Fermilab

AP-Note-90-002

ACCELERATOR PHYSICS DEPARTMENT

TITLE: Modeling of Separators

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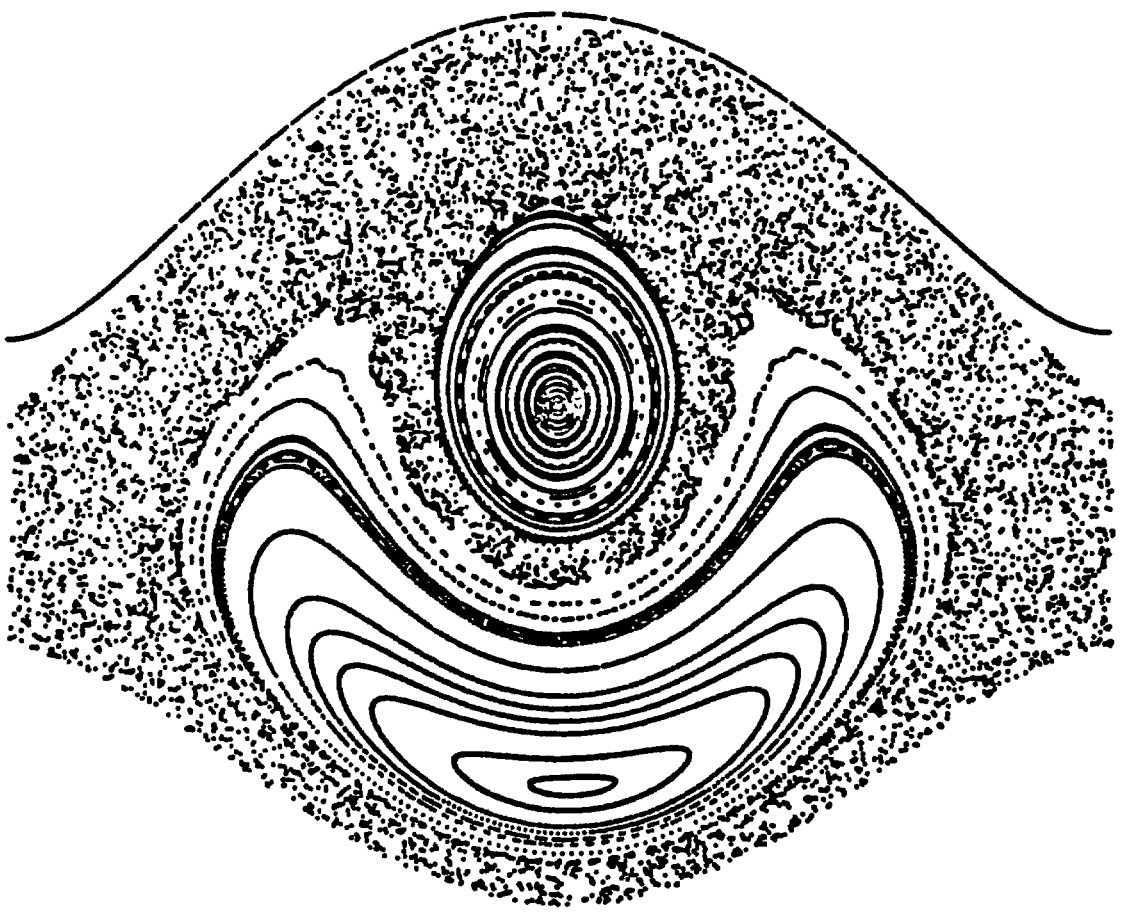
January 23-25, 1990



AP-90-2

Modeling of Separators

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at the Los Alamos Conference on Accelerator Codes

January 23-25 1990

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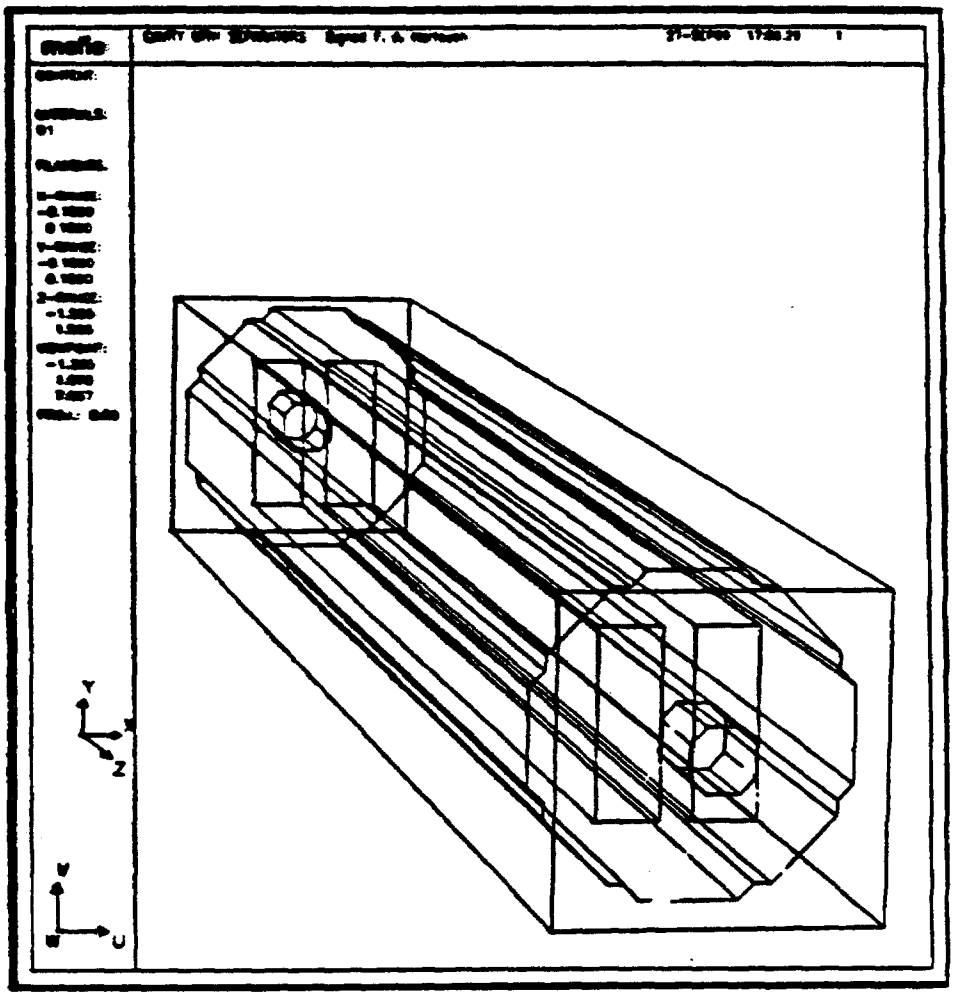
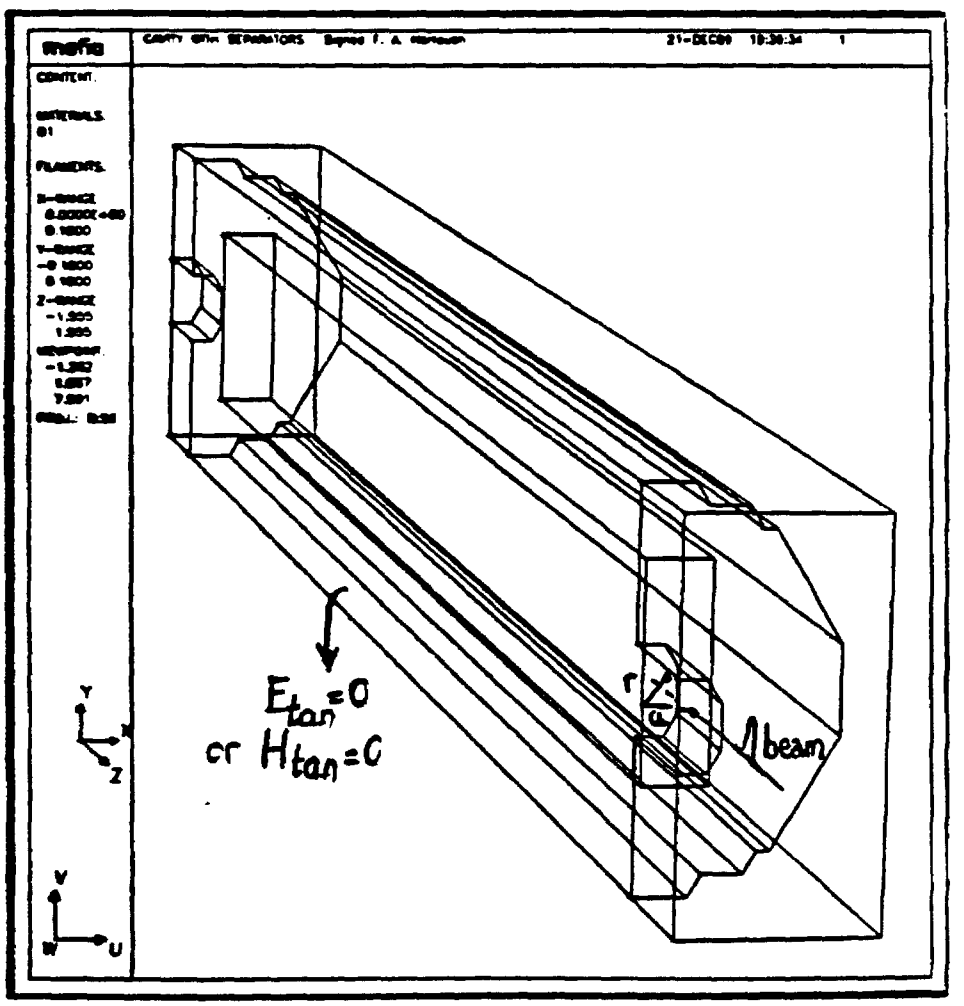
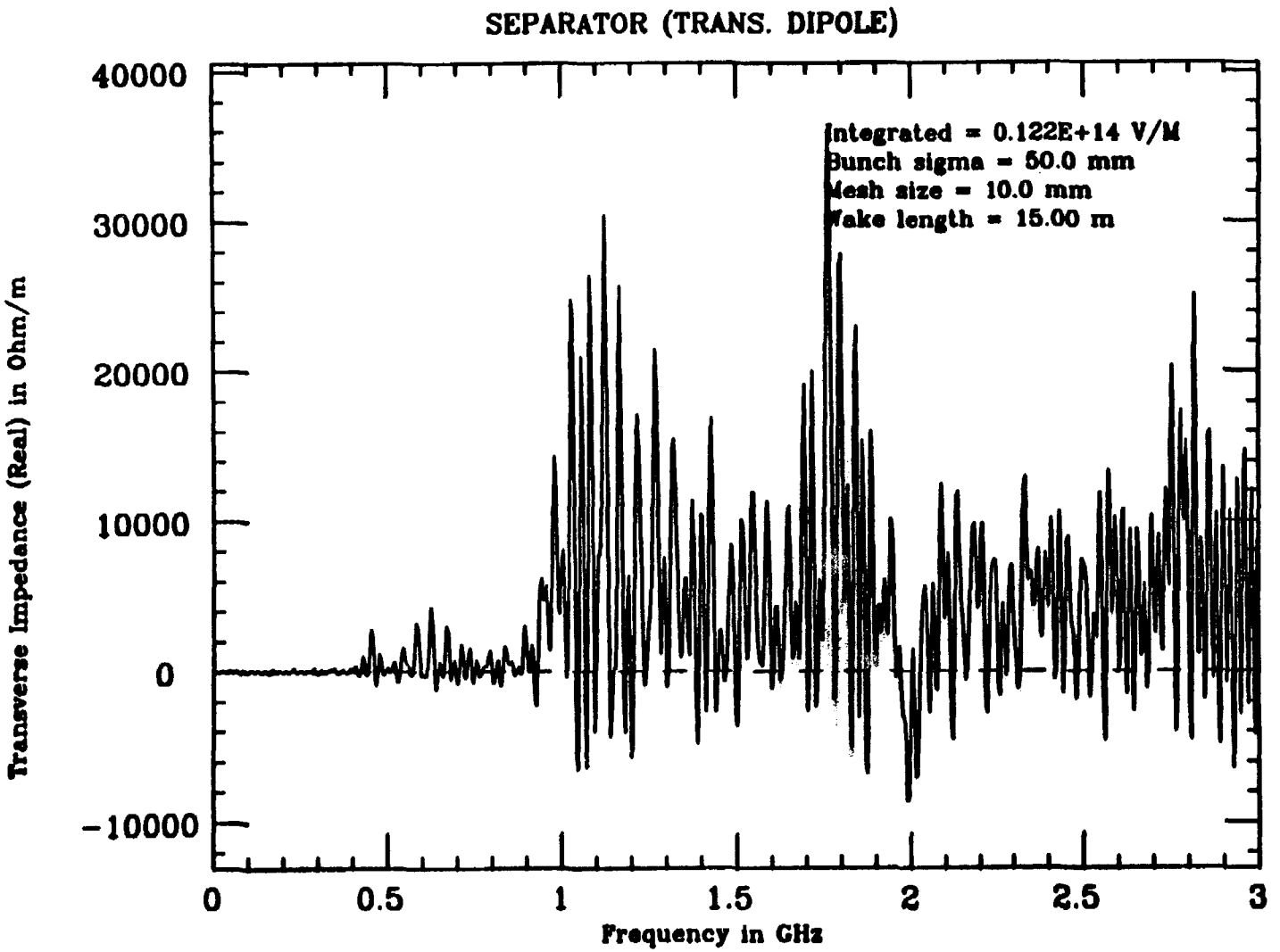

mafia
Y
Z
V
W
U


mafia
$E_{tan}=0$
or $H_{tan}=0$
r
Ω_{beam}
Y
Z
V
W
U

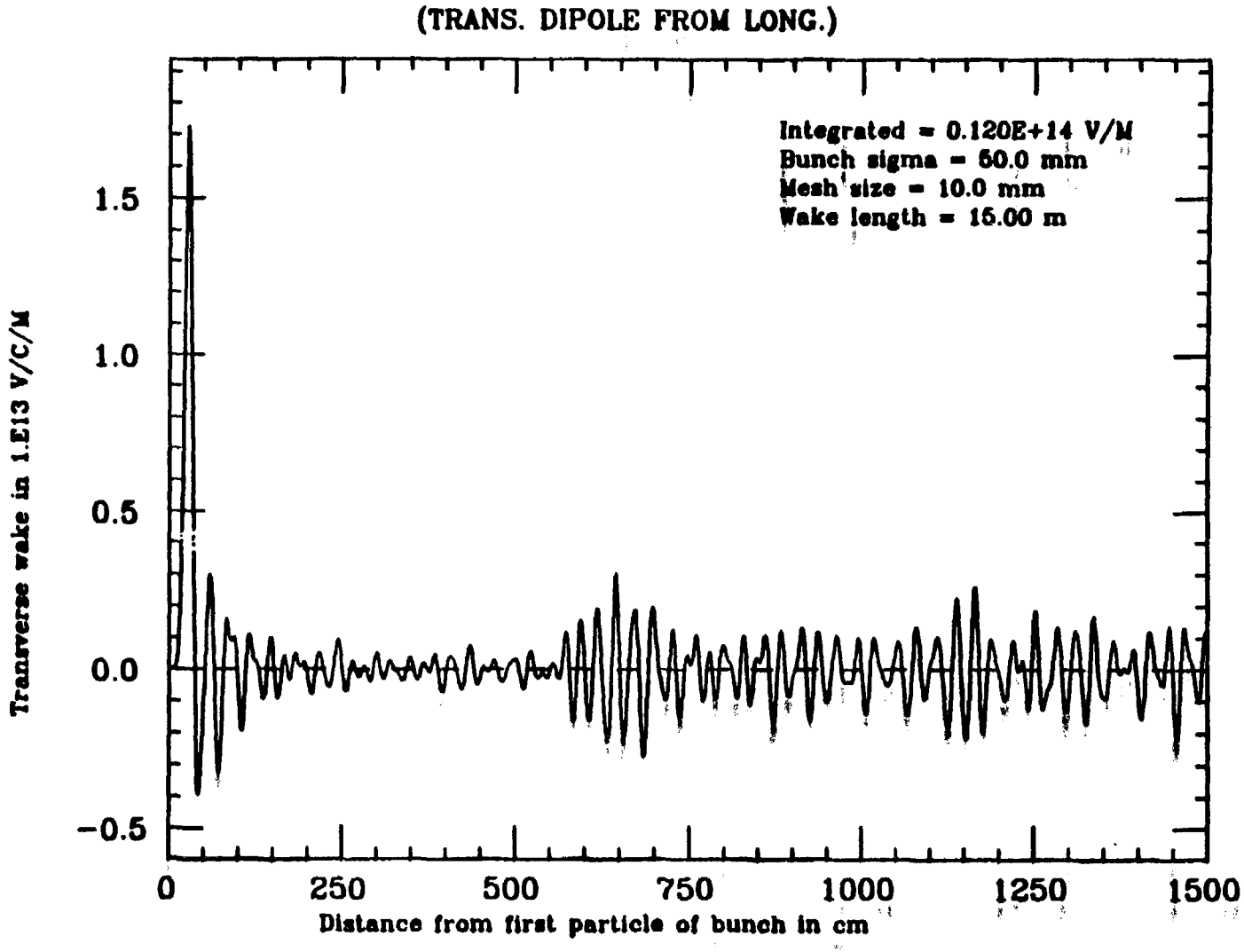
Merits of Using Half Geometry

- Less modes calculated and therefore less error in calculating a monopole, dipole or quadrapole

- More mesh points and therefore better resolution

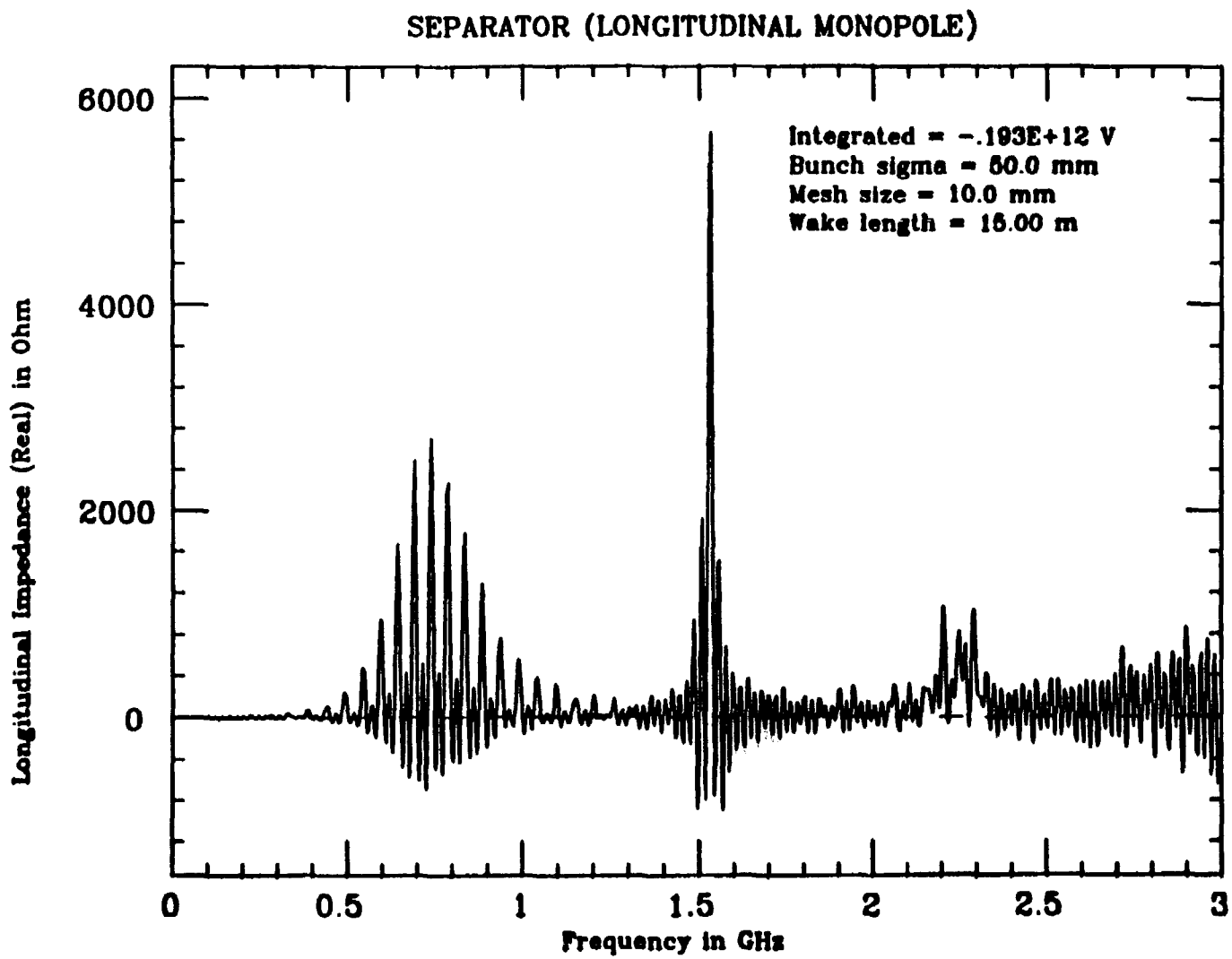

SEPARATOR (TRANS. DIPOLE)
Integrated = 0.122E+14 V/M
Bunch sigma = 50.0 mm
Mesh size = 10.0 mm
Wake length = 15.00 m
Transverse Impedance (Real) in Ohm/m
40000
30000
20000
10000
0
-10000
0
0.5
1
1.5
2
2.5
3
Frequency in GHz

• full cell



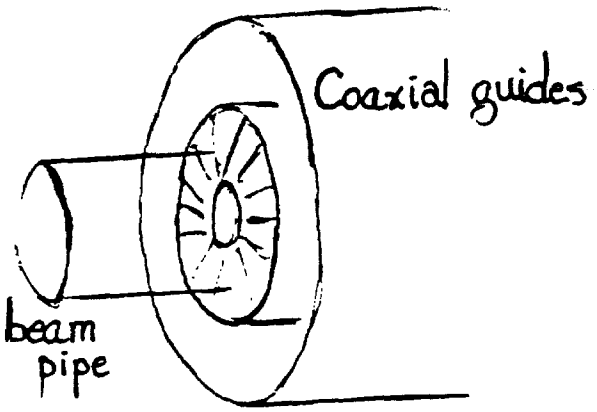
$a = 0$ $\quad F_z(s) = -e I_0 \, W_0'(s)$

$a \neq 0$ $\quad F_z(s) = -e I_0 \, W_0'(s) - e I_1 \, W_1'(s) \, a \cos\theta$


SEPARATOR (LONGITUDINAL MONOPOLE)
Integrated = -.193E+12 V
Bunch sigma = 50.0 mm
Mesh size = 10.0 mm
Wake length = 15.00 m
Longitudinal Impedance (Real) in Ohm
6000
4000
2000
0
0
0.5
1
1.5
2
2.5
3
Frequency in GHz

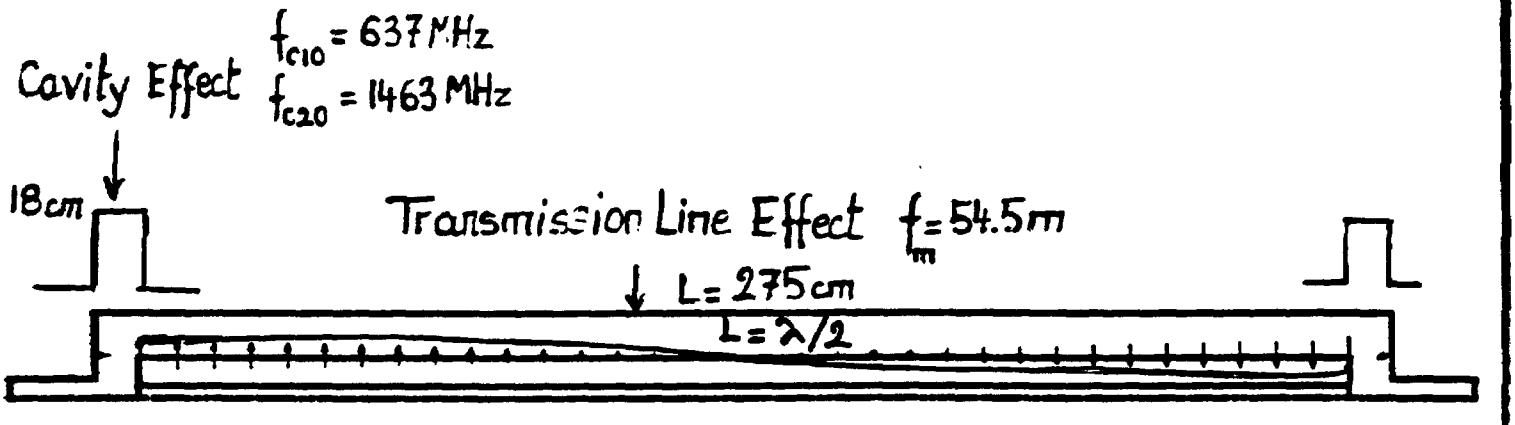
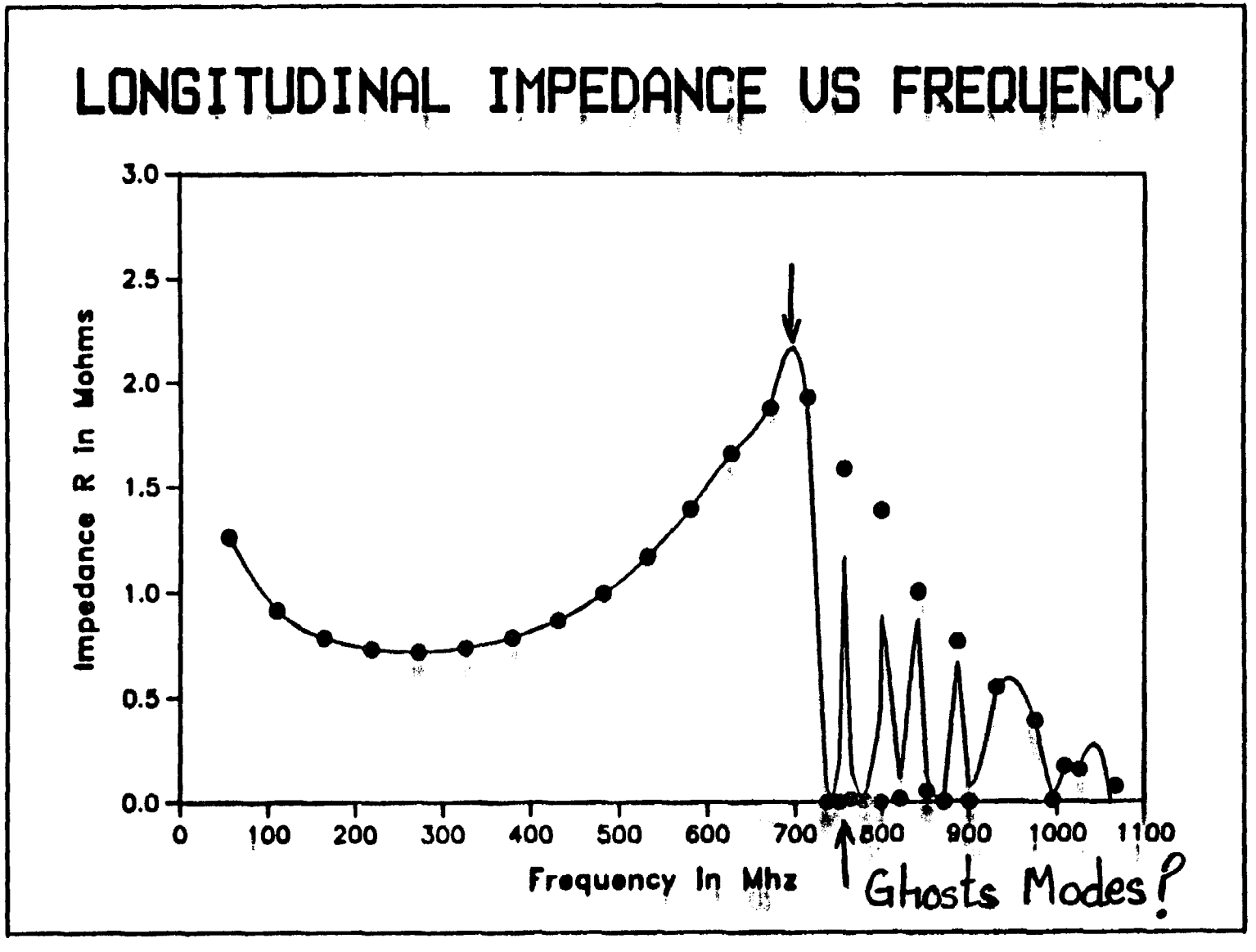
The 2-D Approximate solution

The 3-D problem can be approximated by a 2-D cylindrically symmetric coaxial guides



This geometry can be analyzed using the eigen modes solver URMELT (URMEL).

TEXT: The TEVATRON electrostatic SEPARATORS ; K/V/PC= 0.00001 AT R/M= 0.0000 ; FRAME= 4
PLOT: E-FIELD AT PHI=0 ; ID: NARFOUSH11-SEP8915:25:09 ; MODE:TM0-EE- 1 ; F/MHZ= 54.217 ; F/FC= 0.0



E31 Preliminary Result