



Dr. Davide Bacco

Technical University of Denmark (DTU)

Department of Photonics Engineering

Towards silicon photonics for fiber based quantum communication



Istituto TeCIP – Blue room 10.30am
7th December 2018

Abstract

In a society based on the continuous exchange of sensitive data and information, the importance of secure and trustable communications is essential. By exploiting principles of Quantum Physics, it is possible to share data in an unconditionally secure way, no longer based on mathematical assumptions of the encryption algorithm, but founded on the basic principles of Quantum Mechanics.

In this context, the project relies on the development of a Quantum Communication (QCs) systems able to increase the actual performance in terms of rate, security and distance. The key to exceed the barriers of present QCs resides in the extensive knowledge of high-speed classical optical communications merged with future technologies based on integrated photonic circuits. By using custom silicon chips combined with nonlinear devices, and high-speed optical communications, it will be possible to push the limits of QCs, paving the way for new horizons.

In this lecture he will present the latest research on quantum photonics technologies based on silicon photonics carried out in the D NRF CoE: Silicon Photonics for Optical Communication (SPOC), including high-dimensional quantum communication, pure photon pair source on silicon, high dimensional quantum entanglement manipulation on silicon, and quantum teleportation. He will also present recent results on new quantum key distribution protocols and integration of classical and quantum signals into the same optical fiber.

Biography

Davide Bacco was born in Italy in 1986. He received his degree on Telecommunication Engineering in 2011 at the University of Padova, Italy. In 2015 he finished in the same University the Ph.D degree on Science Technology and Spatial Measures (CISAS). He worked in 2015 as a postdoctoral fellow at the Institute for Photonic and Nanotechnology of the National Research Center (CNR-IFN), Padova. Now he is currently a MSCA H.C. Ørsted COFUND Postdoc at the Department of Photonics Engineering at the Technical University of Denmark (DTU). His research interests regards quantum optical communications, secure communications and silicon photonics for optical communications.