



*Applied Physics & OSA
Optics Seminar*

Polymer Electro-optic Devices

Prof. William H. Steier

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Material and fabrication advances have brought polymer high speed, low voltage EO modulators close to commercial development. The technology is now being applied to more complex photonic switches and circuits and we will review some of the latest applications of polymers in photonics.

Polymer optical modulators have the unique advantage of being flexible and able to conform to a desired surface. We will present results on flexible modulators and the measured effects of bending on V_{π} and the extinction ratio. The allowed bending radius without significant increases in insertion loss or physical damage will be presented.

EO and passive polymers also hold promise in the field of micro-photonics. We will present our results on polymer micro-ring resonators integrated with polymer waveguides. Passive micro-resonators with a finesse of 141 @ 1300nm and 117 @ 1550nm have been achieved. Larger rings with Q's of over 10^5 @ 1300 nm have been demonstrated. We will show the use of electro-optic micro-resonators as low voltage limited RF bandwidth modulators.

Coupled micro-resonators can be used for wide-band tuning of lasers based on the vernier effect. We have demonstrated coupled rings with a tuning enhancement factor of 40. These coupled resonators have been both voltage and thermally tuned. The measurements on a tunable laser based on the coupled resonators and EDFA. Finally we will review some recent work on polymer micro-ring sensors and linearized optical modulators.

Biography:

Dr. William H. Steier is the W. M. Hogue Professor of Electrical Engineering at the University of Southern California. He received the BSEE from the University of Evansville and the MSEE and the Ph.D. from the University of Illinois, Urbana. From 1962 to 1968 he was a Member of the Technical Staff at Bell Telephone Laboratories. He has held several administrative positions at USC including Department Chair. He is a Fellow of IEEE and of the American Optical Society. He received the USC Associates Award for Creativity in Research and the University of Illinois ECE Department Distinguished Alumni Award. His research group has published extensively in opto-electronics including high-speed optical modulators, polymer photonic components and circuits, and nonlinear optical devices.

Wednesday, February 16, 2005.

4:00pm-5:00pm.

Watson 104

Refreshments will be available in the Watson Lobby at 3:45pm.

