

Courses Offered:

EE-540: Microwave Devices and Systems

- Analyzing wave propagation by using proper simplifications in Maxwell's equations.
- Creating scattering parameters for simple circuits.
- Designing matching networks using the Smith chart.
- Analyzing power combiners and directional couplers using microwave parameters.
- Designing planar microwave circuits using Computer-Aided Design (CAD) software.

EE-634: RF Circuit Design

- Designing various microwave filters (lumped, transmission-line) using given specifications.
- Using computational techniques to discretize Laplace's equation.
- Performing calculations of the noise figure and dynamic range for wireless systems.
- Using the Smith chart to identify stability regions of microwave amplifiers.

EE-674: Signal and Power Integrity

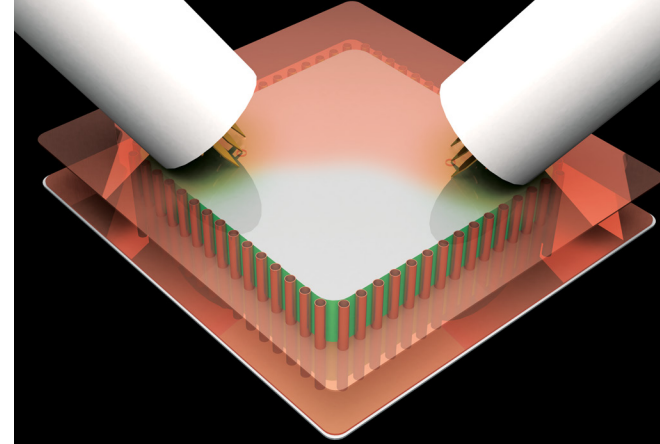
- Understanding trends that make power and signal integrity analysis critical in high-speed digital systems.
- Simulating models as digital links for I/O buffers, transmission lines, and package parasitics.
- Minimizing the effects of various coupling mechanisms which create simultaneous switching noise.
- Stepping through numerical techniques used in power integrity simulations.
- Understanding the generation of macromodels for transmission lines and interconnects to perform time-domain simulations.

Contact Info:

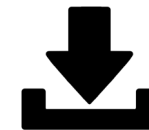
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**High Frequency
Electronics Laboratory**
at San Diego State University



**Research specialized in
signal/power integrity
modeling
and
numerical
electromagnetics.**



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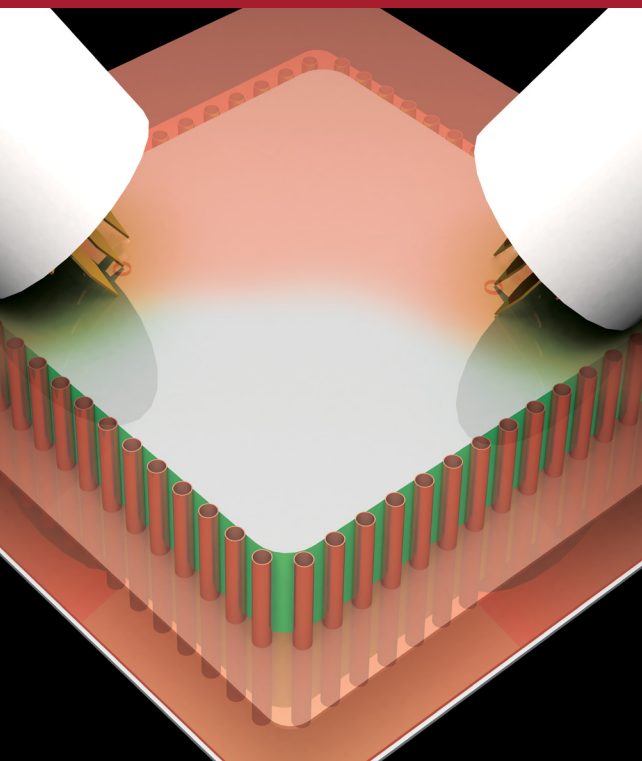


ORA

An algorithm which produces a
rational function approximation
from Touchstone files in MATLAB®

Kappa Extractor

A MATLAB®-based tool to extract
the dielectric constant, loss tangent,
and dielectric thickness from high-
frequency measurements.

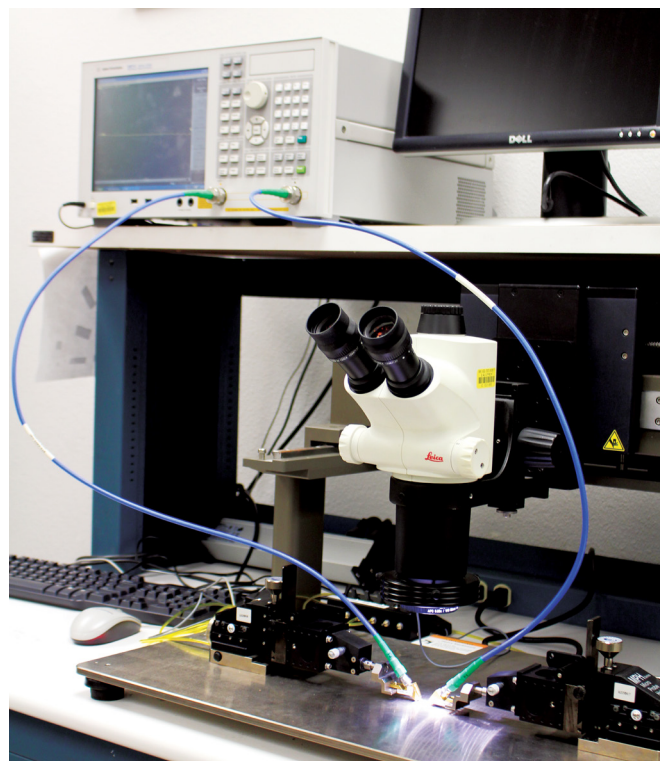


Equipment:

- Agilent E8361C PNA Network Analyzer
10MHz - 67 GHz
- Agilent E5071Z ENA Network Analyzer
300kHz-20 GHz
- Agilent E4404B Spectrum Analyzer
9kHz-6.7GHz
- Agilent N4691-60006 Electronic Calibration
Module (ECal)
300 kHz-26.5 GHz
- Microprobes
 - FormFactor |Z| Probes®

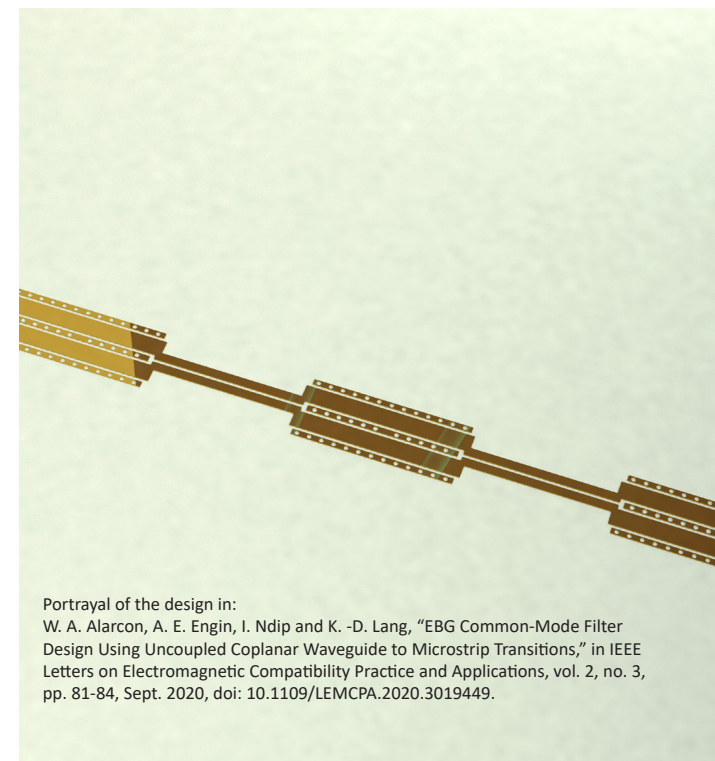
CAD Lab:

- Sonnet
- Ansys HFSS, 2D Extractor
- Keysight ADS
- MATLAB



Research Scope:

- Dielectric constant and loss tangent
characterization at >10 GHz
- Package and board characterization with
microprobes
- Full-wave simulation of interconnects and
power distribution networks
- Electrical IC package design and
troubleshooting for signal and power integrity



Portrayal of the design in:
W. A. Alarcon, A. E. Engin, I. Ndir and K. -D. Lang, "EBG Common-Mode Filter
Design Using Uncoupled Coplanar Waveguide to Microstrip Transitions," in IEEE
Letters on Electromagnetic Compatibility Practice and Applications, vol. 2, no. 3,
pp. 81-84, Sept. 2020, doi: 10.1109/LEMCPA.2020.3019449.