*Applied Physics & OSA*

*Optics Seminar*

# Surface Plasmon Resonance Performance Enhancement with Applications in Nano Bio and Chemical Sensors


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***Abstract:***

Surface plasmon resonances can play a significant role in enhancing the performance of nano structures such as antennas, apertures and sensors based on total internal reflection. In this presentation we will discuss some fundamental issues related to nano-apertures and antennas illuminated by optical waves. We have found that by morphing the shape of the sub-wavelength aperture or antenna the optical power throughput can be increased by three to four orders of magnitude in practical devices. We will explain the underlying physics in terms of the topology of the pointing vector flow, and we will use this understanding to explain how even better apertures can be designed and manufactured in the future. We found that commonly used manufacturing techniques using FIB technology can drastically reduce the throughput performance and we will present a solution to this problem which should be widely applicable to other nano structures as well. Finally we will apply some of our fundamental understanding of nano-apertures to novel sensor applications in biology and chemistry.


***Brief Biography:***

Professor Hesselink, as a Fulbright scholar, received his PhD from Caltech, where he also taught in Applied Physics for a couple of years. He joined the faculty at Stanford in 1980 and has been there since. His research interests span the fields of optical data storage, 3-D imaging, optical interconnects and more recently nano-photonics for applications in medicine and biology. He has received numerous awards, and is a Member of the Royal Dutch Academy of Arts and Sciences among other distinctions. He has started two successful Stanford spin-off companies.

***Tuesday, February 17th, 2009.***

***4:00pm-5:00pm.***

***Moore 070***

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