

Seminar
COMSET / School of Materials Science and Engineering
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11:00 AM – AMRL – Room 231 - Conference Room

Fabrication of Photonic Structures in Glass using Femtosecond Laser Pulses

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Abstract:

Femtosecond (fs) laser pulses can be used to directly “write” photonic structures, such as waveguides, splitters, interferometers etc, inside a glass. This technique has great potential as a fabrication technique for three-dimensional all-optical integrated components with applications in telecommunications as well as in biological and chemical sensors and medical technology. The fs writing technique relies on the fact that fs laser pulses -tightly focused inside a bulk glass- can induce localized refractive index changes of the glass within the focal volume of the laser beam. By scanning the glass with respect to the laser focus waveguide structures can be fabricated inside the glass.

We have studied the structural changes associated with fs-laser modification in glass using Raman and fluorescence confocal microscopy. In this presentation I will give an overview of fs laser modification in glass and discuss how laser parameters and glass composition influence the structural changes observed.

Bio:

Denise M. Krol received the B.S. and M.S. degrees in Chemistry and the Ph. D. degree in Physics from the University of Utrecht, the Netherlands in 1975, 1976 and 1980, respectively. From 1980- 1986 she was a Research Scientist at Philips Research Laboratory, Eindhoven, the Netherlands and from 1986-1994 a Member of Technical Staff at AT&T Bell Laboratories, Murray Hill, NJ. In 1994-1995 she was awarded a grant from the Visiting Professorship for Women program of the National Science Foundation and served as a visiting professor in the Chemistry Department at Stanford University, Stanford, CA. From 1995 - 2004 she held a joint appointment as a professor in the Department of Applied Science at the University of California, Davis and as a physicist at Lawrence Livermore National Laboratory. Since 2004 she has been full-time on the faculty at UC Davis. Dr. Krol has published over 100 papers and holds 4 patents. In 1991 she was awarded the Vittorio Gottardi Award from the International Committee on Glass. She is a Fellow of the American Ceramic Society and the Optical Society of America.