

8th International Conference and Exhibition on

LASERS, OPTICS & PHOTONICS

November 15-17, 2017 | Las Vegas, USA

Integrated terahertz photonics and optoelectronics

Qi Jie Wang and **Guozhen Liang**

Nanyang Technological University, Singapore

Currently, terahertz (THz) optical systems are based on bulky free-space optics. This is due to the lack of a common platform onto which different THz components, e.g., source, waveguide, modulator and detector can be monolithically integrated. With the development of THz quantum cascade laser (QCL), it has been realized that the QCL chip may be such a platform for integrated THz photonics. Here, we report our recent works where the THz QCL is integrated with passive or optoelectronic components. They are: 1) integrated graphene modulator with THz QCL achieving 100% modulation depth and fast speed; 2) phase-locked THz QCL with integrated plasmonic waveguide and subwavelength antennas realizing dynamically widely tunable polarizations.

Biography

Qi Jie Wang received his PhD degree in Electrical and Electronic Engineering from Nanyang Technological University, Singapore in 2005. After completing his PhD, he joined the School of Engineering and Applied Science, Harvard University, as a Post-doctoral Researcher. In October 2009, he was assigned as a Joint Nanyang Assistant Professor at the School of Electrical and Electronic Engineering (EEE) and the School of Physical and Mathematical Sciences (SPMS). Since Feb 2015, he has been promoted to tenured Associate Professor in School of EEE and SPMS, NTU.

qjwang@ntu.edu.sg

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