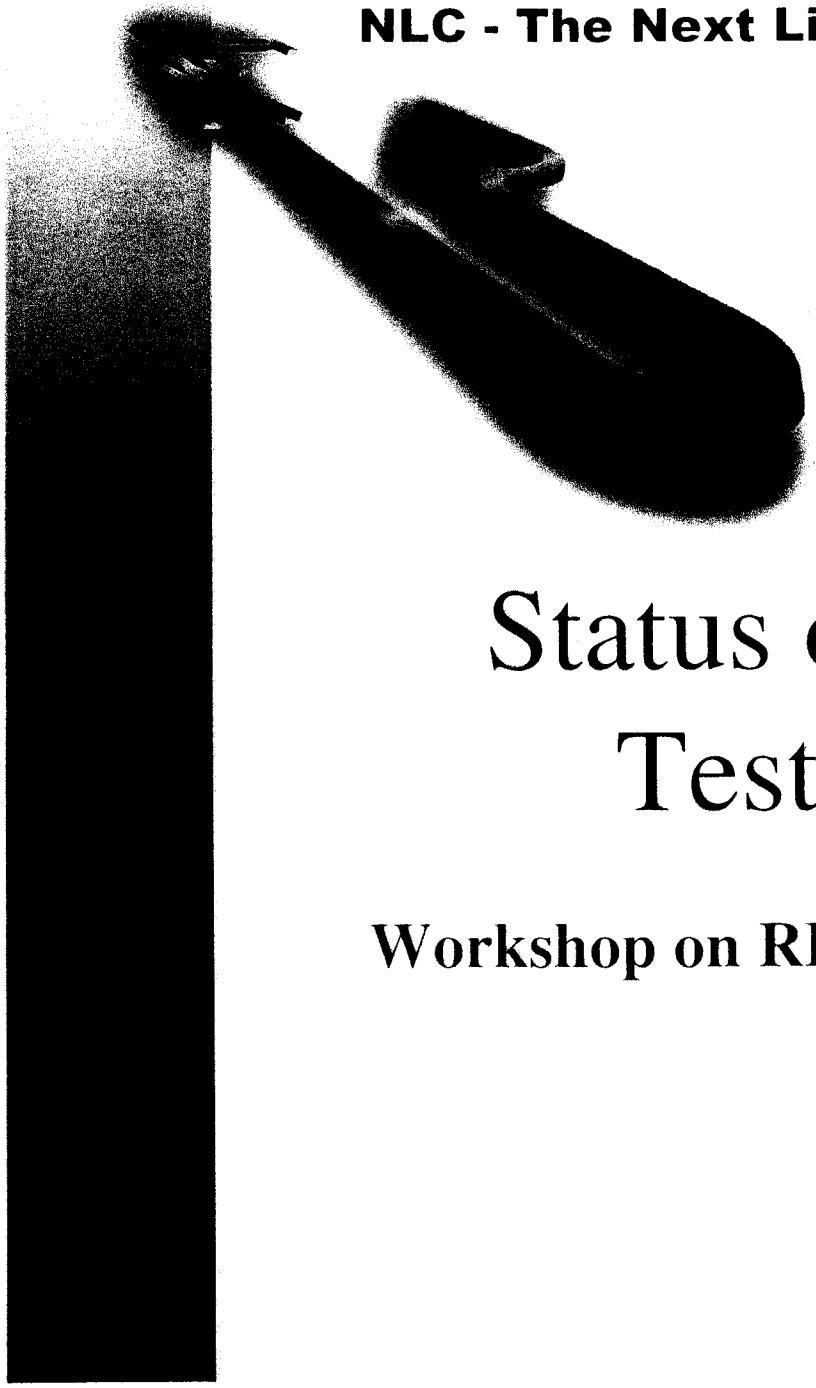


NLC - The Next Linear Collider Project

Status of High Gradient Testing Structures

Workshop on RF Breakdown in Copper Structures

Juwen Wang

August 2000

J. W. 6/15/00

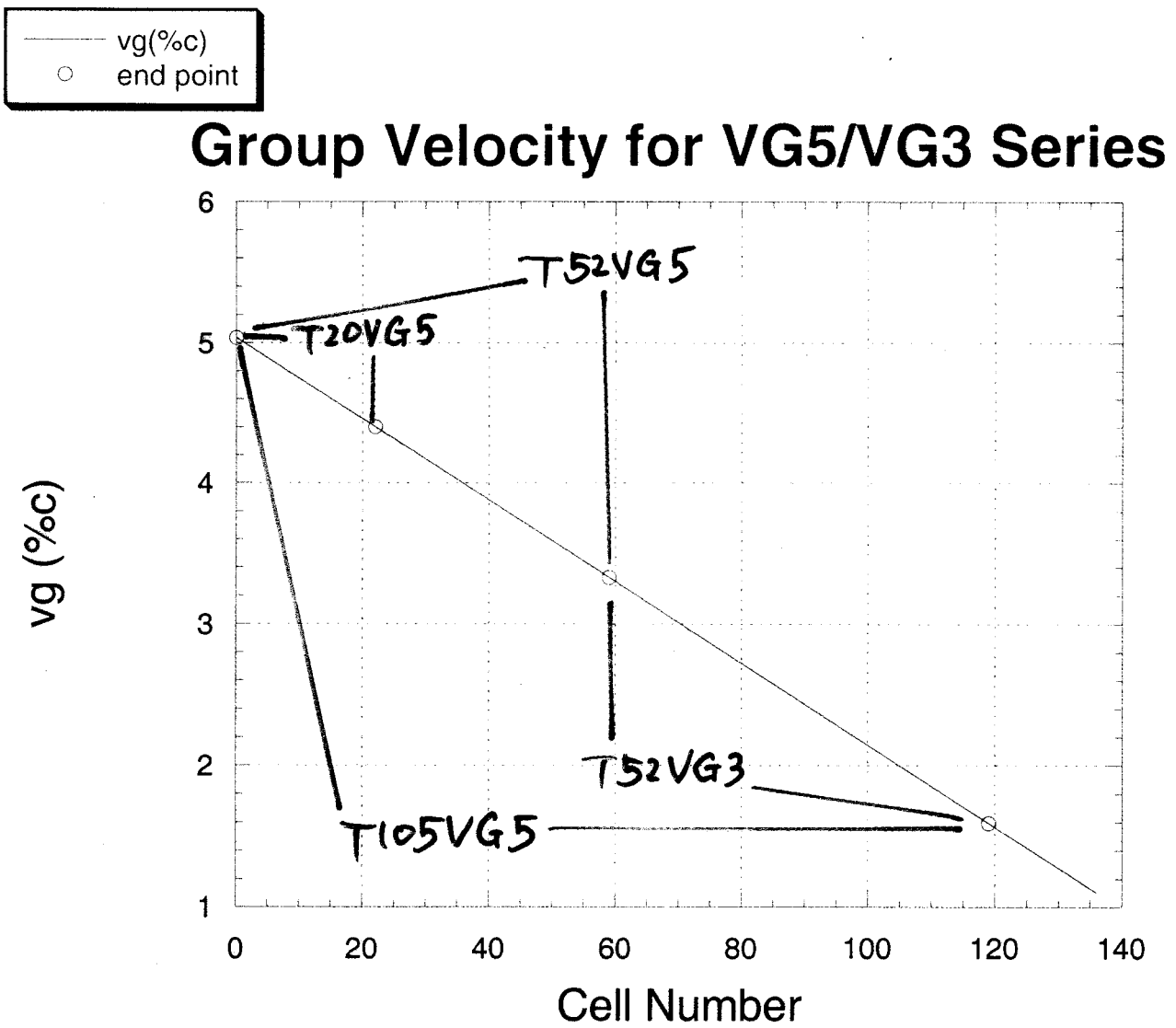
Structures to Be Made

1. Modify DS2 to be 52 cavity (45.5 cm) structure with starting v_g=5% c.

2. A series of new structures with the following basic features:

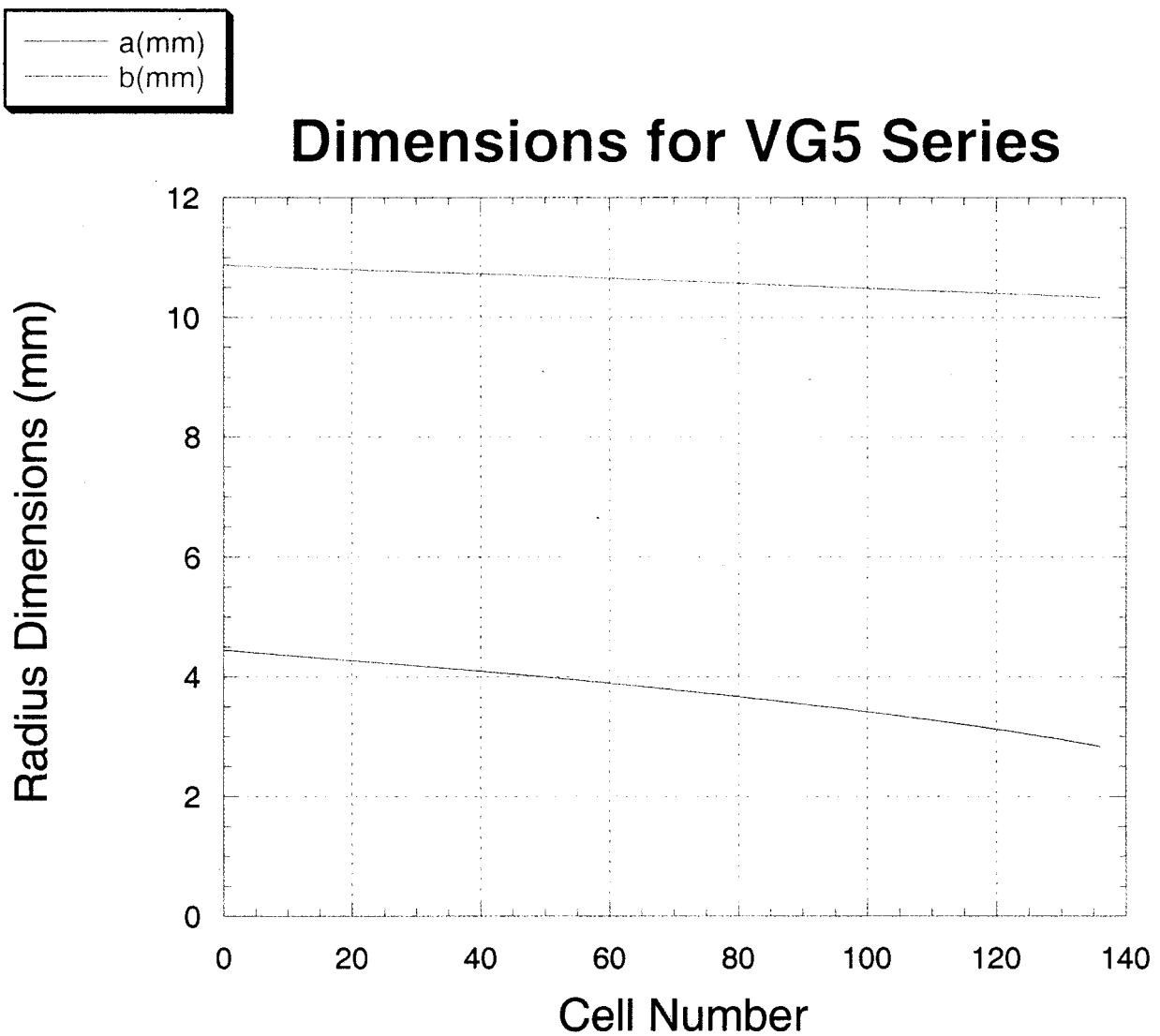
- 2π/3 TW Structures
- Disc-Loaded Waveguide
- Constant Surface Field
- No Vacuum Manifolds
- Uniform Disk Thickness
- Share common coupler designs

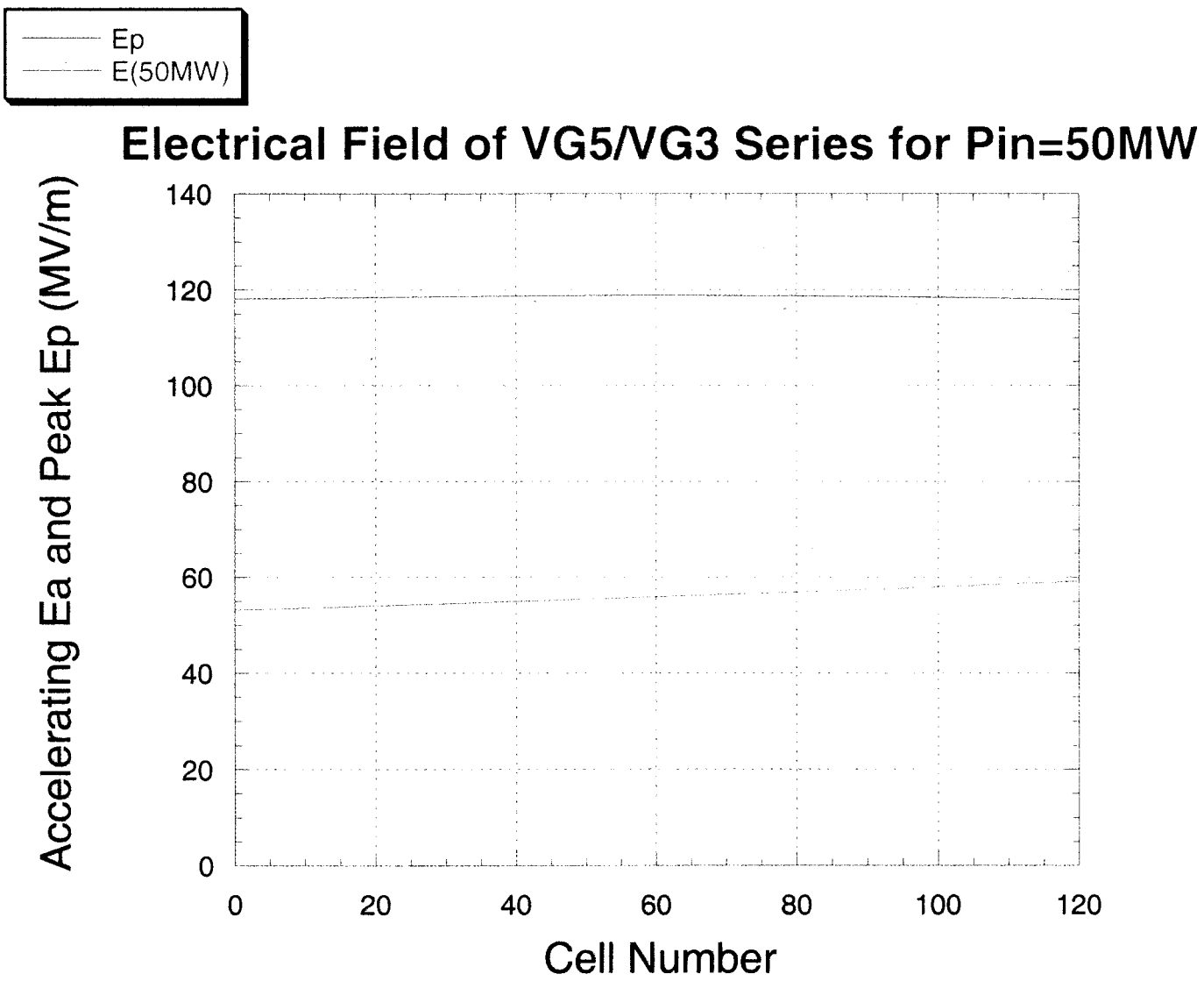
Name	Length (cm)	Starting v_g (% c)
T20VG12	20	12
T20VG5	20	5
T52VG5	52	5
T105VG5	105	5
T52VG3	52	3

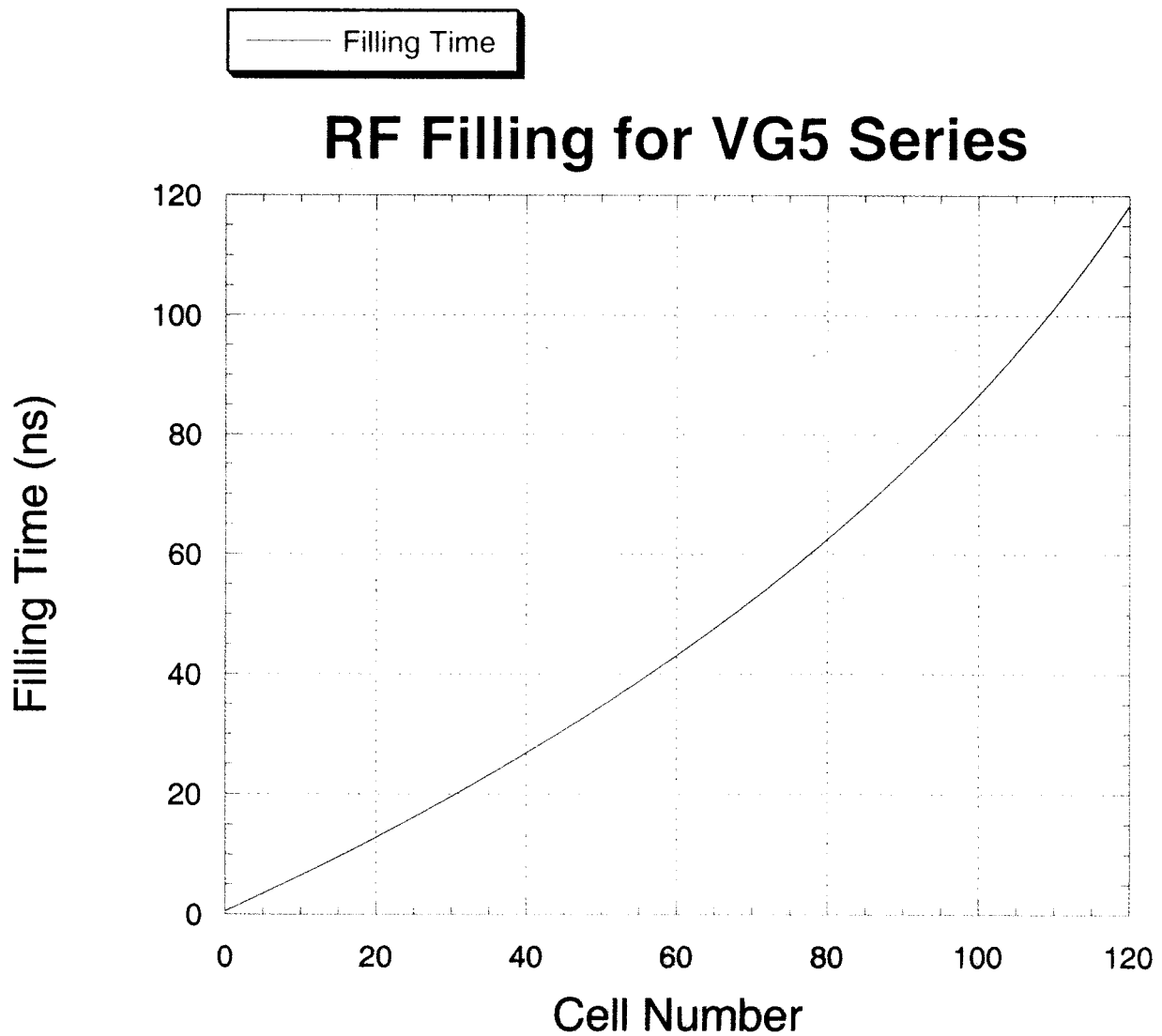

vg(%c)
end point
Group Velocity for VG5/VG3 Series
vg (%c)
Cell Number
T52VG5
T20VG5
T52VG3
T105VG5
6
5
4
3
2
1
0
20
40
60
80
100
120
140

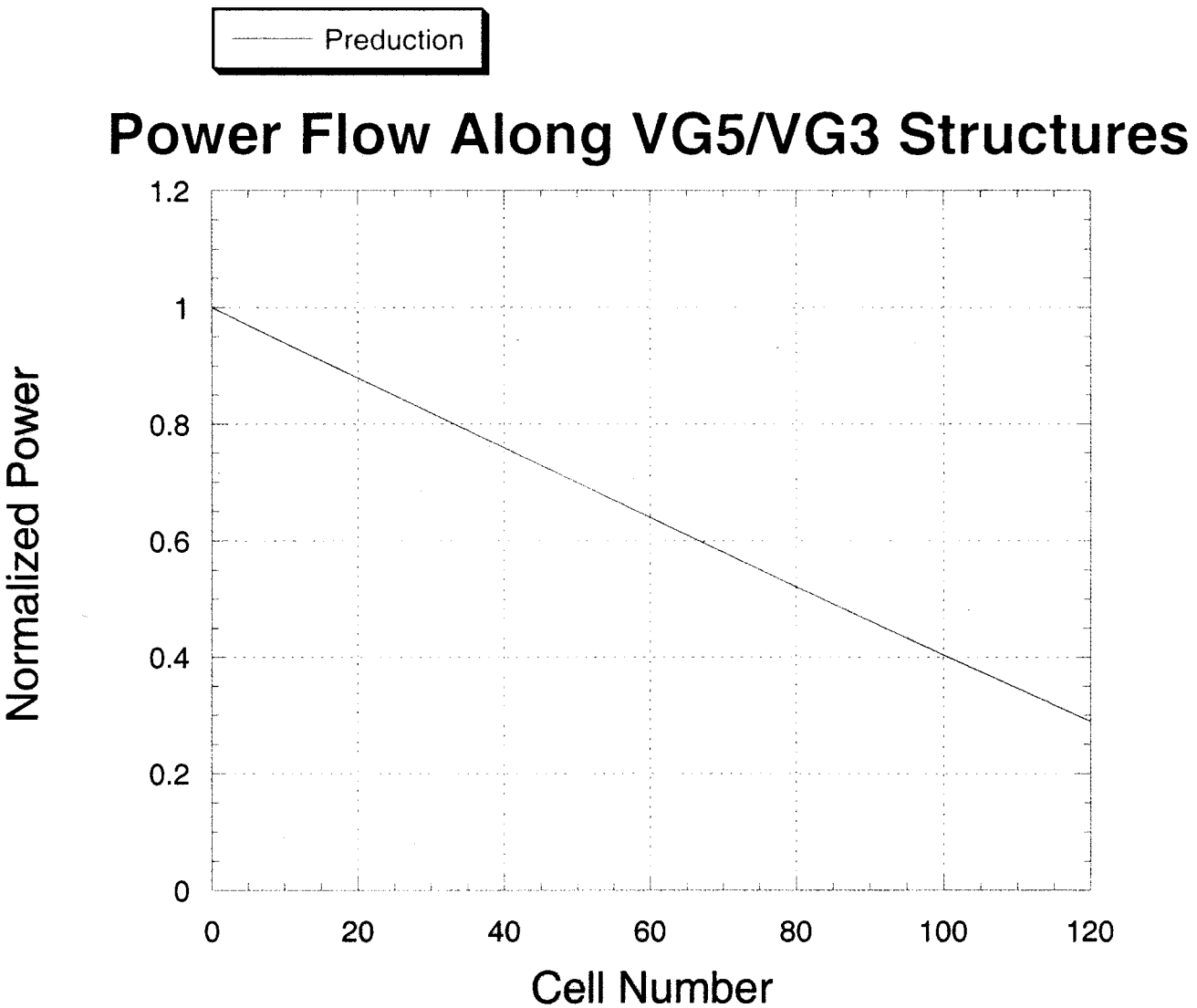
Structures Specifications

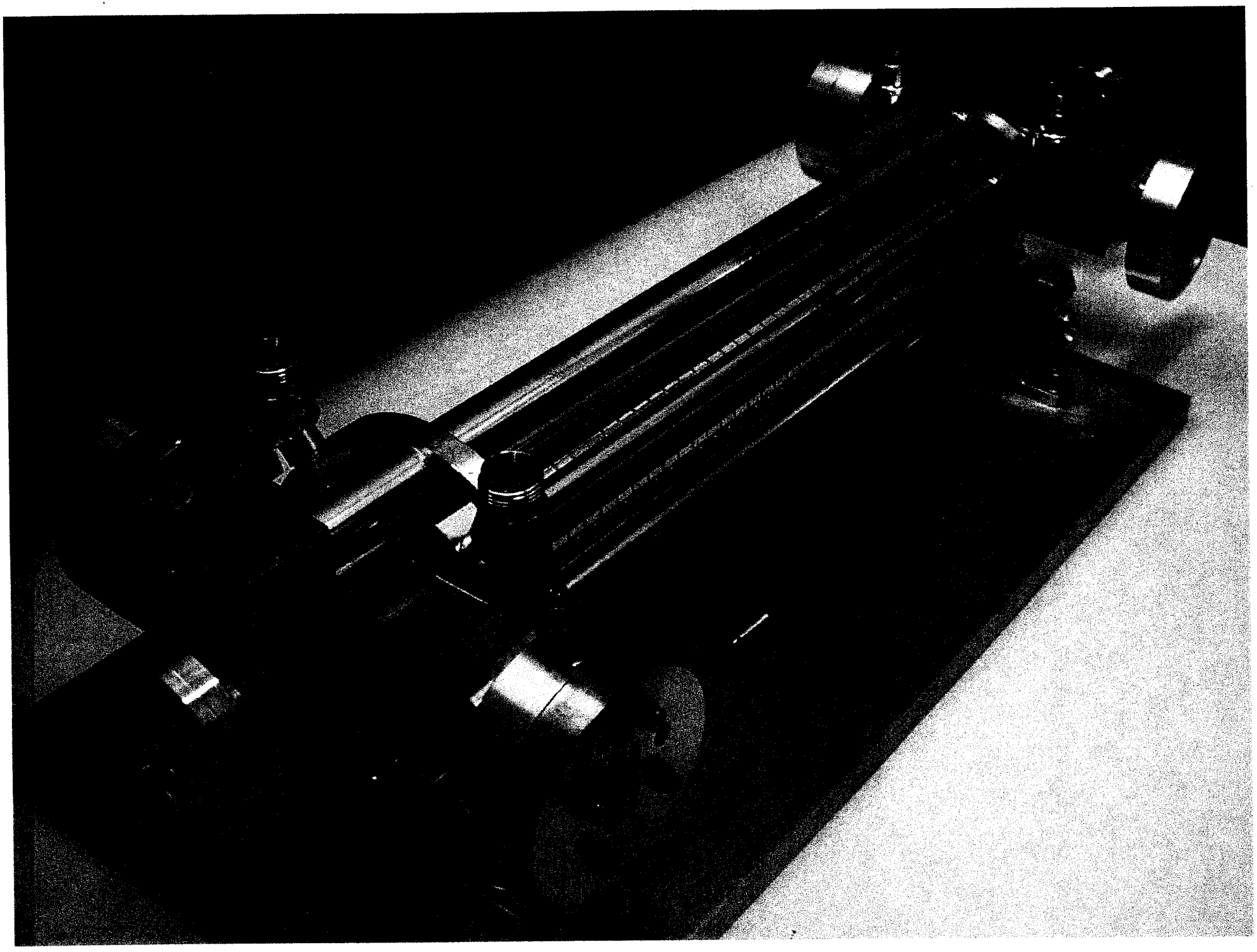
Name	L (cm)	Total Cells	v_g % c	2a mm	r MΩ/m	τ	Q_{ave}	T_f ns	E_p/E_a	P_{in} for E_a 50MV/m
T20VG12	20	23	12–11.3	11.44	67.5	.028	7300	5.7	3.0	132.6
T20VG5	20	23	5–4.33	8.9–8.47	82-86	0.072	6857	13.7	2.22–2.18	46.8
T52VG5	52	60	5–2.84	8.9–7.44	82-95	0.27	6837	52.7	2.22–2.09	41.4
T105VG5	105	120	5–1.36	8.9–6.0	82-110	0.62	6817	118.4	2.22–1.97	37.9
T52VG3	52	60	3–0.81	7.57–5.22	94-118	0.63	6782	122.1	2.14-1.90	20.5


a(mm)
b(mm)
Dimensions for VG5 Series
Radius Dimensions (mm)
12
10
8
6
4
2
0
0
20
40
60
80
100
120
140
Cell Number


Ep
E(50MW)
Electrical Field of VG5/VG3 Series for Pin=50MW
Accelerating Ea and Peak Ep (MV/m)
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
Cell Number


Filling Time
RF Filling for VG5 Series
Filling Time (ns)
120
100
80
60
40
20
0
0
20
40
60
80
100
120
Cell Number


Preduction
Power Flow Along VG5/VG3 Structures
Normalized Power
1.2
1
0.8
0.6
0.4
0.2
0
0
20
40
60
80
100
120
Cell Number



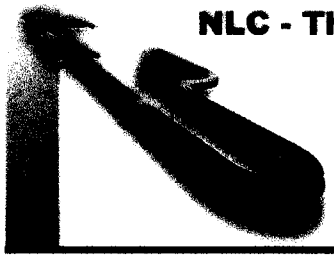
Fabrication Table
for HG Testing Structures

Nested Cups by KEK	Nested Cups by Robertson	Flat Cups by KEK
(T53VG5N)		T53VG5F
(T53VG3N)		
(T20VG12N)		T20VG12F
1. For round shaped parts, KEK makes final drawings. 2. For coupler parts, SLAC makes PF-290-290 series final drawings 3. Support, cooling system drawings by SLAC	1. For all parts SLAC makes PF-290-290 series final drawings. 2. Support, cooling system drawings by SLAC	1. For all RF disks and couplers, SLAC modifies DDS3 (PF-290-286 series) drawings, then KEK makes final drawings. 2. Waveguide assembly drawings by SLAC 3. Support, cooling system drawings by SLAC.

( ) Structures will not be made.
* Structures with higher priority

Fermi Lab
LLNL

doc/memo/highpower/fabricatiobtable



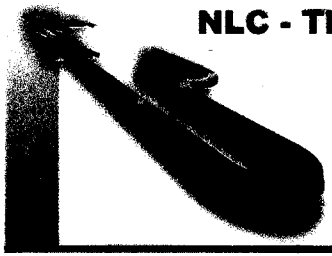
NLC - The Next Linear Collider Project

Testing Program

NLCTA Two RF Stations

500 Hours/Month (70%)

September - October	Modified DS2
	DDS3
November - December	T20VG5
	T105VG5



Conclusion

We Need to Build Cleaner Structures

- More Studies
- Handling and Storage
- N2 Purge
- Environment Improvement (Funding)