Columbia University Optics Seminar

"Silicon-based Optical Links – can they be economically viable?"

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Date/Time: Monday, March 11th, 11AM –12PM
Location: 750 Schapiro CEPSR Interschool Lab

Abstract: It is now over twenty years since the seminal paper of Richard Soref detailing his vision for silicon based optoelectronics [1]. Since that time the number of published works on silicon photonics climbed exponentially until 2008, and since levelled. This indicates, perhaps, a maturity in the field as larger groups tend to dominate research activities and commercial applications are sought. Certainly, there now appears to be convergence on the approach to optical source development, optical coupling, modulation and detection [2]. In this talk I will discuss the background to the functionality required to create a silicon optical link. Recent results from our group will be presented demonstrating optical modulation via micro-rings at wavelengths around 1300nm and 1550nm. The potential for exploiting wavelength division multiplexing will be discussed and the basis of a 40Gbps link (4 wavelengths x 10Gbps) will be presented. Further, a novel technique for providing temperature insensitive modulation will be discussed [3]. I will present also work which explores alternative techniques for optical detection and modulation which are based upon the exploitation of deep-levels in silicon. Such techniques have significant advantage due to their ease of implementation. To conclude I will invite the audience to speculate with me as to the economic viability of a silicon-based approach to widely deployed optical links.

Bio: Andy Knights was awarded a Ph.D. in Physics from the University of East Anglia in 1994, working on the interaction of anti-matter with clean solid surfaces. He subsequently worked as a post-doctoral fellow, first at the University of Western Ontario and then at the University of Surrey. The period from the beginning of his Ph.D. work to the end of the research at Surrey witnessed a consolidation of the applied aspects of his work (primarily in the development of novel semiconductor devices, processes and functionality), although it remained grounded in the desire for the understanding of underlying physical phenomena.

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