

# Physics Colloquium

## Michigan Technological University

December 8 (Thursday) 2005, 4:05 to 4:55 pm  
Room 139, Fisher Hall

Image reconstruction, wave front sensing, and adaptive optics  
in extreme atmospheric seeing conditions

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### Abstract

As "conventional adaptive optics" technology has matured for astronomical imaging, interest has developed in using adaptive optics in other applications, and in somewhat more difficult atmospheric seeing conditions than astronomers typically encounter. Developing adaptive optics and post detection image processing techniques for imaging and controlling laser beams in these environments requires understanding the atmospheric effects, and careful algorithm development and test. In this talk the motivation for this work is discussed, and the nature of the atmospheric optics problem is presented. Preliminary image reconstruction results are presented.

### Biography

Dr. Michael C. Roggemann is presently a Professor of Electrical Engineering at Michigan Technological University, Houghton, MI. He is co-author of the book "Imaging Through Turbulence", and has authored or co-authored over 60 journal articles and over 70 conference papers. Dr. Roggemann is a member of the IEEE, and is a Fellow of both the Optical Society of America and SPIE – The International Society for Optical Engineering. From 2002 to 2005 he was also associated with the Boeing Corporation as a senior research scientist, where he was a Technical Fellow of the Boeing Corporation. Roggemann was an Associate Professor of Engineering Physics at the Air Force Institute of Technology, Wright-Patterson AFB, Ohio from 1992 to 1997. He is an honorably retired Air Force Officer at the rank of Major. Dr. Roggemann performed his undergraduate work at Iowa State University, graduating in 1982 with the BSEE degree. He performed graduate work at the Air Force Institute of Technology, completing the MSEE degree in 1983, and the Ph.D. in 1989. Dr. Roggemann has been an electro-optics program manager at Wright Laboratories, Wright-Patterson AFB, Ohio, and an imaging researcher at the Phillips Laboratory, Kirtland AFB, NM. His present research interests include imaging and beam projection through atmospheric turbulence, optical remote sensing system design and analysis, and signal and image processing.