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Terahertz Technology in Outer and Inner Space

Dr. Peter H. Siegel

IEEE MTT-S Distinguished Microwave Lecturer

**California Institute of Technology
Jet Propulsion Laboratory
Pasadena CA**

Date: Tuesday, November 14, 2006

Time: Lecture 7:00 pm

Place: Mitre Corporation Building 2, 7515 Colshire Drive, McLean VA [directions](#)

Cost: The lecture is free.

Optional Dinner: Please join the speaker and the membership for dinner at the lecture site. Dinner Cost \$15.00. Reception 5:30 pm, Dinner 6:00-7:00 pm

RSVP for dinner only by Friday November 10 to Roger Kaul, 301-394-4775, r.kaul@ieee.org

Abstract: After more than 30 years of niche applications in the space sciences area, the field of Terahertz Technology is entering a true Renaissance. While major strides continue to be made in submillimeter wave astronomy and spectroscopy, the past few years have seen an unprecedented expansion of terahertz applications, components and instruments. Broad popular interest in this unique frequency domain has emerged for the first time, spanning applications as diverse as biohazard detection and tumor recognition.

Already there are groups around the world who have applied specialized Terahertz techniques to disease diagnostics, recognition of protein structural states, monitoring of receptor binding, performing label-free DNA sequencing and visualizing contrast in otherwise uniform tissue. A commercial terahertz imaging system has recently started tests in a hospital environment and new high sensitivity imagers with much deeper penetration into tissue have begun to emerge.

Solicitations for more sophisticated instruments and enabling terahertz components have filtered into US agency proposal calls from DoD and NASA, to NSF and NIH, and many new research groups have sprung up, both in this country and in Europe and Asia.

This talk will broadly survey terahertz technology from its cradle applications in space science and spectroscopy to more recent biomedical and chemical uses.

Bio: Peter H. Siegel obtained a BS in astronomy from Colgate University, Hamilton NY in 1976, an MS in Physics and a PhD in Electrical Engineering from Columbia University in 1978 and 1983 respectively. He has been involved in the analysis and development of millimeter-and submillimeter-wave sensors for 30 years.

He began his career in millimeter wave technology in 1975 as a summer student at the NASA Goddard Institute for Space Studies in New York City, working with astronomer Patrick Thaddeus and engineer Tony Kerr on low noise receivers. In 1983 he moved up in frequency to the submillimeter, working as a National Research Council Fellow on THz planar antenna arrays. From 1984-87 Dr. Siegel was employed at the National Radio Astronomy Observatory where he worked with Sandy Weinreb and the millimeter wave receiver group in Charlottesville Virginia, maintaining the Kitt Peak National Radio Observatory.

He moved to JPL in 1987 to work on advanced technology development for NASA astrophysics

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applications. At JPL, Dr. Siegel naturally became involved in several satellite instrument applications, including a very successful Earth observing platform that returned early data on the Antarctic ozone hole and chemical processes in the stratosphere. In 1993 he founded the JPL Submillimeter Wave Advanced Technology team (SWAT), a group of up to 25 engineers and scientists working on the development of submillimeter-wave technology for NASA's near and long term astrophysics, Earth remote sensing, and planetary mission applications. He is currently a Senior Research Scientist in submillimeter wave technology. At JPL, Dr. Siegel has led or co-I'd more than sixty R&D programs as well as developing and delivering hardware for four major space flight instruments.

Recently Dr. Siegel joined the staff at Caltech as a Senior Scientist at the Beckman Institute, Division of Biology, where he is working on biological applications of THz technology. He maintains a joint appointment as the Technical Group Supervisor for SWAT at JPL, where he continues to propose and work on space applications of THz technology.

Dr. Siegel and his JPL team have won numerous awards for their technical achievements and are internationally recognized as leaders in THz technology development. Dr. Siegel is a member of AAAS, Chair of IEEE MTT Committee 4 - Terahertz Technology, a member of the organizing committee of the International Symposium on Infrared and Millimeter Waves and an elected Fellow of the IEEE.

New Local Chapter Administrative Committee members are needed.

Join us in planning the next lecture. Please volunteer... everyone has something to offer.

Please contact 2006 Chapter Chair Bruce Levine at bruce.levine@ieee.org

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