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**Modelling and design of optoelectronic
devices for high speed optical communication
and silicon photonics platform**



TeCIP Institute – BLUE room 11 am
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Abstract:

The *Microwave and Opto Electronics Group* (MOG) is active from 20 years in the modelling and design of microwave devices and circuits as well as optoelectronic devices such as modulator, photodetectors, light sources (LED and lasers) and solar cells. Since 2017 the group is also member of PhotoNext, the Inter-Dipartimental Center of Politecnico di Torino dedicated to Photonic technologies and their applications.

In this seminar Pr. Gioannini will present first the research activity of MOG related to the development of modelling tools and design of optoelectronic devices for high speed optical communication and in the context of the silicon photonic platform, focusing on Ge-based detectors for silicon photonics ICs, InGaAs/InP vertical photodetectors, electro-optic and electro-absorption modulators.

Then she will dedicate the rest of the seminar to her principal research area, presenting some recent results on the modelling of laser diodes in the context of silicon photonic applications:

- Quantum dot lasers as simple optical frequency comb generators integrated in DWDM silicon photonic transmitters;
- Quantum dot ring lasers for generation of light pulses at THz repetition rate;
- Modelling of laser diode instabilities induced by external optical feedback arising by spurious back reflections from the silicon photonic circuit;
- Design of hybrid Si/III-V external cavity lasers.

Biography:

Mariangela Gioannini received the PhD degree in Electronics and Communication Engineering from Politecnico di Torino in 2002. Since 2005 she is with Dipartimento di Elettronica e Telecomunicazioni of Politecnico di Torino, first as assistant professor and from 2014 as associate professor. Since 2017 she is member of the PhotoNext, the Inter-Dipartimental Center for Photonic technologies and their applications. Since 2002 she has carried on research on the numerical modelling of semiconductor lasers and optical amplifiers based on III-V quantum dot active materials in the frame of several EU projects. She is author and co-author of more than 70 research publications and two book chapters. She is the Semiconductor Lasers Programme Committee Chair of CLEO/Europe 2019.