



Lasers and Electro-optics Society  
Hong Kong Chapter

**Date** : 7 December, 2006 (Thursday)  
**Time** : 3:30 p.m. – 4:30 p.m.  
**Location** : Rm 418, Ho Sin Hang Engineering Building,  
The Chinese University of Hong Kong

## *Improving the Photonic Integration Density and Functionalities with Nanostructures and Metamaterials*

**Professor Sailing He**

**Joint Research Centre of Photonics of the Royal Institute of Technology (Sweden) and  
Zhejiang University (China)**

### **Abstract**

Electronics circuits keep shrinking in dimensions, according to Moore's law, with FET gate lengths in the laboratory being in the tens of nm range. In contrast, photonic circuit elements and waveguides have lateral dimensions on the order of the wavelength. A key to make photonics have an electronics-like development is a drastic reduction of size. One way to reduce the size of photonic devices is to use high-index materials, e.g. Si. Surface plasmon (SP) waveguides, which utilize the fact that light can be confined in a single interface between a metal and dielectric, can offer a tight confinement for the light field. The cross-sectional size of a SP waveguide could be pushed down to tens of nanometers. Nano-structured artificial materials (metamaterials) with negative index can give unprecedented physical properties and functionality unattainable with naturally-existing materials. We will present our recent results on some ultra-compact planar lightwave circuits based on Si nano-waveguides and SP nano-waveguides, as well as some nano-structured materials of negative index and their applications.

### **About the Speaker**

Prof. Sailing He received the Licentiate of Technology and Ph.D. degree from the Royal Institute of Technology, Stockholm, Sweden, in 1991 and 1992, respectively. After obtaining his PhD degree, he has worked at the Royal Institute of Technology as an assistant professor, an associate professor and a full professor. He is also with Zhejiang University (China) since 1999 as a "Chang-jiang" scholar appointed by the Ministry of Education of China. He is the Director and one of the two chief scientists of the Joint Research Centre of Photonics of the Royal Institute of Technology (Sweden) and Zhejiang University (China). Prof. Sailing He has first-authored one monograph (Oxford University Press) and authored/co-authored over 250 papers in refereed international journals

**ALL ARE WELCOME**

Host: Professor Chinlon Lin (Tel: 2609-8370, Email: chinlon@ie.cuhk.edu.hk)  
Enquiries: Electronic Engineering Dept., CUHK (Tel.: 2609-8270)