Eliminating Excess Surface Fields
in The Input Coupler

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IG
2/34/100

1. Matched Input Couplers typically show a
   Peak in $|E_1(0,0,3)|$ in the Coupler.

2. Input Couplers appear to be susceptible to
   Arcing and to exhibit surface erosion.

$|E(0,0,3)|$ is not a surface field.

We need to look at $E(0, n_x, 3)$ and

$|E(-n_x, 0, 3)|$

$R_c$ is radius of beam in is at first cell

The surface field peaks at $x = n_c, y = n_c$. 
TOTAL E-FIELD MAGNITUDE VS Z

FIELD STRENGTH [ARB. UNITS]

Z-POSITION [M]

FREQUENCY/Hz: 1.142400000000E+10
BASE OF EALLMAG

REFERENCE COORDINATE: Z
MESHLINE RT 177

TOTAL E-FIELD MAGNITUDE VS Z

FREQUENCY/GHz: 1.1429 GHz
METAL PHOTONIC BAND GAP 6 CELL CAVITY

EQUATION: [EALLMAG(1)]* | 7.523E-05, 7.523E-05, 7.523E-05|

MAFIA

P--: 4010

#1DGRAPH

NORMAN'S FORMULA

FIXED COORDINATES:
MESHLINE X Y T 146212

RDINATE: EALLMAG
COMPONENT: -
MAFIA

P--:4010
#1DGRAPH

TOTAL E-FIELD MAGNITUDE VS Z

FIELD STRENGTH (arb. units) vs Z-POSITION (m)

DESIGN RESONANCE FREQUENCY: 1.142 GHz

SQUARE ROOT OF THE MAGNITUDE OF THE ELECTRIC FIELD

0.00E+00  2.00E-02  4.00E-02

-4.00E-02 -2.00E-02

Z-POSITION [m]
Modifications investigated.

1. Increase $\Delta c$. This works. It induces a phase deficiency of $10^\circ$.

2. Increase $b$ in adjacent $c$ complex to compensate for phase error. This undid most of what had been gained.

3. All of the above but also eliminate quadrupole effect. This does work but barely.

4. Reduce $b$ in cell adjacent complex. For case tried this introduced an $60^\circ$ phase deficiency, but otherwise worked well.