

Keynote: Si Nano_Photonics for Data Center Applications

Diaa Khalil

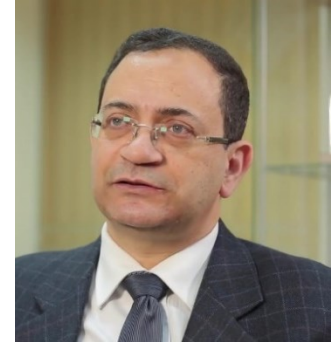
Faculty of Engineering, Ain Shams University, 1 Elsarayat St. Abbassia, 11517, Cairo, Egypt.

E-mail: diaa_khalil@eng.asu.edu.eg

Prof. Diaa Khalil has over 37 years of experience in micro and nano photonic systems. He obtained his PhD from INPG France in 1993. He is Professor of photonics since 2004 in ASU where he was also the Chairman of the ECE Dept., the vice dean of research and the acting dean. He supervised more than 80 MSc and PhD. From 2007 to 2020, he was the CTO of the Optical MEMS Division in Si-Ware Systems where he is currently one of the company technical advisors. He is inventor of about 25 patents and patent applications, author and co-author of more than 370 publications, 4 book chapters and 1 ebook. He is a senior member in IEEE, OSA, SPIE, URSI, a member in the editorial board of the journal, Light: Science and Applications, produced by the Nature PG and associate editor of the journal of IEEE-PTL. He is a holder of the State incentive prize in 1998 and state appreciation prize in 2021

Scopus ID: 7003898118

 <http://orcid.org/0000-0002-2067-2002>.



ABSTRACT

With the huge demand of data transfer all over the world, optical communication becomes the default standard communication technique for long haul systems as well as access networks. Photons as carriers of information are penetrating in all the communication levels, they transfer data between continents, between countries, cities, buildings, boards and even between chips in the microprocessors. With this transformation, it becomes also a necessity to move photon manipulation from individual devices to complex circuits that can scale down in price and up in production. This created the technology of Si photonics in which Photonics devices are produced on a Si substrate using standard scalable IC technology. The increase of the photonic device density on the substrate led to the use of nano photonic components and the need of integration of these devices very close to the electronic devices led to the Co Packaged Optical CPO solutions in data centers.

In this work we present the recent development for building CPO solutions on Si technology for data center applications. The architecture of the solution, the main challenges facing its implementation and the solutions suggested to overcome these challenges will be briefly

addressed. Examples of the solutions proposed in the literature and those in the market will be critically reviewed.