Analysis of Microstrip Anode

LAPPD Electronics subgroup meeting
07/17/13
presented by Jennifer Hwu
InnoSys, Inc.
Salt Lake City, Utah 84115
hwu@innosystech.com
Model Set Up
Overview of a basic structure of LAPPD.
Convergence of characteristic impedance as function of top height.

- **Boundary Condition Consideration**

![Graph showing the convergence of characteristic impedance as a function of top boundary height.](image-url)
Single microstrip line with fixture.
reflections of back-to-back fixtures.
Impedance (real) comparison with and without fixtures.
Impedance (imaginary) comparison between with and without fixtures.
Signal in time domain
30 Strip Structure Study
Complete 30-strip anode structure and port number arrangement.

port #  8 6 4 2

port #  7 5 3

port 1: signal in
Time arrival at port 2
Input impedance (real) vs frequency.

![Graph showing impedance vs frequency](image-url)
Input impedance (imaginary) vs frequency.
Transmission S21 of the center strip line.
Cross talk on far end port 4, 6 and 8

InnoSys Inc. Cross talk from port 1 to far end ports

HFSSDesign1

InnoSys Proprietary and Confidential
Cross talk on near end port 3, 5 and 7
40 Strip Structure Study
Transmission from near to far end for both 30 and 40 strip structure

- Issues with fanout card identified.
Possible Improvement
Step pulse response at far end port 2 for 30 strip structure with and without modification

- Transit time with solid borofloat glass is 1.21ns
- Transit time with honeycomb structure is only 0.79ns.
Transmission from near to far end for 30 strip structure with and without modification
Cross talk on near end port 3, 5 and 7 for 30 strip structure with and without modification
Cross talk on far end port 4, 6 and 8 for 30 strip structure with and without modification
Summary

- Performance improvement achieved!
  - Far end cross talk significantly reduced
  - Near end cross talk still significant

- System level simulation is needed.
  - Matching network for fan out card

- True time domain based analysis results will be summarized and presented later.