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Optical feedback interferometry in quantum cascade lasers

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After reviewing the features of self-mixing interferometry in quantum cascade lasers, its inherent ultra-stability and its several metrological applications, I will present our recent results on a novel contact-free method based on the use of THz quantum cascade lasers operating under optical feedback to image in reflection mode the free electron plasma photogenerated onto a semiconductor surface. Self-mixing interferometry is also used to demonstrate the possibility to produce sub-wavelength patterns acting as metamaterials in semiconductors pumped by a spatially modulated near-infrared beam.

Biography

Gaetano Scamarcio is a Professor of Physics who graduated and received his PhD in Physics. He has been a Research Fellow at the Max-Planck-Institute für Festkörperforschung, Stuttgart, Germany, and in 1992 a visiting scientist at the Walter-Schottky-Institute, Garching, Germany. He has been a visiting scientist of Bell Laboratories, Lucent Technologies (formerly AT&T), Murray Hill, (USA). His main research interests are in the fields of quantum cascade lasers, optical, vibrational and transport properties of semiconductor structures at the nano-scale, spectroscopic techniques for real-time monitoring of optoelectronic devices, optoelectronic sensors for mechatronics. His research activity is documented by 220 ISI publications, and 7 filed patents. He has been chair of the 100th National Congress of the Italian Physical Society (Applied Physics Section) in 2014, member of the Program Committee of the 9th and 10th International Conference on Inter sub band Transitions in Quantum Wells, Cumbria, UK in 2007, and Montreal, in 2009; Director of the International School of INFM "Progress in laser sources and photonic devices", Capri, in 2002. He has been the recipient of Award of the Italian Physical Society (1989), Firestone Prize for young laureates (1985), NATO-CNR Advanced Fellowship (1995) and Ambassadorial Fellowship of the International Rotary Foundation (1994).

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