Optical Transceivers & Silicon Photonics Forum

PRELIMINARY PROGRAM

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Yole Développement

Alexis Debray

Senior Analyst – Emerging Technologies

Alexis Debray, Ph.D., is a Senior Analyst at Yole Développement (Yole), dedicated to the production of technology & market reports and custom consulting projects in the fields of Photonics, Sensing, and Semiconductors.
Before joining Yole, Alexis spent 17 years in Japan. He worked for 2 years developing expertise in MEMS technologies and then for 15 years at Canon Inc. as a research engineer, where he contributed to numerous developmental projects focused on MEMS devices, lingual prehension, and terahertz imaging devices.
Alexis is the author of various scientific publications and patents. He graduated from ENSICAEN (France) and was awarded a Ph.D. in applied acoustics.

Martin Vallo

Technology & Market Analyst, Solid-state Lighting

Martin Vallo, PhD serves as a Technology & Market Analyst specialized in solid-state lighting technologies, within the Photonics, Sensing & Display division at Yole Développement (Yole). With 9 years' experience within semiconductor technology, Martin is involved today in the development of technology & market reports as well as the production of custom consulting projects at Yole.
Prior his mission at Yole, he worked at CEA (Grenoble, France), with a mission focused on the epitaxial growth of InGaN/GaN core-shell nanowire LEDs by MOCVD and their characterization for highly flexible photonic devices. Martin graduated from Academy of Sciences, Institute of Electrical Engineering (Slovakia) with an engineering degree in III-nitride semiconductors.

Trends in Optical Transceivers and Silicon Photonics

Network traffic growth has been increasing exponentially over recent decades. The growth has been driven by newly emerging digital applications including the IoTs, AR/VR, connected homes and cars. Also, services such as streaming UHD videos need higher data throughput with the image quality increase. Meeting all technical requirements requires higher performance optical modules. The evolution of multiple technologies has enabled transmission speed of 400G and beyond in long haul and metro networks. The goal for future form factors is to reduce their size and thus decrease power consumption and increase density. Progress in integration of optical component technologies led to dramatic reductions in complexity and cost of the modules. The industry is developing different approaches for heterogeneous integration of InP lasers directly onto silicon chips. While InP material platform dominates in intermediate and long reach, silicon photonics might be a key enabling technology for certain data center applications needed to address growing traffic at lower cost.
Silicon photonics has become an important technology for optical communication. Since the release by Luxtera (now Cisco) of the first optical transceiver using silicon photonics in 2008, the silicon photonics optical transceiver market has grown to $581M, with almost 5M units shipped. Silicon photonics is now serving new applications including immunoassays and fiber optic gyroscopes. New applications are on the way including LiDAR, photonic computing, disaggregated datacenters, and, last but not least, the collaboration of Apple with Rockley Photonics for consumer health.

System Plus Consulting

Sylvain Hallereau

Senior Technology & Cost Analyst

Sylvain Hallereau is Principal Technology & Cost Analyst at System Plus Consulting, part of Yole Développement (Yole).
Working in close collaboration with the laboratory teams, Sylvain produces reverse engineering & costing reports while also contributing to custom projects, especially focused on solid-state lighting components, sensors, biotechnology devices, and ICs. Together, they define the objectives of the analysis and the most relevant methodology to gain a detailed understanding of the structure of the device. Sylvain then analyzes the results to describe the technology choices made by the leading semiconductor companies and the related process flows and also calculates the cost structure.
In parallel, based on his significant technical and industrial knowledge, Sylvain supports the development of the semiconductor device activities and the related team at System Plus Consulting. He also contributes to the strategies of this department.
Sylvain daily runs a strategic watch within the semiconductor community. Through his investigations, his aim is to identify innovative components and new manufacturing processes. In this way, Sylvain supports System Plus Consulting with the setting up of new methodologies for analysis and the updating of advanced simulation tools, especially those developed internally by System Plus Consulting's experts.
Sylvain regularly contributes to numerous media articles, using his technology and industry expertise to analyze and comment on the latest innovations.
He holds a master's degree in Microelectronics from the University of Nantes (France).

100G and 400G Optical Transceivers Benchmark: Structure & Cost Comparison of Silicon Photonics versus InP Dies Solution for CWDM4 and PSM4 Transceivers

The presentation will highlight a benchmark of 100G and 400G optical transceivers, PSM4 and CWDM, with InP versus Silicon photonic technology.
Based on pictures extracted from teardown and physical analysis of six 100G and 400G optical transceivers from Finisar/II-VI, Cisco, Intel and Innolight, we will compare the different technical solutions of the manufacturers. Spatial multiplexer, discrete silicon multiplexer or integration on silicon photonic die for the TOSA multiplexer will be compared. InP laser with and without EAM will also be compared with the silicon photonic solution.
The reception part of the six optical transceivers will be also showed, as well as the main ICs to understand the impact of the 400G versus 100G and the supply chain of the different manufacturers.

Yuanjie Semiconductor Technology, Co., Ltd.

Liangbo Wang

Senior Technical Marketing Director

Liangbo Wang Senior Technical Marketing Director in Yuanjie, graduated from Zhejiang University majoring in semiconductor material physics. Worked for SMIC, Sifotonics, Huawei and Pinduoduo focused on semiconductor CMOS chip, silicon photonics chip development and technical planning with more than 13 years of optical communication experience. Now working in Yuanjie semiconductor, responsible for technical planning and marketing.

InP Maser status and challenge for High-Speed Optical Communication

Due to the large-scale deployment of 5G wireless fronthaul and the evolution of data center from 100G to 400G, InP EEL laser has faced tremendous challenges no matter in silicon photonics solutions or in traditional free space solutions. For 5G wireless application, CWDM6 has gradually become the mainstream in fronthaul application, yet 1350nm/1370nm DFB laser has not been widely used up to now, how to solve its dispersion problem with lost cost production, and how to effectively solve the technical bottleneck of industrial temperature 50G PAM4 DML for the subsequent fronthaul upgrade. Besides, data center 400G is also facing the technological evaluation. How to significantly improve EML yield, to meet the requirements of non-hermetic packaging and to achieve TEC-less COB package. For silicon photonics application, continuous improvement of CW laser power is an urgent technical point for 400G DR4 and next generation CPO; In this situation, what kind of new design and technology to effectively meet the demand is the focus of the market.

Shenzhen Gigalight Technology Co., Ltd.

Eric Chen

Vice President

Eric Chen, the vice president of GIGALIGHT, with more than 20 years of experience and profound insights into the telecommunication industry, has participated in and led the research and development of a variety of telecommunication equipment, and involved in the formulation of a number of communications industry standards and telecom operator standards.

*陈洋现任易飞扬副总裁，拥有**20多年通信行**业经验，持续参与并主导了多种电信设备的研发，参加过**多**项通信行业标准和电信运营商标准的制订，对行业有深刻的见解。*

Exploration of main technical issues of silicon-based optical modules

At the critical moment when the entire optical transmission industry is moving towards silicon-based optical technology, all participants are faced with numerous technical difficulties and challenges. As early as 2016, Gigalight had studied silicon-based 100G PSM4 and DML-based 100G PSM4 optical modules, but the conclusion was below expectation. Currently, our goal is to simultaneously study EML-based 400G QSFP DD DR4 optical modules and silicon-based 400G QSFP DD DR4 optical modules to obtain more valuable objective research results and apply them to our product development & design goal - get the balance of all parameters. As the transmission of 400G QSFP DD DR4 is not ideal, we sincerely look forward to the full development of silicon-based optical modules under the next 112G per lane industry protocol.

Sicoya

Sven Otte

CEO

Sven Otte is the Chief Executive Officer and Co-Founder of Sicoya. Prior to Sicoya Sven was the Global Business Director of Optoelectronics at FCI. Before joining FCI he served as Global Vice President of Engineering at MergeOptics, Senior IC Design Engineer at Multilink Technologies and Senior System Architect at Santel Networks in Fremont, USA. Sven holds a Ph.D. in optical communications from the University of Kiel and authored several articles about electronic dispersion compensation for high speed optical transmission systems and Silicon Photonics technologies.

How Silicon Photonics enables the Terabit Transceivers for Next Generation Datacenter Interconnects

At the critical moment when the entire optical transmission industry is moving towards silicon-based optical technology, all participants are faced with numerous technical difficulties and challenges. As early as 2016, Gigalight had studied silicon-based 100G PSM4 and DML-based 100G PSM4 optical modules, but the conclusion was below expectation. Currently, our goal is to simultaneously study EML-based 400G QSFP DD DR4 optical modules and silicon-based 400G QSFP DD DR4 optical modules to obtain more valuable objective research results and apply them to our product development & design goal - get the balance of all parameters. As the transmission of 400G QSFP DD DR4 is not ideal, we sincerely look forward to the full development of silicon-based optical modules under the next 112G per lane industry protocol.

MRSI Systems, Mycronic Group

Limin Zhou, Ph.D.

Senior Director of Strategic Marketing

Dr. Zhou Limin, Senior director of strategic marketing in MRSI Systems, Mycronic Group. Previously, Limin was Senior R&D Director in Neophotonics China, NPI & Product Engineering Director in Oclaro Asia, and NPI Operation Director in both JDSU and SAMN-SCI China. He also worked in SEBIT, CAS as professor for high power laser chips and application development. Limin started his industrial career from Chartered Semiconductor Manufacturing (Globalfoundries) in Singapore as a Senior Engineer of Lithograph.

The challenges and Solutions of volume manufacturing in Optical Transceiver & Silicon Photonics

Optical Transceivers have played a crucial role in the 5G & Data Center system. 5G deployment and more data center setup, driving the continued increase in optical transceivers demand. The technology innovations allow the optical transceivers to have higher bandwidth, smaller package size and much lower power consumption. The high performance optical transceivers have faster life cycles, and the customers need high volume for fast delivery. The high density high performance products need higher accuracy assembly. However the optical transceiver cost is much more sensitive than before. Optical transceivers become the biggest driver for silicon photonics technology application. These fast pace innovation and technology changes bring huge challenges to the assembly manufacturing for high performance optical transceiver suppliers, who need the innovative solutions from the assembling process engineers and equipment vendors to address these challenges. In this talk, I plan to discuss the key assembling challenges and the innovative solutions to address these challenges for Optical transceivers and Silicon Photonics.