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RF Cavities and Amplifiers

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Collider Accelerator Department
Brookhaven National Laboratory

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

DISCLAIMER

AD/RHIC-RD-6

RF Cavities and Amplifiers

(Mini-Workshop on RHIC RF Systems)

July 11-15, 1988
Collider Center

J. G. Cottingham
BNL

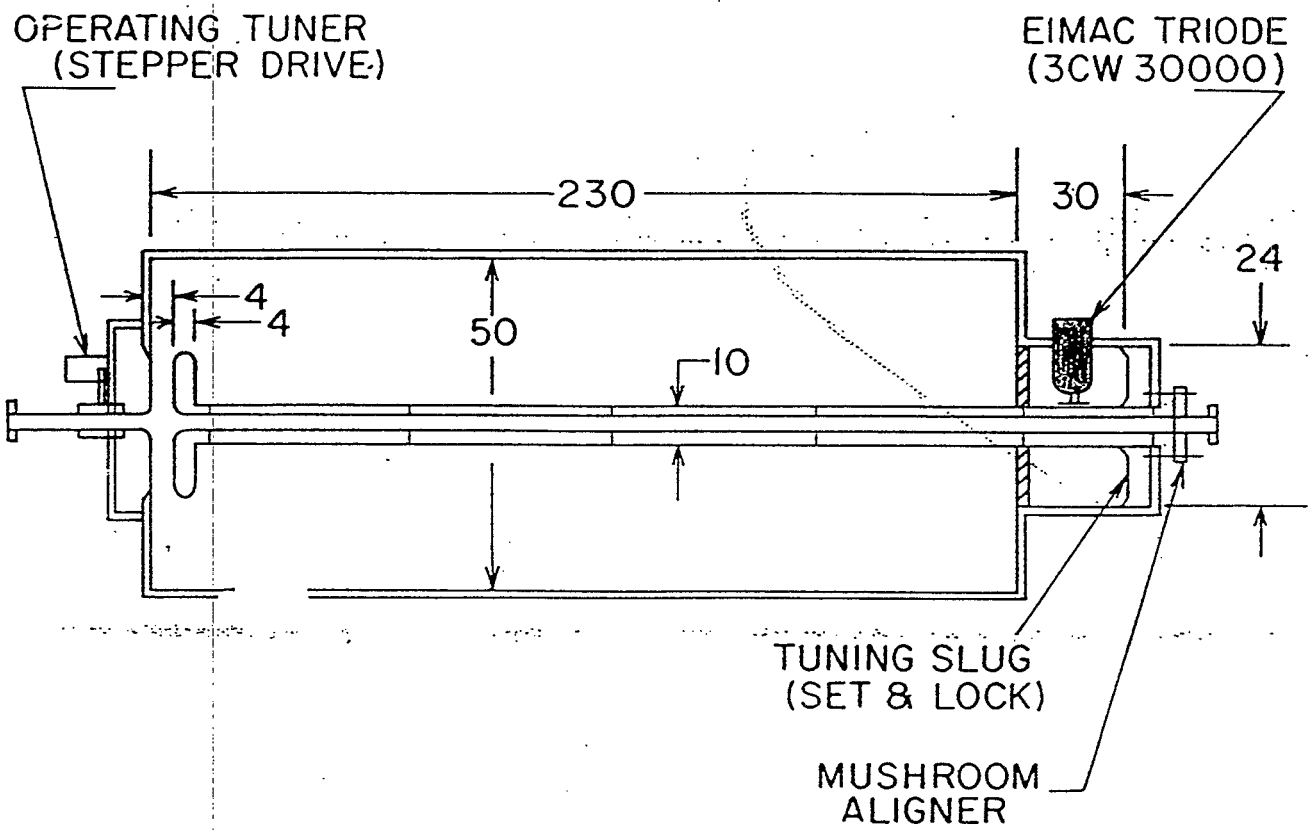
RHIC ACCELERATING SYSTEMS

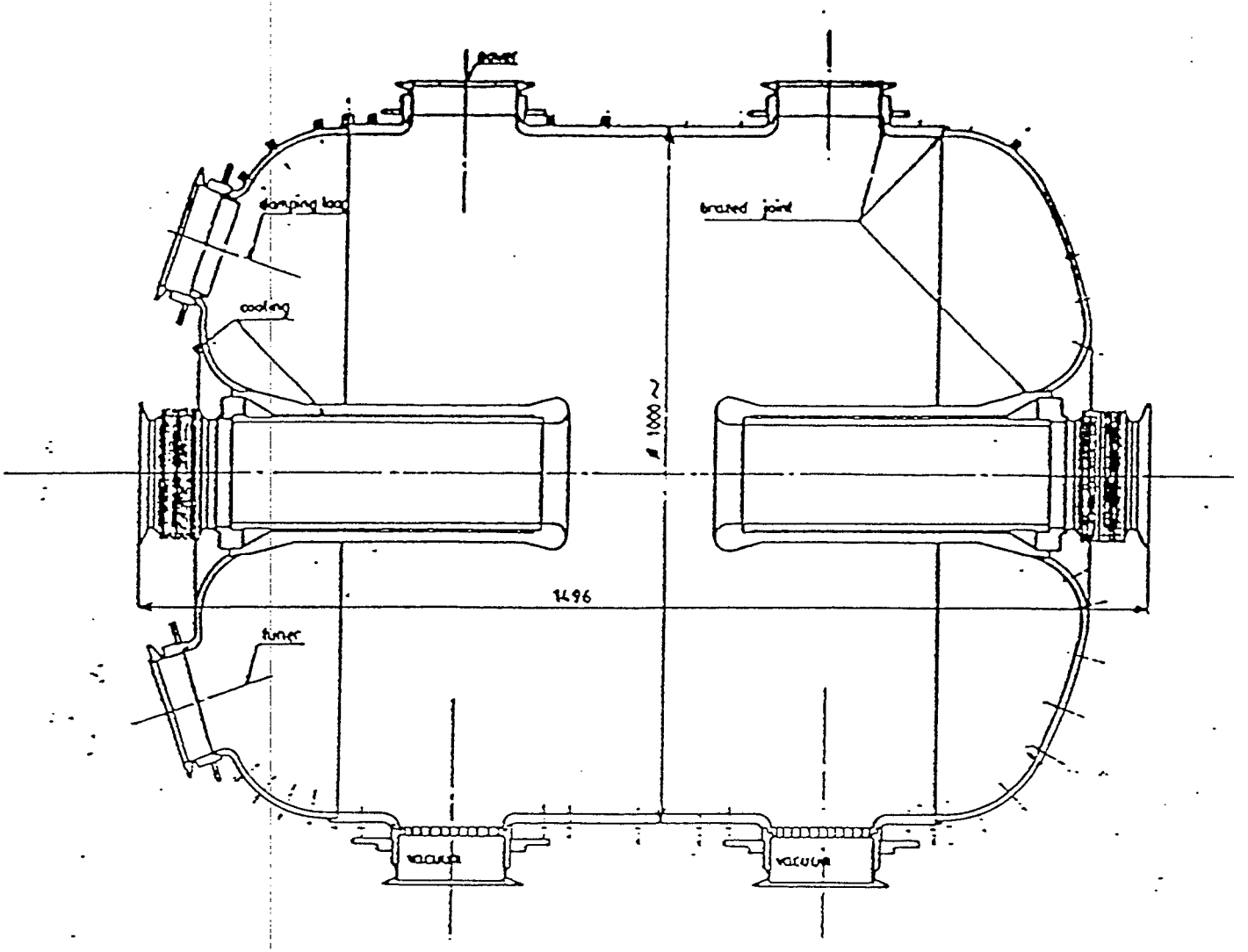
Frequency	26.74	160.4 MHz
Harmonic No.	342	2052
Accelerator Voltage/Ring	0.3-0.4	11.0 MV
Frequency Change	-1%	-0.12%
Number of Cavities/ring	2	11
Voltage/cavity	0.15-0.2	1.0 MV
Cavity Power	20-25	75-90 KW
Amplifier Power Rating	45	100 KW
"ON" time	C.W.	C.W.
Sin es	.04	0
No. of Bunches	57	57

E. Courant -

RHIC ACCELERATING SYSTEM (continued)

Frequency	26.74	160.4 MHz
Shunt Z/cavity, Tuned	800×10^3	6.7×10^6
Shunt Z, Total Tuned	1.6×10^6	73.3×10^6
Shunt Z/cavity Detuned	$-j\ 8.9 \times 10^3$	$-j\ 47 \times 10^3$ ohms
Shunt Z, Total Detuned	$-j\ 17.8 \times 10^3$	$-j\ 520 \times 10^3$ ohm
Cavity Q, Unloaded	9000	45000
Cavity Q, Loaded	4500	22500


OPERATING TUNER
(STEPPER DRIVE)
EIMAC TRIODE
(3CW 30000)
230
30
24
4
4
50
10
TUNING SLUG
(SET & LOCK)
MUSHROOM
ALIGNER

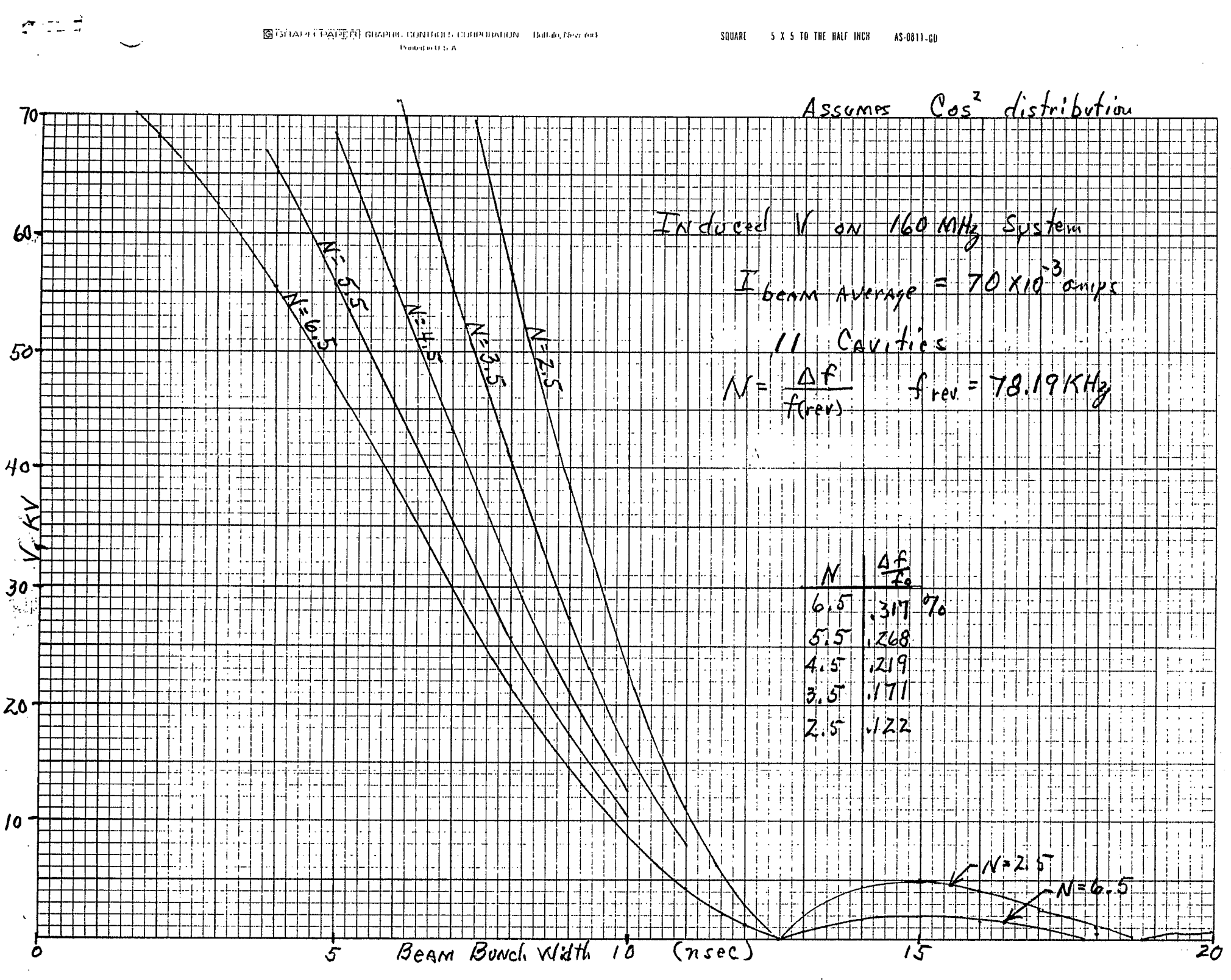


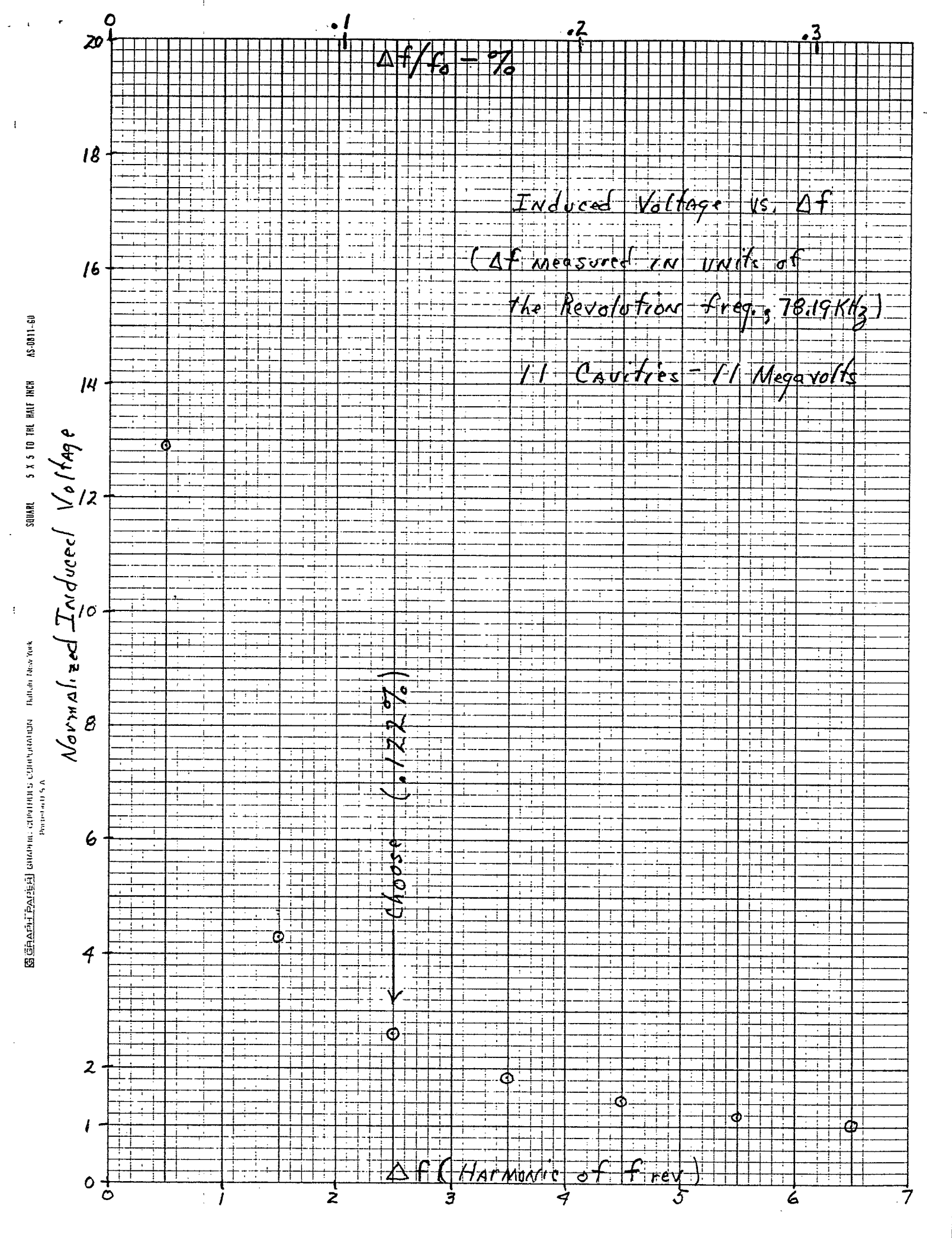
Cross-section of a 100 MHz cavity (SPS)

0 100 200 mm

Design study of a 100 MHz single-cell cavity for application in the SPS p/pbar collider

G. Rogner




Induced Voltage vs. Δf
(Δf measured in units of the Revolution freq.; 78.19 KHz)
11 Cavities - 11 Megavolts
Δf/f₀ - %
Normalized Induced Voltage
Δf (Harmonic of f rev)
Choose (.122%)
0
.1
.2
.3
20
18
16
14
12
10
8
6
4
2
1
0
1
2
3
4
5
6
7