
.1300E+02	.772100E+00	.772078E+00
.1400E+02	.770800E+00	.770789E+00
.1500E+02	.769600E+00	.769629E+00
.1600E+02	.768600E+00	.768578E+00
.1700E+02	.767600E+00	.767608E+00
.1800E+02	.766700E+00	.766699E+00
.1900E+02	.765900E+00	.765900E+00
.2000E+02	.765100E+00	.765100E+00

TABLE XXII

THIS IS THE OUTPUT FILE FOR LSQFIT FOR AVG D(EMIT) FOR 4-8 GHZ, 3 PLATE PAIRS, $\bar{C}$=13.5 MM, VARIABLE GAP, EMITTANCES FROM 1 TO 20 PI.

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	.15245603E+01
1	-.13393265E+01
2	.13107924E+01
3	-.68669710E+00
4	.21007301E+00
5	-.40907870E-01
6	.53486635E-02
7	-.48223031E-03
8	.30139142E-04
9	-.12848734E-05
10	.35694858E-07
11	-.58299993E-09
12	.42493528E-11

ϵ ($\times\pi$ mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.983400E+00	.983390E+00
.2000E+01	.935200E+00	.935299E+00
.3000E+01	.857600E+00	.857190E+00
.4000E+01	.760100E+00	.761047E+00
.5000E+01	.703800E+00	.702501E+00
.6000E+01	.687900E+00	.688893E+00
.7000E+01	.701300E+00	.701071E+00
.8000E+01	.721100E+00	.720750E+00
.9000E+01	.739000E+00	.739495E+00
.1000E+02	.756000E+00	.755667E+00
.1100E+02	.769400E+00	.769487E+00
.1200E+02	.781100E+00	.780935E+00
.1300E+02	.789400E+00	.790018E+00
.1400E+02	.797900E+00	.797165E+00
.1500E+02	.802700E+00	.802845E+00
.1600E+02	.806700E+00	.807195E+00
.1700E+02	.811000E+00	.810424E+00
.1800E+02	.812400E+00	.812699E+00
.1900E+02	.812300E+00	.812221E+00
.2000E+02	.812600E+00	.812609E+00

TABLE XXIII

THIS IS THE OUTPUT FILE FOR LSQFIT FOR 4-8 GHZ, 3 PLATE PAIRS, VARIABLE GAP FROM 20 TO 4 PI AND THEN CONSTANT GAP=10.584 MM FROM 4 TO 1 PI, $\bar{\epsilon}$=13.5mm.

$$\bar{d}(\epsilon) = \sum_{i=0}^{12} \alpha_i \epsilon^i$$

i	α_i
0	.13477330E+01
1	-.10011514E+01
2	.87194908E+00
3	-.39527560E+00
4	.10126920E+00
5	-.15738916E-01
6	.15237859E-02
7	-.88782312E-04
8	.25302585E-05
9	.18217711E-07
10	-.38945354E-08
11	.11653043E-09
12	-.12143662E-11

ϵ ($\times\pi$mm-mrad)	$\bar{d}$	Fit to $\bar{d}$
.1000E+01	.910200E+00	.910223E+00
.2000E+01	.874700E+00	.874495E+00
.3000E+01	.830300E+00	.831051E+00
.4000E+01	.760100E+00	.758741E+00
.5000E+01	.703800E+00	.704754E+00
.6000E+01	.687900E+00	.688530E+00
.7000E+01	.701300E+00	.699969E+00
.8000E+01	.721100E+00	.720993E+00
.9000E+01	.739000E+00	.740312E+00
.1000E+02	.756000E+00	.755649E+00
.1100E+02	.769400E+00	.768812E+00
.1200E+02	.781100E+00	.780772E+00
.1300E+02	.789400E+00	.790583E+00
.1400E+02	.797900E+00	.797418E+00
.1500E+02	.802700E+00	.802312E+00
.1600E+02	.806700E+00	.807010E+00
.1700E+02	.811000E+00	.811079E+00
.1800E+02	.812400E+00	.812244E+00
.1900E+02	.812300E+00	.812362E+00
.2000E+02	.812600E+00	.812591E+00

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2000E+08	146.0	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.807	.6566E-01	.3940E-04	.8660E-10	.9150E+00	.6008E-01	-.1902E+01	.2757E+04	.4861E+04	.5671E+00	.7618E+04	.2851E-14
19.0	.809	.6949E-01	.4169E-04	.9164E-10	.9104E+00	.6327E-01	-.1999E+01	.2771E+04	.4861E+04	.5701E+00	.7633E+04	.2637E-01
18.0	.811	.7372E-01	.4423E-04	.9722E-10	.9054E+00	.6675E-01	-.2106E+01	.2785E+04	.4861E+04	.5730E+00	.7647E+04	.5270E-01
17.0	.810	.7779E-01	.4668E-04	.1026E-09	.9006E+00	.7006E-01	-.2206E+01	.2776E+04	.4861E+04	.5711E+00	.7637E+04	.7921E-01
16.0	.807	.8210E-01	.4926E-04	.1083E-09	.8955E+00	.7352E-01	-.2310E+01	.2757E+04	.4861E+04	.5672E+00	.7618E+04	.1061E+00
15.0	.803	.8668E-01	.5201E-04	.1143E-09	.8902E+00	.7717E-01	-.2419E+01	.2729E+04	.4861E+04	.5615E+00	.7591E+04	.1333E+00
14.0	.797	.9159E-01	.5495E-04	.1208E-09	.8846E+00	.8102E-01	-.2533E+01	.2692E+04	.4861E+04	.5537E+00	.7553E+04	.1612E+00
13.0	.790	.9688E-01	.5813E-04	.1278E-09	.8785E+00	.8512E-01	-.2653E+01	.2644E+04	.4861E+04	.5439E+00	.7505E+04	.1898E+00
12.0	.781	.1026E+00	.6154E-04	.1353E-09	.8721E+00	.8944E-01	-.2777E+01	.2583E+04	.4861E+04	.5314E+00	.7445E+04	.2193E+00
11.0	.770	.1086E+00	.6517E-04	.1433E-09	.8654E+00	.9400E-01	-.2906E+01	.2508E+04	.4861E+04	.5160E+00	.7369E+04	.2499E+00
10.0	.756	.1152E+00	.6914E-04	.1520E-09	.8581E+00	.9888E-01	-.3041E+01	.2419E+04	.4861E+04	.4976E+00	.7280E+04	.2820E+00
9.0	.739	.1226E+00	.7356E-04	.1617E-09	.8501E+00	.1042E+00	-.3185E+01	.2316E+04	.4861E+04	.4765E+00	.7177E+04	.3158E+00
8.0	.721	.1310E+00	.7862E-04	.1728E-09	.8411E+00	.1102E+00	-.3340E+01	.2200E+04	.4861E+04	.4526E+00	.7061E+04	.3519E+00
7.0	.701	.1417E+00	.8501E-04	.1868E-09	.8300E+00	.1176E+00	-.3526E+01	.2082E+04	.4861E+04	.4283E+00	.6943E+04	.3908E+00
6.0	.689	.1596E+00	.9576E-04	.2105E-09	.8117E+00	.1295E+00	-.3830E+01	.2010E+04	.4861E+04	.4135E+00	.6871E+04	.4329E+00
5.0	.702	.1992E+00	.1195E-03	.2626E-09	.7735E+00	.1540E+00	-.4462E+01	.2090E+04	.4861E+04	.4300E+00	.6951E+04	.4773E+00
4.0	.761	.2922E+00	.1753E-03	.3853E-09	.6939E+00	.2027E+00	-.5691E+01	.2453E+04	.4861E+04	.5046E+00	.7314E+04	.5218E+00
3.0	.857	.4942E+00	.2965E-03	.6517E-09	.5591E+00	.2763E+00	-.7345E+01	.3112E+04	.4861E+04	.6402E+00	.7973E+04	.5659E+00
2.0	.935	.8825E+00	.5295E-03	.1164E-08	.3915E+00	.3455E+00	-.8155E+01	.3705E+04	.4861E+04	.7621E+00	.8566E+04	.6171E+00
1.0	.983	.1951E+01	.1171E-02	.2573E-08	.1878E+00	.3663E+00	-.5371E+01	.4095E+04	.4861E+04	.8424E+00	.8956E+04	.7148E+00

TIME = .7148E+00

TABLE XXIV

3 plate pairs
Variable gap to 1 π mm-mrad

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2000E+08	146.0	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.884	.7878E-01	.4727E-04	.1039E-09	.8994E+00	.7086E-01	-.2243E+01	.3307E+04	.4861E+04	.6804E+00	.8169E+04	.2417E-14
19.0	.901	.8629E-01	.5177E-04	.1138E-09	.8907E+00	.7685E-01	-.2429E+01	.3442E+04	.4861E+04	.7080E+00	.8303E+04	.2197E-01
18.0	.917	.9423E-01	.5654E-04	.1243E-09	.8815E+00	.8306E-01	-.2621E+01	.3560E+04	.4861E+04	.7324E+00	.8421E+04	.4339E-01
17.0	.931	.1028E+00	.6167E-04	.1355E-09	.8719E+00	.8961E-01	-.2822E+01	.3668E+04	.4861E+04	.7545E+00	.8529E+04	.6441E-01
16.0	.943	.1121E+00	.6723E-04	.1478E-09	.8616E+00	.9655E-01	-.3034E+01	.3764E+04	.4861E+04	.7742E+00	.8625E+04	.8512E-01
15.0	.953	.1222E+00	.7330E-04	.1611E-09	.8506E+00	.1039E+00	-.3258E+01	.3847E+04	.4861E+04	.7914E+00	.8708E+04	.1056E+00
14.0	.962	.1333E+00	.7995E-04	.1757E-09	.8388E+00	.1118E+00	-.3494E+01	.3916E+04	.4861E+04	.8056E+00	.8777E+04	.1261E+00
13.0	.968	.1454E+00	.8726E-04	.1918E-09	.8261E+00	.1201E+00	-.3744E+01	.3969E+04	.4861E+04	.8164E+00	.8830E+04	.1466E+00
12.0	.972	.1589E+00	.9535E-04	.2096E-09	.8124E+00	.1291E+00	-.4009E+01	.4003E+04	.4861E+04	.8235E+00	.8864E+04	.1672E+00
11.0	.974	.1739E+00	.1044E-03	.2294E-09	.7975E+00	.1387E+00	-.4288E+01	.4016E+04	.4861E+04	.8261E+00	.8877E+04	.1882E+00
10.0	.972	.1907E+00	.1144E-03	.2515E-09	.7814E+00	.1490E+00	-.4583E+01	.4003E+04	.4861E+04	.8235E+00	.8864E+04	.2097E+00
9.0	.967	.2095E+00	.1257E-03	.2763E-09	.7639E+00	.1601E+00	-.4891E+01	.3958E+04	.4861E+04	.8143E+00	.8820E+04	.2319E+00
8.0	.956	.2308E+00	.1385E-03	.3043E-09	.7449E+00	.1719E+00	-.5210E+01	.3875E+04	.4861E+04	.7971E+00	.8736E+04	.2552E+00
7.0	.940	.2547E+00	.1528E-03	.3359E-09	.7244E+00	.1845E+00	-.5532E+01	.3742E+04	.4861E+04	.7699E+00	.8604E+04	.2801E+00
6.0	.915	.2815E+00	.1689E-03	.3712E-09	.7024E+00	.1977E+00	-.5845E+01	.3545E+04	.4861E+04	.7293E+00	.8407E+04	.3072E+00
5.0	.877	.3106E+00	.1864E-03	.4097E-09	.6796E+00	.2111E+00	-.6115E+01	.3260E+04	.4861E+04	.6707E+00	.8121E+04	.3376E+00
4.0	.820	.3391E+00	.2035E-03	.4472E-09	.6584E+00	.2233E+00	-.6268E+01	.2847E+04	.4861E+04	.5857E+00	.7708E+04	.3736E+00
3.0	.726	.3543E+00	.2126E-03	.4672E-09	.6476E+00	.2294E+00	-.6098E+01	.2231E+04	.4861E+04	.4589E+00	.7092E+04	.4198E+00
2.0	.551	.3058E+00	.1835E-03	.4033E-09	.6833E+00	.2090E+00	-.4932E+01	.1284E+04	.4861E+04	.2641E+00	.6145E+04	.4923E+00
1.0	.173	.6059E-01	.3635E-04	.7990E-10	.9212E+00	.5581E-01	-.8183E+00	.1272E+03	.4861E+04	.2616E-01	.4988E+04	.7701E+00

TIME = .7701E+00

TABLE XXV

2 plate pairs
Variable gap to 1mm-mrad

NP	NK	GA	GAINDB	IA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2000E+08	146.0	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.810	.6617E-01	.3970E-04	.8726E-10	.9144E+00	.6051E-01	-.1915E+01	.2778E+04	.4861E+04	.5715E+00	.7639E+04	.2831E-14
19.0	.810	.6975E-01	.4185E-04	.9199E-10	.9101E+00	.6348E-01	-.2006E+01	.2782E+04	.4861E+04	.5723E+00	.7643E+04	.2612E-01
18.0	.811	.7371E-01	.4423E-04	.9721E-10	.9054E+00	.6674E-01	-.2105E+01	.2785E+04	.4861E+04	.5729E+00	.7646E+04	.5244E-01
17.0	.810	.7790E-01	.4674E-04	.1027E-09	.9005E+00	.7014E-01	-.2209E+01	.2780E+04	.4861E+04	.5719E+00	.7641E+04	.7893E-01
16.0	.806	.8200E-01	.4920E-04	.1081E-09	.8956E+00	.7344E-01	-.2308E+01	.2754E+04	.4861E+04	.5665E+00	.7615E+04	.1058E+00
15.0	.802	.8649E-01	.5190E-04	.1141E-09	.8904E+00	.7702E-01	-.2414E+01	.2723E+04	.4861E+04	.5602E+00	.7585E+04	.1331E+00
14.0	.797	.9158E-01	.5495E-04	.1208E-09	.8846E+00	.8101E-01	-.2533E+01	.2691E+04	.4861E+04	.5536E+00	.7552E+04	.1610E+00
13.0	.790	.9696E-01	.5818E-04	.1279E-09	.8784E+00	.8518E-01	-.2655E+01	.2646E+04	.4861E+04	.5443E+00	.7507E+04	.1896E+00
12.0	.781	.1025E+00	.6148E-04	.1351E-09	.8722E+00	.8938E-01	-.2775E+01	.2581E+04	.4861E+04	.5310E+00	.7442E+04	.2191E+00
11.0	.769	.1084E+00	.6504E-04	.1430E-09	.8656E+00	.9384E-01	-.2901E+01	.2503E+04	.4861E+04	.5149E+00	.7364E+04	.2497E+00
10.0	.756	.1152E+00	.6912E-04	.1519E-09	.8581E+00	.9886E-01	-.3040E+01	.2418E+04	.4861E+04	.4975E+00	.7279E+04	.2818E+00
9.0	.740	.1229E+00	.7372E-04	.1620E-09	.8498E+00	.1044E+00	-.3190E+01	.2321E+04	.4861E+04	.4775E+00	.7182E+04	.3156E+00
8.0	.721	.1311E+00	.7867E-04	.1729E-09	.8410E+00	.1103E+00	-.3342E+01	.2202E+04	.4861E+04	.4529E+00	.7063E+04	.3517E+00
7.0	.700	.1412E+00	.8474E-04	.1863E-09	.8304E+00	.1173E+00	-.3517E+01	.2075E+04	.4861E+04	.4269E+00	.6936E+04	.3907E+00
6.0	.689	.1594E+00	.9566E-04	.2103E-09	.8118E+00	.1294E+00	-.3826E+01	.2008E+04	.4861E+04	.4131E+00	.6869E+04	.4328E+00
5.0	.705	.2004E+00	.1203E-03	.2643E-09	.7723E+00	.1548E+00	-.4484E+01	.2104E+04	.4861E+04	.4328E+00	.6965E+04	.4771E+00
4.0	.759	.2904E+00	.1742E-03	.3830E-09	.6953E+00	.2019E+00	-.5668E+01	.2438E+04	.4861E+04	.5016E+00	.7299E+04	.5215E+00
3.0	.831	.3481E+00	.2089E-03	.4591E-09	.6520E+00	.2269E+00	-.6032E+01	.2192E+04	.4861E+04	.4509E+00	.7053E+04	.5699E+00
2.0	.874	.3854E+00	.2313E-03	.5083E-09	.6261E+00	.2413E+00	-.5695E+01	.1618E+04	.4861E+04	.3329E+00	.6479E+04	.6386E+00
1.0	.910	.4176E+00	.2505E-03	.5507E-09	.6051E+00	.2527E+00	-.3704E+01	.8765E+03	.4861E+04	.1803E+00	.5738E+04	.7847E+00

TIME = .7847E+00

TABLE XXVI

3 plate pairs
Variable gap to 4π mm-mrad
then constant gap to 1π mm-mrad

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2500E+08	148.0	110.0	110.0	.5500E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.884	.1611E+00	.5909E-04	.1623E-09	.8101E+00	.1305E+00	-.2507E+01	.5168E+04	.7596E+04	.6804E+00	.1276E+05	.2162E-14
19.0	.901	.1765E+00	.6472E-04	.1778E-09	.7950E+00	.1403E+00	-.2690E+01	.5377E+04	.7596E+04	.7080E+00	.1297E+05	.1974E-01
18.0	.917	.1927E+00	.7067E-04	.1942E-09	.7795E+00	.1502E+00	-.2874E+01	.5563E+04	.7596E+04	.7324E+00	.1316E+05	.3918E-01
17.0	.931	.2102E+00	.7708E-04	.2118E-09	.7633E+00	.1605E+00	-.3062E+01	.5731E+04	.7596E+04	.7545E+00	.1333E+05	.5844E-01
16.0	.943	.2292E+00	.8404E-04	.2309E-09	.7463E+00	.1711E+00	-.3256E+01	.5881E+04	.7596E+04	.7742E+00	.1348E+05	.7764E-01
15.0	.953	.2499E+00	.9163E-04	.2518E-09	.7284E+00	.1820E+00	-.3454E+01	.6011E+04	.7596E+04	.7914E+00	.1361E+05	.9688E-01
14.0	.962	.2726E+00	.9994E-04	.2746E-09	.7096E+00	.1934E+00	-.3658E+01	.6119E+04	.7596E+04	.8056E+00	.1371E+05	.1163E+00
13.0	.968	.2975E+00	.1091E-03	.2997E-09	.6897E+00	.2052E+00	-.3865E+01	.6201E+04	.7596E+04	.8164E+00	.1380E+05	.1360E+00
12.0	.972	.3251E+00	.1192E-03	.3275E-09	.6687E+00	.2174E+00	-.4076E+01	.6255E+04	.7596E+04	.8235E+00	.1385E+05	.1561E+00
11.0	.974	.3558E+00	.1304E-03	.3584E-09	.6465E+00	.2300E+00	-.4288E+01	.6275E+04	.7596E+04	.8261E+00	.1387E+05	.1769E+00
10.0	.972	.3901E+00	.1430E-03	.3930E-09	.6230E+00	.2430E+00	-.4501E+01	.6255E+04	.7596E+04	.8235E+00	.1385E+05	.1986E+00
9.0	.967	.4286E+00	.1571E-03	.4318E-09	.5981E+00	.2563E+00	-.4709E+01	.6185E+04	.7596E+04	.8143E+00	.1378E+05	.2215E+00
8.0	.956	.4720E+00	.1731E-03	.4755E-09	.5719E+00	.2699E+00	-.4907E+01	.6055E+04	.7596E+04	.7971E+00	.1365E+05	.2460E+00
7.0	.940	.5210E+00	.1910E-03	.5248E-09	.5443E+00	.2836E+00	-.5086E+01	.5848E+04	.7596E+04	.7699E+00	.1344E+05	.2727E+00
6.0	.915	.5758E+00	.2111E-03	.5801E-09	.5158E+00	.2970E+00	-.5230E+01	.5540E+04	.7596E+04	.7293E+00	.1314E+05	.3025E+00
5.0	.877	.6354E+00	.2330E-03	.6401E-09	.4873E+00	.3096E+00	-.5312E+01	.5094E+04	.7596E+04	.6707E+00	.1269E+05	.3371E+00
4.0	.820	.6936E+00	.2543E-03	.6987E-09	.4618E+00	.3203E+00	-.5276E+01	.4449E+04	.7596E+04	.5857E+00	.1204E+05	.3791E+00
3.0	.726	.7246E+00	.2657E-03	.7300E-09	.4490E+00	.3253E+00	-.4989E+01	.3486E+04	.7596E+04	.4589E+00	.1108E+05	.4349E+00
2.0	.551	.6255E+00	.2294E-03	.6301E-09	.4919E+00	.3077E+00	-.4017E+01	.2006E+04	.7596E+04	.2641E+00	.9602E+04	.5241E+00
1.0	.173	.1239E+00	.4544E-04	.1248E-09	.8487E+00	.1052E+00	-.6550E+00	.1987E+03	.7596E+04	.2616E-01	.7794E+04	.8568E+00

TIME = .8568E+00

TABLE XXVII

2 plate pairs
Variable gap to 1π mm-mrad

$\eta = 0.0055$

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2000E+08	146.0	110.0	110.0	.5500E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.807	.1074E+00	.3940E-04	.8660E-10	.8667E+00	.9312E-01	-.1801E+01	.2757E+04	.4861E+04	.5671E+00	.7618E+04	.3010E-14
19.0	.809	.1137E+00	.4169E-04	.9164E-10	.8598E+00	.9776E-01	-.1888E+01	.2771E+04	.4861E+04	.5701E+00	.7633E+04	.2788E-01
18.0	.811	.1206E+00	.4423E-04	.9722E-10	.8522E+00	.1028E+00	-.1982E+01	.2785E+04	.4861E+04	.5730E+00	.7647E+04	.5580E-01
17.0	.810	.1273E+00	.4668E-04	.1026E-09	.8451E+00	.1076E+00	-.2070E+01	.2776E+04	.4861E+04	.5711E+00	.7637E+04	.8401E-01
16.0	.807	.1343E+00	.4926E-04	.1083E-09	.8376E+00	.1125E+00	-.2161E+01	.2757E+04	.4861E+04	.5672E+00	.7618E+04	.1127E+00
15.0	.803	.1418E+00	.5201E-04	.1143E-09	.8298E+00	.1177E+00	-.2255E+01	.2729E+04	.4861E+04	.5615E+00	.7591E+04	.1419E+00
14.0	.797	.1499E+00	.5495E-04	.1208E-09	.8215E+00	.1231E+00	-.2352E+01	.2692E+04	.4861E+04	.5537E+00	.7553E+04	.1718E+00
13.0	.790	.1585E+00	.5813E-04	.1278E-09	.8127E+00	.1289E+00	-.2454E+01	.2644E+04	.4861E+04	.5439E+00	.7505E+04	.2027E+00
12.0	.781	.1678E+00	.6154E-04	.1353E-09	.8035E+00	.1348E+00	-.2559E+01	.2583E+04	.4861E+04	.5314E+00	.7445E+04	.2346E+00
11.0	.770	.1777E+00	.6517E-04	.1433E-09	.7938E+00	.1411E+00	-.2666E+01	.2508E+04	.4861E+04	.5160E+00	.7369E+04	.2679E+00
10.0	.756	.1886E+00	.6914E-04	.1520E-09	.7834E+00	.1477E+00	-.2776E+01	.2419E+04	.4861E+04	.4976E+00	.7280E+04	.3029E+00
9.0	.739	.2006E+00	.7356E-04	.1617E-09	.7721E+00	.1549E+00	-.2893E+01	.2316E+04	.4861E+04	.4765E+00	.7177E+04	.3401E+00
8.0	.721	.2144E+00	.7862E-04	.1728E-09	.7595E+00	.1628E+00	-.3016E+01	.2200E+04	.4861E+04	.4526E+00	.7061E+04	.3800E+00
7.0	.701	.2318E+00	.8501E-04	.1868E-09	.7440E+00	.1725E+00	-.3161E+01	.2082E+04	.4861E+04	.4283E+00	.6943E+04	.4233E+00
6.0	.689	.2612E+00	.9576E-04	.2105E-09	.7190E+00	.1878E+00	-.3392E+01	.2010E+04	.4861E+04	.4135E+00	.6871E+04	.4705E+00
5.0	.702	.3259E+00	.1195E-03	.2626E-09	.6681E+00	.2177E+00	-.3854E+01	.2090E+04	.4861E+04	.4300E+00	.6951E+04	.5211E+00
4.0	.761	.4781E+00	.1753E-03	.3853E-09	.5683E+00	.2717E+00	-.4661E+01	.2453E+04	.4861E+04	.5046E+00	.7314E+04	.5738E+00
3.0	.857	.8087E+00	.2965E-03	.6517E-09	.4169E+00	.3371E+00	-.5477E+01	.3112E+04	.4861E+04	.6402E+00	.7973E+04	.6301E+00
2.0	.935	.1444E+01	.5295E-03	.1164E-08	.2571E+00	.3713E+00	-.5356E+01	.3705E+04	.4861E+04	.7621E+00	.8566E+04	.7034E+00
1.0	.983	.3192E+01	.1171E-02	.2573E-08	.1023E+00	.3266E+00	-.2926E+01	.4095E+04	.4861E+04	.8424E+00	.8956E+04	.8677E+00

TIME = .8677E+00

TABLE XXVIII

3 plate pairs
Variable gap to 1π mm-mrad

$\eta = 0.0055$

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2000E+08	146.0	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.902	.8202E-01	.4921E-04	.1082E-09	.8956E+00	.7346E-01	-.2325E+01	.3444E+04	.4861E+04	.7084E+00	.8305E+04	.2332E-14
19.0	.913	.8852E-01	.5311E-04	.1167E-09	.8881E+00	.7861E-01	-.2484E+01	.3530E+04	.4861E+04	.7262E+00	.8391E+04	.2125E-01
18.0	.923	.9556E-01	.5734E-04	.1260E-09	.8800E+00	.8410E-01	-.2653E+01	.3611E+04	.4861E+04	.7428E+00	.8472E+04	.4233E-01
17.0	.935	.1039E+00	.6233E-04	.1370E-09	.8707E+00	.9044E-01	-.2848E+01	.3707E+04	.4861E+04	.7626E+00	.8568E+04	.6312E-01
16.0	.945	.1126E+00	.6755E-04	.1485E-09	.8610E+00	.9693E-01	-.3046E+01	.3781E+04	.4861E+04	.7778E+00	.8642E+04	.8369E-01
15.0	.954	.1224E+00	.7342E-04	.1614E-09	.8504E+00	.1041E+00	-.3262E+01	.3853E+04	.4861E+04	.7926E+00	.8714E+04	.1042E+00
14.0	.963	.1335E+00	.8012E-04	.1761E-09	.8385E+00	.1120E+00	-.3501E+01	.3924E+04	.4861E+04	.8073E+00	.8786E+04	.1246E+00
13.0	.969	.1457E+00	.8745E-04	.1922E-09	.8258E+00	.1203E+00	-.3751E+01	.3977E+04	.4861E+04	.8182E+00	.8838E+04	.1450E+00
12.0	.972	.1589E+00	.9534E-04	.2096E-09	.8124E+00	.1291E+00	-.4009E+01	.4003E+04	.4861E+04	.8234E+00	.8864E+04	.1657E+00
11.0	.973	.1737E+00	.1042E-03	.2290E-09	.7978E+00	.1386E+00	-.4284E+01	.4010E+04	.4861E+04	.8250E+00	.8871E+04	.1867E+00
10.0	.972	.1907E+00	.1144E-03	.2515E-09	.7814E+00	.1490E+00	-.4583E+01	.4004E+04	.4861E+04	.8236E+00	.8865E+04	.2082E+00
9.0	.968	.2099E+00	.1260E-03	.2769E-09	.7635E+00	.1603E+00	-.4898E+01	.3966E+04	.4861E+04	.8159E+00	.8827E+04	.2304E+00
8.0	.957	.2308E+00	.1385E-03	.3044E-09	.7449E+00	.1719E+00	-.5211E+01	.3877E+04	.4861E+04	.7975E+00	.8738E+04	.2537E+00
7.0	.939	.2540E+00	.1524E-03	.3350E-09	.7249E+00	.1841E+00	-.5522E+01	.3732E+04	.4861E+04	.7678E+00	.8594E+04	.2785E+00
6.0	.915	.2814E+00	.1688E-03	.3711E-09	.7025E+00	.1976E+00	-.5843E+01	.3544E+04	.4861E+04	.7290E+00	.8405E+04	.3057E+00
5.0	.880	.3123E+00	.1874E-03	.4118E-09	.6784E+00	.2118E+00	-.6136E+01	.3277E+04	.4861E+04	.6742E+00	.8139E+04	.3361E+00
4.0	.817	.3371E+00	.2022E-03	.4445E-09	.6599E+00	.2224E+00	-.6244E+01	.2830E+04	.4861E+04	.5822E+00	.7691E+04	.3719E+00
3.0	.711	.2551E+00	.1530E-03	.3364E-09	.7240E+00	.1847E+00	-.4909E+01	.1606E+04	.4861E+04	.3304E+00	.6467E+04	.4232E+00
2.0	.574	.1661E+00	.9969E-04	.2191E-09	.8052E+00	.1338E+00	-.3157E+01	.6975E+03	.4861E+04	.1435E+00	.5559E+04	.5270E+00
1.0	.430	.9316E-01	.5590E-04	.1229E-09	.8828E+00	.8224E-01	-.1206E+01	.1956E+03	.4861E+04	.4023E-01	.5057E+04	.8773E+00

TIME = .8773E+00

TABLE XXIX

2 plate pairs
Variable gap to 4π mm-mrad
then constant gap to 1π mm-mrad

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.1500E+08	143.5	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	Q	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.884	.5909E-01	.3545E-04	.5844E-10	.9230E+00	.5454E-01	-.1738E+01	.1860E+04	.2734E+04	.6804E+00	.4595E+04	.3119E-14
19.0	.901	.6472E-01	.3883E-04	.6401E-10	.9162E+00	.5929E-01	-.1888E+01	.1936E+04	.2734E+04	.7080E+00	.4670E+04	.2830E-01
18.0	.917	.7067E-01	.4240E-04	.6990E-10	.9090E+00	.6424E-01	-.2043E+01	.2003E+04	.2734E+04	.7324E+00	.4737E+04	.5583E-01
17.0	.931	.7708E-01	.4625E-04	.7624E-10	.9014E+00	.6948E-01	-.2206E+01	.2063E+04	.2734E+04	.7545E+00	.4797E+04	.8275E-01
16.0	.943	.8404E-01	.5043E-04	.8313E-10	.8933E+00	.7507E-01	-.2380E+01	.2117E+04	.2734E+04	.7742E+00	.4851E+04	.1092E+00
15.0	.953	.9163E-01	.5498E-04	.9063E-10	.8845E+00	.8105E-01	-.2565E+01	.2164E+04	.2734E+04	.7914E+00	.4898E+04	.1353E+00
14.0	.962	.9994E-01	.5996E-04	.9885E-10	.8751E+00	.8745E-01	-.2762E+01	.2203E+04	.2734E+04	.8056E+00	.4937E+04	.1612E+00
13.0	.968	.1091E+00	.6545E-04	.1079E-09	.8649E+00	.9434E-01	-.2973E+01	.2232E+04	.2734E+04	.8164E+00	.4967E+04	.1871E+00
12.0	.972	.1192E+00	.7152E-04	.1179E-09	.8538E+00	.1018E+00	-.3198E+01	.2252E+04	.2734E+04	.8235E+00	.4986E+04	.2130E+00
11.0	.974	.1304E+00	.7827E-04	.1290E-09	.8417E+00	.1098E+00	-.3439E+01	.2259E+04	.2734E+04	.8261E+00	.4993E+04	.2393E+00
10.0	.972	.1430E+00	.8581E-04	.1415E-09	.8286E+00	.1185E+00	-.3697E+01	.2252E+04	.2734E+04	.8235E+00	.4986E+04	.2660E+00
9.0	.967	.1571E+00	.9429E-04	.1554E-09	.8141E+00	.1279E+00	-.3973E+01	.2227E+04	.2734E+04	.8143E+00	.4961E+04	.2935E+00
8.0	.956	.1731E+00	.1038E-03	.1712E-09	.7984E+00	.1382E+00	-.4265E+01	.2180E+04	.2734E+04	.7971E+00	.4914E+04	.3220E+00
7.0	.940	.1910E+00	.1146E-03	.1889E-09	.7811E+00	.1492E+00	-.4570E+01	.2105E+04	.2734E+04	.7699E+00	.4839E+04	.3523E+00
6.0	.915	.2111E+00	.1267E-03	.2088E-09	.7625E+00	.1610E+00	-.4879E+01	.1994E+04	.2734E+04	.7293E+00	.4729E+04	.3849E+00
5.0	.877	.2330E+00	.1398E-03	.2304E-09	.7430E+00	.1731E+00	-.5169E+01	.1834E+04	.2734E+04	.6707E+00	.4568E+04	.4211E+00
4.0	.820	.2543E+00	.1526E-03	.2515E-09	.7247E+00	.1843E+00	-.5380E+01	.1602E+04	.2734E+04	.5857E+00	.4336E+04	.4633E+00
3.0	.726	.2657E+00	.1594E-03	.2628E-09	.7152E+00	.1900E+00	-.5334E+01	.1255E+04	.2734E+04	.4589E+00	.3989E+04	.5167E+00
2.0	.551	.2294E+00	.1376E-03	.2269E-09	.7462E+00	.1711E+00	-.4422E+01	.7222E+03	.2734E+04	.2641E+00	.3457E+04	.5985E+00
1.0	.173	.4544E-01	.2726E-04	.4495E-10	.9400E+00	.4271E-01	-.8171E+00	.7154E+02	.2734E+04	.2616E-01	.2806E+04	.8955E+00

TIME = .8955E+00

TABLE XXX

2 plate pairs
Variable gap to 1π mm-mrad

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2000E+08	146.0	110.0	110.0	.5500E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.810	.1083E+00	.3970E-04	.8726E-10	.8658E+00	.9374E-01	-.1813E+01	.2778E+04	.4861E+04	.5715E+00	.7639E+04	.2990E-14
19.0	.810	.1141E+00	.4185E-04	.9199E-10	.8593E+00	.9808E-01	-.1894E+01	.2782E+04	.4861E+04	.5723E+00	.7643E+04	.2763E-01
18.0	.811	.1206E+00	.4423E-04	.9721E-10	.8523E+00	.1028E+00	-.1982E+01	.2785E+04	.4861E+04	.5729E+00	.7646E+04	.5555E-01
17.0	.810	.1275E+00	.4674E-04	.1027E-09	.8449E+00	.1077E+00	-.2073E+01	.2780E+04	.4861E+04	.5719E+00	.7641E+04	.8374E-01
16.0	.806	.1342E+00	.4920E-04	.1081E-09	.8378E+00	.1124E+00	-.2159E+01	.2754E+04	.4861E+04	.5665E+00	.7615E+04	.1124E+00
15.0	.802	.1415E+00	.5190E-04	.1141E-09	.8301E+00	.1175E+00	-.2251E+01	.2723E+04	.4861E+04	.5602E+00	.7585E+04	.1417E+00
14.0	.797	.1499E+00	.5495E-04	.1208E-09	.8215E+00	.1231E+00	-.2352E+01	.2691E+04	.4861E+04	.5536E+00	.7552E+04	.1716E+00
13.0	.790	.1587E+00	.5818E-04	.1279E-09	.8126E+00	.1289E+00	-.2456E+01	.2646E+04	.4861E+04	.5443E+00	.7507E+04	.2025E+00
12.0	.781	.1677E+00	.6148E-04	.1351E-09	.8036E+00	.1348E+00	-.2557E+01	.2581E+04	.4861E+04	.5310E+00	.7442E+04	.2344E+00
11.0	.769	.1774E+00	.6504E-04	.1430E-09	.7942E+00	.1409E+00	-.2662E+01	.2503E+04	.4861E+04	.5149E+00	.7364E+04	.2677E+00
10.0	.756	.1885E+00	.6912E-04	.1519E-09	.7835E+00	.1477E+00	-.2776E+01	.2418E+04	.4861E+04	.4975E+00	.7279E+04	.3028E+00
9.0	.740	.2011E+00	.7372E-04	.1620E-09	.7717E+00	.1552E+00	-.2897E+01	.2321E+04	.4861E+04	.4775E+00	.7182E+04	.3399E+00
8.0	.721	.2145E+00	.7867E-04	.1729E-09	.7594E+00	.1629E+00	-.3017E+01	.2202E+04	.4861E+04	.4529E+00	.7063E+04	.3798E+00
7.0	.700	.2311E+00	.8474E-04	.1863E-09	.7446E+00	.1721E+00	-.3154E+01	.2075E+04	.4861E+04	.4269E+00	.6936E+04	.4231E+00
6.0	.689	.2609E+00	.9566E-04	.2103E-09	.7192E+00	.1876E+00	-.3390E+01	.2008E+04	.4861E+04	.4131E+00	.6869E+04	.4704E+00
5.0	.705	.3280E+00	.1203E-03	.2643E-09	.6666E+00	.2186E+00	-.3870E+01	.2104E+04	.4861E+04	.4328E+00	.6965E+04	.5209E+00
4.0	.759	.4752E+00	.1742E-03	.3830E-09	.5700E+00	.2709E+00	-.4647E+01	.2438E+04	.4861E+04	.5016E+00	.7299E+04	.5735E+00
3.0	.831	.5696E+00	.2089E-03	.4591E-09	.5189E+00	.2956E+00	-.4801E+01	.2192E+04	.4861E+04	.4509E+00	.7053E+04	.6337E+00
2.0	.874	.6307E+00	.2313E-03	.5083E-09	.4895E+00	.3087E+00	-.4453E+01	.1618E+04	.4861E+04	.3329E+00	.6479E+04	.7208E+00
1.0	.910	.6833E+00	.2505E-03	.5507E-09	.4661E+00	.3185E+00	-.2854E+01	.8765E+03	.4861E+04	.1803E+00	.5738E+04	.9086E+00

TIME = .9086E+00

TABLE XXXI

3 plate pairs
Variable gap to 4π mm-mrad
then constant gap to 1π mm-mrad

$\eta = 0.0055$

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2000E+08	146.0	110.0	110.0	.5500E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.902	.1342E+00	.4921E-04	.1082E-09	.8377E+00	.1124E+00	-.2175E+01	.3444E+04	.4861E+04	.7084E+00	.8305E+04	.2493E-14
19.0	.913	.1448E+00	.5311E-04	.1167E-09	.8267E+00	.1197E+00	-.2312E+01	.3530E+04	.4861E+04	.7262E+00	.8391E+04	.2278E-01
18.0	.923	.1564E+00	.5734E-04	.1260E-09	.8149E+00	.1274E+00	-.2457E+01	.3611E+04	.4861E+04	.7428E+00	.8472E+04	.4549E-01
17.0	.935	.1700E+00	.6233E-04	.1370E-09	.8014E+00	.1362E+00	-.2621E+01	.3707E+04	.4861E+04	.7626E+00	.8568E+04	.6800E-01
16.0	.945	.1842E+00	.6755E-04	.1485E-09	.7876E+00	.1451E+00	-.2786E+01	.3781E+04	.4861E+04	.7778E+00	.8642E+04	.9042E-01
15.0	.954	.2002E+00	.7342E-04	.1614E-09	.7725E+00	.1547E+00	-.2963E+01	.3853E+04	.4861E+04	.7926E+00	.8714E+04	.1129E+00
14.0	.963	.2185E+00	.8012E-04	.1761E-09	.7558E+00	.1652E+00	-.3156E+01	.3924E+04	.4861E+04	.8073E+00	.8786E+04	.1354E+00
13.0	.969	.2385E+00	.8745E-04	.1922E-09	.7382E+00	.1761E+00	-.3353E+01	.3977E+04	.4861E+04	.8182E+00	.8838E+04	.1582E+00
12.0	.972	.2600E+00	.9534E-04	.2096E-09	.7199E+00	.1872E+00	-.3552E+01	.4003E+04	.4861E+04	.8234E+00	.8864E+04	.1814E+00
11.0	.973	.2842E+00	.1042E-03	.2290E-09	.7002E+00	.1990E+00	-.3760E+01	.4010E+04	.4861E+04	.8250E+00	.8871E+04	.2052E+00
10.0	.972	.3121E+00	.1144E-03	.2515E-09	.6785E+00	.2118E+00	-.3980E+01	.4004E+04	.4861E+04	.8236E+00	.8865E+04	.2298E+00
9.0	.968	.3435E+00	.1260E-03	.2769E-09	.6552E+00	.2251E+00	-.4203E+01	.3966E+04	.4861E+04	.8159E+00	.8827E+04	.2556E+00
8.0	.957	.3777E+00	.1385E-03	.3044E-09	.6313E+00	.2385E+00	-.4417E+01	.3877E+04	.4861E+04	.7975E+00	.8738E+04	.2829E+00
7.0	.939	.4157E+00	.1524E-03	.3350E-09	.6063E+00	.2520E+00	-.4618E+01	.3732E+04	.4861E+04	.7678E+00	.8594E+04	.3124E+00
6.0	.915	.4604E+00	.1688E-03	.3711E-09	.5787E+00	.2664E+00	-.4813E+01	.3544E+04	.4861E+04	.7290E+00	.8405E+04	.3451E+00
5.0	.880	.5110E+00	.1874E-03	.4118E-09	.5497E+00	.2809E+00	-.4973E+01	.3277E+04	.4861E+04	.6742E+00	.8139E+04	.3823E+00
4.0	.817	.5516E+00	.2022E-03	.4445E-09	.5281E+00	.2913E+00	-.4997E+01	.2830E+04	.4861E+04	.5822E+00	.7691E+04	.4269E+00
3.0	.711	.4174E+00	.1530E-03	.3364E-09	.6052E+00	.2526E+00	-.4103E+01	.1606E+04	.4861E+04	.3304E+00	.6467E+04	.4897E+00
2.0	.574	.2719E+00	.9969E-04	.2191E-09	.7101E+00	.1931E+00	-.2785E+01	.6975E+03	.4861E+04	.1435E+00	.5559E+04	.6100E+00
1.0	.430	.1524E+00	.5590E-04	.1229E-09	.8189E+00	.1248E+00	-.1118E+01	.1956E+03	.4861E+04	.4023E-01	.5057E+04	.9949E+00

TIME = .9949E+00

TABLE XXXII

$\eta = 0.0055$

2 plate pairs
Variable gap to 4π mm-mrad
then constant gap to 1π mm-mrad

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2500E+08	148.0	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.334	.1406E-01	.8436E-05	.2318E-10	.9808E+00	.1379E-01	-.4334E+00	.7379E+03	.7596E+04	.9714E-01	.8333E+04	.1251E-13
19.0	.359	.1707E-01	.1024E-04	.2814E-10	.9768E+00	.1667E-01	-.5230E+00	.8511E+03	.7596E+04	.1121E+00	.8447E+04	.1052E+00
18.0	.380	.2023E-01	.1214E-04	.3336E-10	.9726E+00	.1968E-01	-.6160E+00	.9557E+03	.7596E+04	.1258E+00	.8551E+04	.2010E+00
17.0	.403	.2415E-01	.1449E-04	.3981E-10	.9674E+00	.2336E-01	-.7296E+00	.1077E+04	.7596E+04	.1418E+00	.8673E+04	.2860E+00
16.0	.422	.2809E-01	.1685E-04	.4630E-10	.9622E+00	.2702E-01	-.8417E+00	.1179E+04	.7596E+04	.1552E+00	.8775E+04	.3634E+00
15.0	.443	.3298E-01	.1979E-04	.5437E-10	.9559E+00	.3152E-01	-.9789E+00	.1298E+04	.7596E+04	.1709E+00	.8894E+04	.4346E+00
14.0	.469	.3956E-01	.2374E-04	.6522E-10	.9474E+00	.3748E-01	-.1160E+01	.1453E+04	.7596E+04	.1913E+00	.9049E+04	.4994E+00
13.0	.496	.4780E-01	.2868E-04	.7880E-10	.9370E+00	.4479E-01	-.1381E+01	.1631E+04	.7596E+04	.2147E+00	.9226E+04	.5580E+00
12.0	.525	.5798E-01	.3479E-04	.9558E-10	.9244E+00	.5359E-01	-.1644E+01	.1826E+04	.7596E+04	.2403E+00	.9421E+04	.6112E+00
11.0	.559	.7165E-01	.4299E-04	.1181E-09	.9079E+00	.6504E-01	-.1985E+01	.2068E+04	.7596E+04	.2723E+00	.9663E+04	.6594E+00
10.0	.602	.9136E-01	.5482E-04	.1506E-09	.8848E+00	.8084E-01	-.2450E+01	.2397E+04	.7596E+04	.3156E+00	.9993E+04	.7027E+00
9.0	.654	.1199E+00	.7191E-04	.1976E-09	.8531E+00	.1022E+00	-.3073E+01	.2830E+04	.7596E+04	.3726E+00	.1043E+05	.7411E+00
8.0	.714	.1607E+00	.9640E-04	.2649E-09	.8106E+00	.1302E+00	-.3874E+01	.3373E+04	.7596E+04	.4440E+00	.1097E+05	.7753E+00
7.0	.786	.2227E+00	.1336E-03	.3671E-09	.7520E+00	.1675E+00	-.4916E+01	.4091E+04	.7596E+04	.5385E+00	.1169E+05	.8059E+00
6.0	.885	.3292E+00	.1975E-03	.5426E-09	.6657E+00	.2191E+00	-.6315E+01	.5182E+04	.7596E+04	.6823E+00	.1278E+05	.8336E+00
5.0	1.023	.5276E+00	.3166E-03	.8698E-09	.5407E+00	.2853E+00	-.8009E+01	.6922E+04	.7596E+04	.9113E+00	.1452E+05	.8591E+00
4.0	1.189	.8914E+00	.5349E-03	.1470E-08	.3886E+00	.3464E+00	-.9338E+01	.9356E+04	.7596E+04	.1232E+01	.1695E+05	.8846E+00
3.0	1.340	.1132E+01	.6790E-03	.1866E-08	.3212E+00	.3635E+00	-.9121E+01	.8908E+04	.7596E+04	.1173E+01	.1650E+05	.9154E+00
2.0	1.436	.1300E+01	.7798E-03	.2143E-08	.2841E+00	.3692E+00	-.7889E+01	.6821E+04	.7596E+04	.8980E+00	.1442E+05	.9628E+00
1.0	1.522	.1459E+01	.8756E-03	.2406E-08	.2545E+00	.3714E+00	-.3785E+01	.3829E+04	.7596E+04	.5041E+00	.1142E+05	.1080E+01

TIME = .1080E+01

TABLE XXXIII

1 plate pair
Variable gap to 4πmm-mrad
then constant gap to 1πmm-mrad

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2500E+08	148.0	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.365	.1680E-01	.1008E-04	.2770E-10	.9771E+00	.1642E-01	-.5159E+00	.8818E+03	.7596E+04	.1161E+00	.8477E+04	.1051E-13
19.0	.381	.1930E-01	.1158E-04	.3181E-10	.9738E+00	.1879E-01	-.5894E+00	.9620E+03	.7596E+04	.1267E+00	.8557E+04	.9483E-01
18.0	.399	.2228E-01	.1337E-04	.3672E-10	.9698E+00	.2161E-01	-.6763E+00	.1052E+04	.7596E+04	.1385E+00	.8648E+04	.1800E+00
17.0	.413	.2529E-01	.1517E-04	.4169E-10	.9659E+00	.2443E-01	-.7628E+00	.1128E+04	.7596E+04	.1485E+00	.8724E+04	.2597E+00
16.0	.431	.2930E-01	.1758E-04	.4831E-10	.9606E+00	.2815E-01	-.8768E+00	.1230E+04	.7596E+04	.1620E+00	.8826E+04	.3340E+00
15.0	.451	.3413E-01	.2048E-04	.5626E-10	.9544E+00	.3257E-01	-.1011E+01	.1343E+04	.7596E+04	.1768E+00	.8939E+04	.4025E+00
14.0	.471	.3999E-01	.2399E-04	.6592E-10	.9469E+00	.3786E-01	-.1172E+01	.1469E+04	.7596E+04	.1934E+00	.9064E+04	.4659E+00
13.0	.496	.4780E-01	.2868E-04	.7880E-10	.9370E+00	.4479E-01	-.1381E+01	.1631E+04	.7596E+04	.2147E+00	.9226E+04	.5243E+00
12.0	.527	.5843E-01	.3506E-04	.9632E-10	.9238E+00	.5398E-01	-.1656E+01	.1840E+04	.7596E+04	.2422E+00	.9435E+04	.5773E+00
11.0	.562	.7252E-01	.4351E-04	.1195E-09	.9068E+00	.6576E-01	-.2006E+01	.2093E+04	.7596E+04	.2756E+00	.9689E+04	.6251E+00
10.0	.602	.9147E-01	.5488E-04	.1508E-09	.8847E+00	.8093E-01	-.2453E+01	.2400E+04	.7596E+04	.3160E+00	.9996E+04	.6681E+00
9.0	.651	.1188E+00	.7126E-04	.1958E-09	.8543E+00	.1015E+00	-.3050E+01	.2805E+04	.7596E+04	.3692E+00	.1040E+05	.7067E+00
8.0	.713	.1604E+00	.9621E-04	.2643E-09	.8109E+00	.1300E+00	-.3868E+01	.3366E+04	.7596E+04	.4432E+00	.1096E+05	.7410E+00
7.0	.790	.2252E+00	.1351E-03	.3712E-09	.7499E+00	.1688E+00	-.4955E+01	.4136E+04	.7596E+04	.5445E+00	.1173E+05	.7715E+00
6.0	.886	.3300E+00	.1980E-03	.5440E-09	.6651E+00	.2195E+00	-.6325E+01	.5196E+04	.7596E+04	.6840E+00	.1279E+05	.7990E+00
5.0	1.014	.5190E+00	.3114E-03	.8556E-09	.5454E+00	.2830E+00	-.7946E+01	.6809E+04	.7596E+04	.8965E+00	.1440E+05	.8246E+00
4.0	1.198	.9045E+00	.5427E-03	.1491E-08	.3844E+00	.3477E+00	-.9372E+01	.9494E+04	.7596E+04	.1250E+01	.1709E+05	.8502E+00
3.0	1.425	.1708E+01	.1025E-02	.2816E-08	.2169E+00	.3705E+00	-.9297E+01	.1344E+05	.7596E+04	.1770E+01	.2104E+05	.8804E+00
2.0	1.603	.3239E+01	.1944E-02	.5340E-08	.1003E+00	.3250E+00	-.6944E+01	.1700E+05	.7596E+04	.2238E+01	.2460E+05	.9301E+00
1.0	1.702	.7305E+01	.4383E-02	.1204E-07	.2946E-01	.2152E+00	-.2193E+01	.1917E+05	.7596E+04	.2524E+01	.2676E+05	.1095E+01

TIME = .1095E+01

TABLE XXXIV

1 plate pair
Variable gap to 1π mm-mrad

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2500E+08	148.0	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.765	.4353E-01	.2612E-04	.7177E-10	.9424E+00	.4103E-01	-.1289E+01	.2285E+04	.7596E+04	.3008E+00	.9880E+04	.4205E-14
19.0	.766	.4363E-01	.2618E-04	.7192E-10	.9423E+00	.4111E-01	-.1289E+01	.2175E+04	.7596E+04	.2864E+00	.9771E+04	.3978E-01
18.0	.767	.4372E-01	.2623E-04	.7208E-10	.9421E+00	.4119E-01	-.1289E+01	.2065E+04	.7596E+04	.2719E+00	.9661E+04	.8171E-01
17.0	.768	.4383E-01	.2630E-04	.7225E-10	.9420E+00	.4129E-01	-.1289E+01	.1955E+04	.7596E+04	.2574E+00	.9551E+04	.1260E+00
16.0	.769	.4394E-01	.2637E-04	.7244E-10	.9419E+00	.4139E-01	-.1289E+01	.1845E+04	.7596E+04	.2429E+00	.9440E+04	.1731E+00
15.0	.770	.4406E-01	.2644E-04	.7264E-10	.9417E+00	.4150E-01	-.1289E+01	.1734E+04	.7596E+04	.2283E+00	.9330E+04	.2231E+00
14.0	.771	.4420E-01	.2652E-04	.7286E-10	.9415E+00	.4161E-01	-.1288E+01	.1624E+04	.7596E+04	.2138E+00	.9219E+04	.2767E+00
13.0	.772	.4435E-01	.2661E-04	.7310E-10	.9413E+00	.4175E-01	-.1287E+01	.1513E+04	.7596E+04	.1992E+00	.9108E+04	.3343E+00
12.0	.774	.4451E-01	.2671E-04	.7338E-10	.9411E+00	.4189E-01	-.1285E+01	.1402E+04	.7596E+04	.1845E+00	.8997E+04	.3965E+00
11.0	.775	.4471E-01	.2682E-04	.7370E-10	.9409E+00	.4206E-01	-.1283E+01	.1290E+04	.7596E+04	.1699E+00	.8886E+04	.4643E+00
10.0	.777	.4492E-01	.2695E-04	.7406E-10	.9406E+00	.4226E-01	-.1281E+01	.1179E+04	.7596E+04	.1552E+00	.8774E+04	.5386E+00
9.0	.779	.4517E-01	.2710E-04	.7446E-10	.9403E+00	.4247E-01	-.1277E+01	.1067E+04	.7596E+04	.1404E+00	.8662E+04	.6210E+00
8.0	.782	.4544E-01	.2726E-04	.7490E-10	.9400E+00	.4271E-01	-.1271E+01	.9538E+03	.7596E+04	.1256E+00	.8549E+04	.7135E+00
7.0	.784	.4573E-01	.2744E-04	.7538E-10	.9396E+00	.4296E-01	-.1261E+01	.8399E+03	.7596E+04	.1106E+00	.8435E+04	.8189E+00
6.0	.787	.4604E-01	.2762E-04	.7590E-10	.9392E+00	.4324E-01	-.1246E+01	.7249E+03	.7596E+04	.9543E-01	.8320E+04	.9419E+00
5.0	.790	.4638E-01	.2783E-04	.7646E-10	.9388E+00	.4354E-01	-.1222E+01	.6085E+03	.7596E+04	.8012E-01	.8204E+04	.1090E+01
4.0	.793	.4675E-01	.2805E-04	.7706E-10	.9383E+00	.4386E-01	-.1182E+01	.4906E+03	.7596E+04	.6460E-01	.8086E+04	.1275E+01
3.0	.796	.4713E-01	.2828E-04	.7769E-10	.9379E+00	.4420E-01	-.1109E+01	.3710E+03	.7596E+04	.4884E-01	.7966E+04	.1526E+01
2.0	.799	.4753E-01	.2852E-04	.7835E-10	.9373E+00	.4455E-01	-.9519E+00	.2494E+03	.7596E+04	.3284E-01	.7845E+04	.1918E+01
1.0	.803	.4793E-01	.2876E-04	.7902E-10	.9368E+00	.4491E-01	-.4576E+00	.1258E+03	.7596E+04	.1656E-01	.7721E+04	.2889E+01

TIME = .2889E+01

TABLE XXXV

3 plate pairs
Constant gap = 30.8mm

NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.3000E+08	149.5	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	G	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.428	.1634E-01	.9802E-05	.3232E-10	.9777E+00	.1597E-01	-.4984E+00	.1029E+04	.1094E+05	.9406E-01	.1197E+05	.1088E-13
19.0	.445	.1765E-01	.1059E-04	.3491E-10	.9760E+00	.1722E-01	-.5362E+00	.1056E+04	.1094E+05	.9653E-01	.1199E+05	.9920E-01
18.0	.462	.1906E-01	.1144E-04	.3770E-10	.9741E+00	.1857E-01	-.5765E+00	.1080E+04	.1094E+05	.9877E-01	.1202E+05	.1964E+00
17.0	.480	.2059E-01	.1235E-04	.4073E-10	.9721E+00	.2002E-01	-.6198E+00	.1102E+04	.1094E+05	.1008E+00	.1204E+05	.2920E+00
16.0	.499	.2225E-01	.1335E-04	.4401E-10	.9699E+00	.2158E-01	-.6660E+00	.1121E+04	.1094E+05	.1025E+00	.1206E+05	.3864E+00
15.0	.519	.2404E-01	.1442E-04	.4755E-10	.9675E+00	.2326E-01	-.7152E+00	.1135E+04	.1094E+05	.1038E+00	.1207E+05	.4799E+00
14.0	.539	.2596E-01	.1558E-04	.5136E-10	.9650E+00	.2505E-01	-.7673E+00	.1144E+04	.1094E+05	.1046E+00	.1208E+05	.5730E+00
13.0	.560	.2804E-01	.1682E-04	.5546E-10	.9623E+00	.2698E-01	-.8223E+00	.1148E+04	.1094E+05	.1049E+00	.1209E+05	.6662E+00
12.0	.582	.3027E-01	.1816E-04	.5988E-10	.9594E+00	.2904E-01	-.8801E+00	.1144E+04	.1094E+05	.1046E+00	.1208E+05	.7603E+00
11.0	.605	.3267E-01	.1960E-04	.6462E-10	.9563E+00	.3124E-01	-.9403E+00	.1131E+04	.1094E+05	.1034E+00	.1207E+05	.8559E+00
10.0	.628	.3523E-01	.2114E-04	.6969E-10	.9530E+00	.3357E-01	-.1002E+01	.1109E+04	.1094E+05	.1014E+00	.1205E+05	.9540E+00
9.0	.652	.3796E-01	.2278E-04	.7510E-10	.9495E+00	.3605E-01	-.1066E+01	.1076E+04	.1094E+05	.9836E-01	.1201E+05	.1056E+01
8.0	.677	.4088E-01	.2453E-04	.8087E-10	.9457E+00	.3866E-01	-.1129E+01	.1030E+04	.1094E+05	.9415E-01	.1197E+05	.1163E+01
7.0	.702	.4398E-01	.2639E-04	.8700E-10	.9418E+00	.4142E-01	-.1189E+01	.9693E+03	.1094E+05	.8863E-01	.1191E+05	.1278E+01
6.0	.728	.4726E-01	.2836E-04	.9349E-10	.9377E+00	.4432E-01	-.1244E+01	.8929E+03	.1094E+05	.8164E-01	.1183E+05	.1405E+01
5.0	.754	.5073E-01	.3044E-04	.1003E-09	.9334E+00	.4735E-01	-.1287E+01	.7986E+03	.1094E+05	.7302E-01	.1174E+05	.1549E+01
4.0	.780	.5437E-01	.3262E-04	.1076E-09	.9288E+00	.5050E-01	-.1305E+01	.6848E+03	.1094E+05	.6261E-01	.1162E+05	.1721E+01
3.0	.807	.5820E-01	.3492E-04	.1151E-09	.9241E+00	.5378E-01	-.1269E+01	.5497E+03	.1094E+05	.5026E-01	.1149E+05	.1943E+01
2.0	.835	.6221E-01	.3733E-04	.1231E-09	.9192E+00	.5719E-01	-.1094E+01	.3918E+03	.1094E+05	.3582E-01	.1133E+05	.2283E+01
1.0	.862	.6640E-01	.3984E-04	.1313E-09	.9142E+00	.6070E-01	-.3471E+00	.2091E+03	.1094E+05	.1911E-01	.1115E+05	.3229E+01

TIME = .3229E+01

TABLE XXXVI

1 plate pair
Constant gap = 30.8 mm

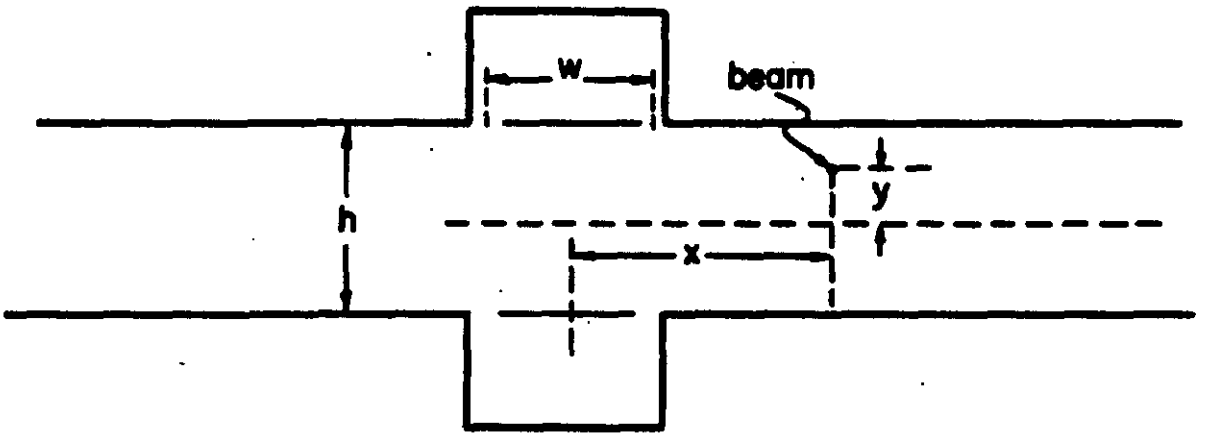
NP	NK	GA	GAINDB	TA	TS	ETA	DELPOP
.2560E+03	.2560E+03	.2500E+08	148.0	110.0	110.0	.9000E-02	.2500E-02

EMIT	DSEN	U	θ	B	Y(U)	UY(U)	RATE	SCHOTPR	NOISEPR	SCHOT/NOIS	PRTOTAL	TIME
20.0	.736	.4032E-01	.2419E-04	.6647E-10	.9464E+00	.3816E-01	-.1199E+01	.2116E+04	.7596E+04	.2786E+00	.9711E+04	.4521E-14
19.0	.740	.4073E-01	.2444E-04	.6714E-10	.9459E+00	.3852E-01	-.1208E+01	.2030E+04	.7596E+04	.2673E+00	.9626E+04	.4260E-01
18.0	.743	.4106E-01	.2464E-04	.6768E-10	.9455E+00	.3882E-01	-.1215E+01	.1939E+04	.7596E+04	.2553E+00	.9535E+04	.8721E-01
17.0	.745	.4132E-01	.2479E-04	.6812E-10	.9452E+00	.3906E-01	-.1220E+01	.1843E+04	.7596E+04	.2427E+00	.9439E+04	.1342E+00
16.0	.747	.4151E-01	.2491E-04	.6844E-10	.9449E+00	.3923E-01	-.1222E+01	.1743E+04	.7596E+04	.2295E+00	.9338E+04	.1838E+00
15.0	.748	.4164E-01	.2498E-04	.6864E-10	.9448E+00	.3934E-01	-.1221E+01	.1639E+04	.7596E+04	.2157E+00	.9234E+04	.2366E+00
14.0	.749	.4169E-01	.2501E-04	.6872E-10	.9447E+00	.3938E-01	-.1219E+01	.1531E+04	.7596E+04	.2016E+00	.9127E+04	.2932E+00
13.0	.748	.4167E-01	.2500E-04	.6870E-10	.9447E+00	.3937E-01	-.1213E+01	.1421E+04	.7596E+04	.1871E+00	.9017E+04	.3541E+00
12.0	.748	.4159E-01	.2495E-04	.6856E-10	.9448E+00	.3929E-01	-.1206E+01	.1309E+04	.7596E+04	.1724E+00	.8905E+04	.4203E+00
11.0	.746	.4144E-01	.2486E-04	.6831E-10	.9450E+00	.3916E-01	-.1195E+01	.1196E+04	.7596E+04	.1575E+00	.8791E+04	.4928E+00
10.0	.744	.4121E-01	.2473E-04	.6794E-10	.9453E+00	.3896E-01	-.1181E+01	.1081E+04	.7596E+04	.1424E+00	.8677E+04	.5730E+00
9.0	.742	.4093E-01	.2456E-04	.6747E-10	.9457E+00	.3870E-01	-.1163E+01	.9665E+03	.7596E+04	.1272E+00	.8562E+04	.6629E+00
8.0	.738	.4057E-01	.2434E-04	.6688E-10	.9461E+00	.3839E-01	-.1142E+01	.8517E+03	.7596E+04	.1121E+00	.8447E+04	.7651E+00
7.0	.735	.4016E-01	.2409E-04	.6620E-10	.9467E+00	.3802E-01	-.1116E+01	.7376E+03	.7596E+04	.9711E-01	.8333E+04	.8833E+00
6.0	.730	.3969E-01	.2381E-04	.6543E-10	.9473E+00	.3759E-01	-.1083E+01	.6248E+03	.7596E+04	.8226E-01	.8220E+04	.1024E+01
5.0	.726	.3917E-01	.2350E-04	.6457E-10	.9479E+00	.3713E-01	-.1042E+01	.5139E+03	.7596E+04	.6765E-01	.8109E+04	.1195E+01
4.0	.720	.3860E-01	.2316E-04	.6363E-10	.9486E+00	.3662E-01	-.9870E+00	.4051E+03	.7596E+04	.5334E-01	.8001E+04	.1415E+01
3.0	.715	.3799E-01	.2279E-04	.6262E-10	.9494E+00	.3607E-01	-.9050E+00	.2990E+03	.7596E+04	.3937E-01	.7895E+04	.1719E+01
2.0	.709	.3734E-01	.2241E-04	.6156E-10	.9502E+00	.3549E-01	-.7582E+00	.1960E+03	.7596E+04	.2580E-01	.7791E+04	.2205E+01
1.0	.702	.3667E-01	.2200E-04	.6045E-10	.9511E+00	.3488E-01	-.3554E+00	.9622E+02	.7596E+04	.1267E-01	.7692E+04	.3444E+01

TIME = .3444E+01

TABLE XXXVIII

2 plate pairs
Constant gap = 30.8 mm



PICKUP – PAIR GEOMETRY

FIG. 1

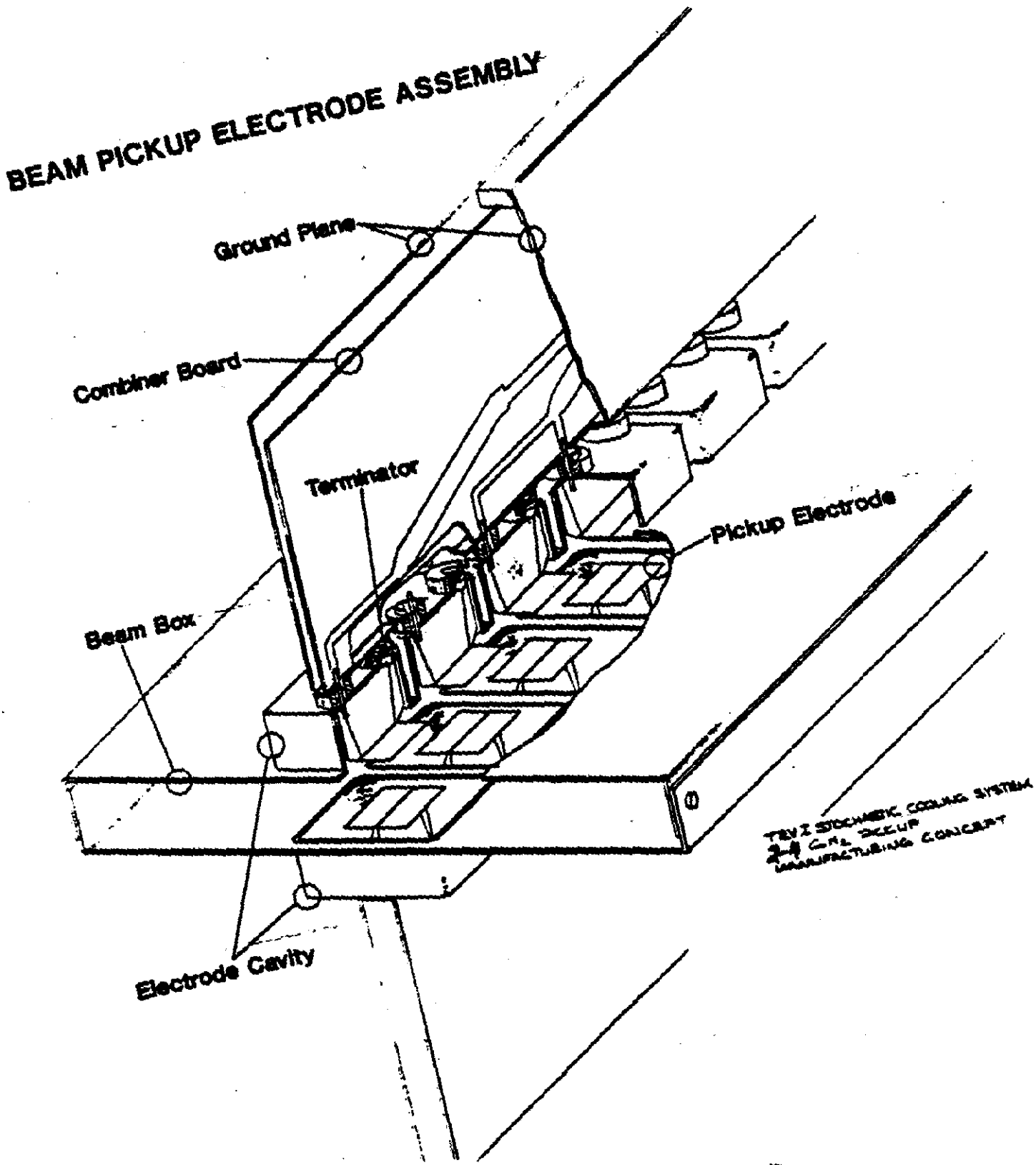
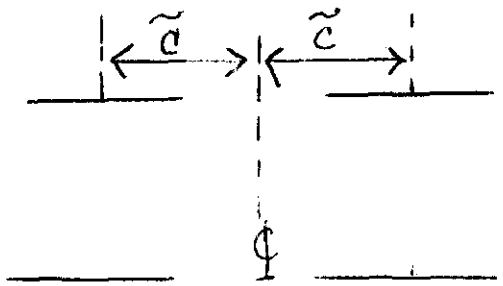
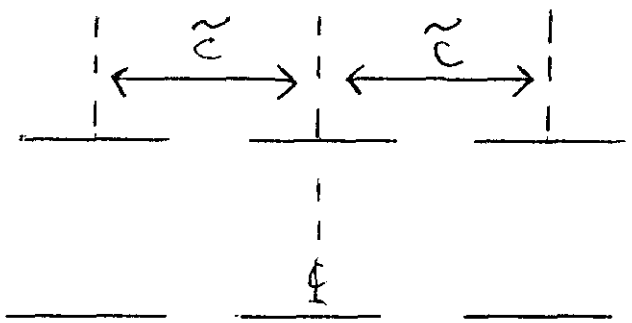

BEAM PICKUP ELECTRODE ASSEMBLY
Ground Plane
Combiner Board
Terminator
Pickup Electrode
Beam Box
Electrode Cavity

FIG. 2



2 Plate Pair Geometry



3 Plate Pair Geometry

(Beam direction is perpendicular to page.)

FIG. 3

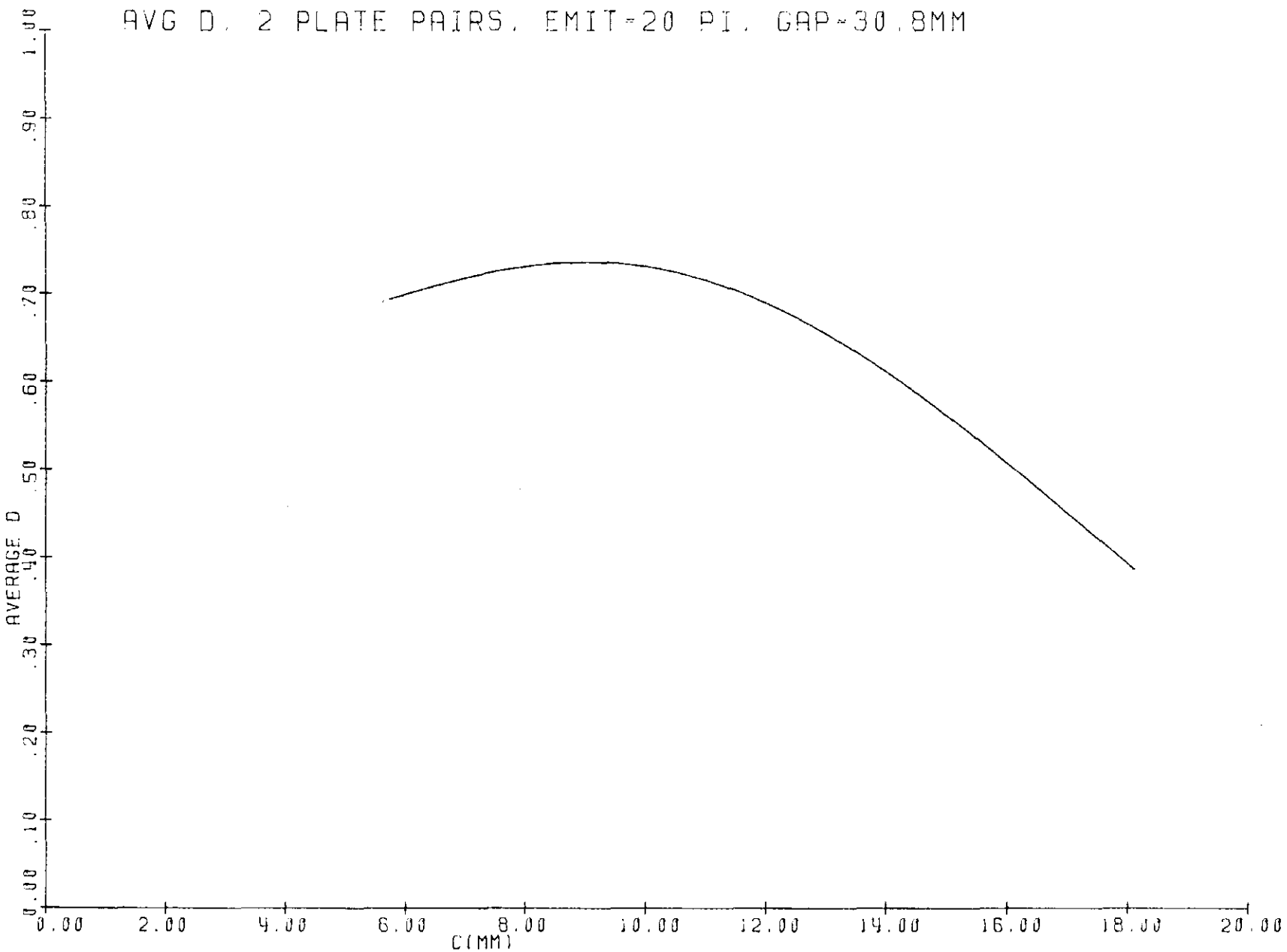

AVG D. 2 PLATE PAIRS. EMIT=20 PI. GAP=30.8MM
AVERAGE D
0.00
.10
.20
.30
.40
.50
.60
.70
.80
.90
1.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
C(MM)

FIG. 4

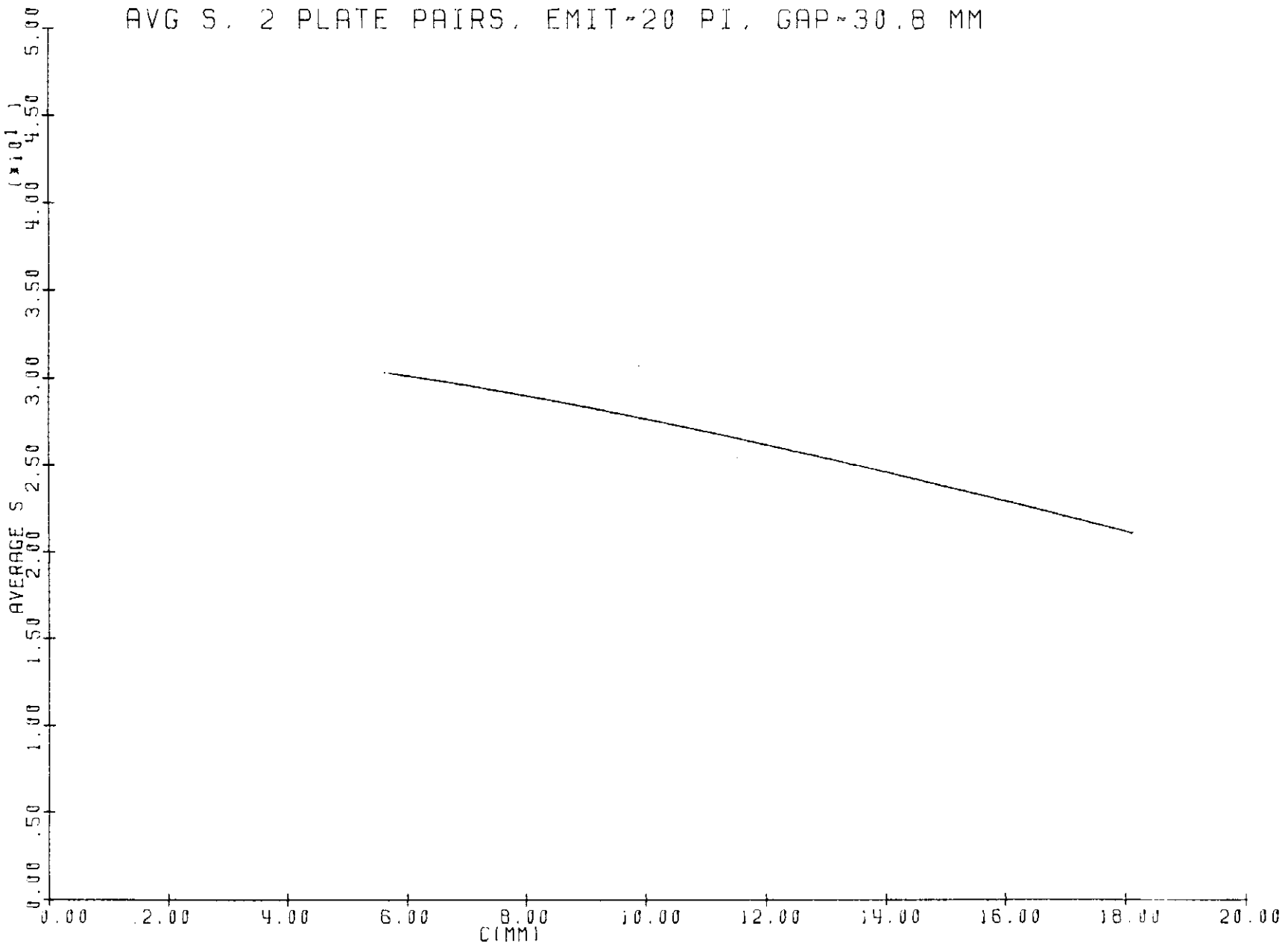

AVG S. 2 PLATE PAIRS, EMIT=20 PI, GAP=30.8 MM
AVERAGE S (*10^1)
0.00
.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
C(MM)

FIG. 5

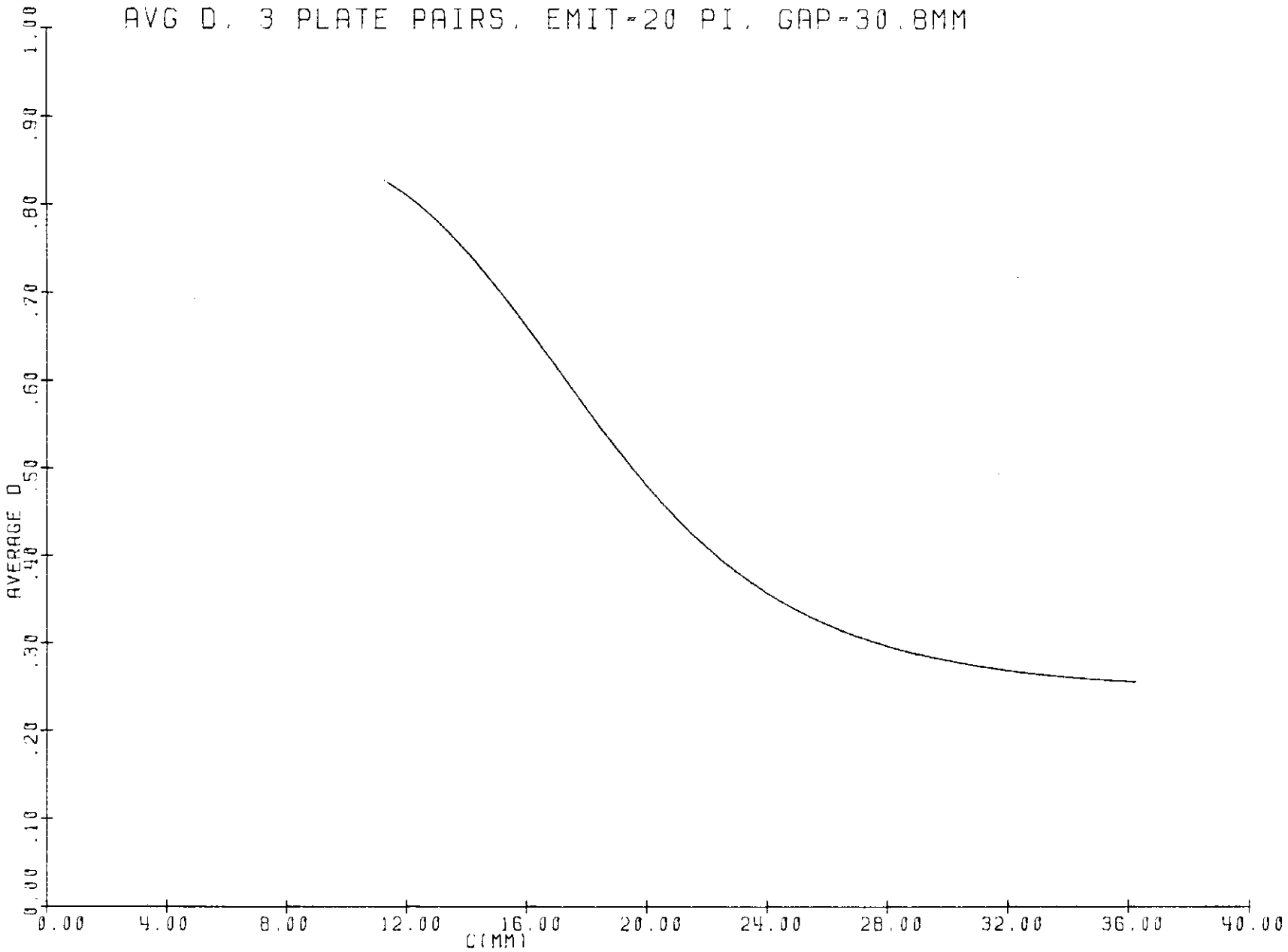

AVG D, 3 PLATE PAIRS, EMIT=20 PI, GAP=30.8MM
AVERAGE D
0.00
.10
.20
.30
.40
.50
.60
.70
.80
.90
1.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
36.00
40.00
C(MM)

FIG. 6

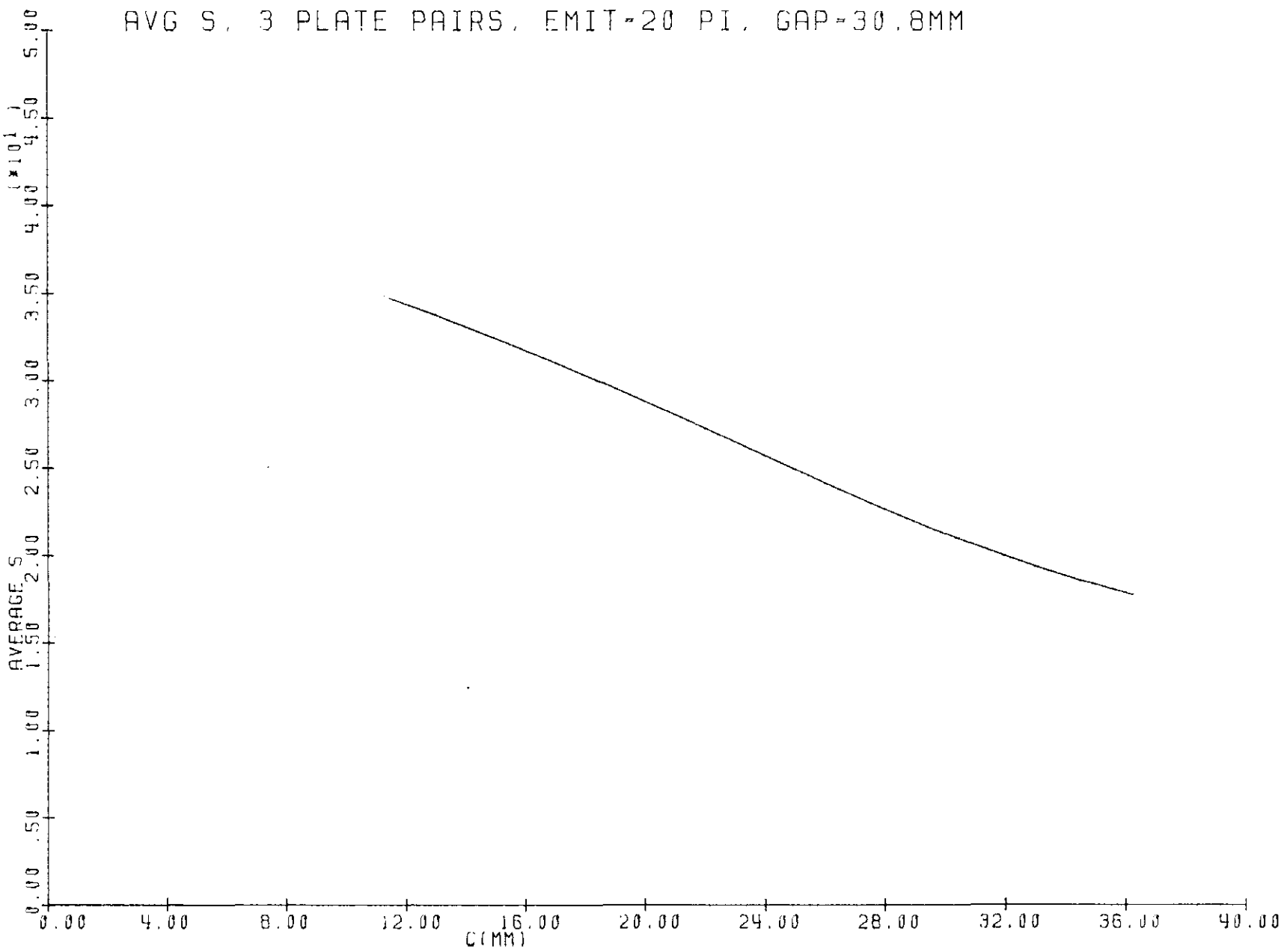

AVG S, 3 PLATE PAIRS, EMIT=20 PI, GAP=30.8MM
AVERAGE S (*10^1)
0.00
.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
36.00
40.00
C(MM)

FIG. 7