



Vertically Integrated Systems

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SPIE Photonics West

23 - 28 January 2010
The Moscone Center
San Francisco, California, USA

VI Systems is proud to be nominated as finalist for the Prism Awards 2009 for Photonics Innovation, in the Lasers category. SPIE and Laurin Publishing are pleased to announce that the Electro Optical Modulated VCSEL (EOM DBR VCSEL) entry has been selected. The Prism Awards (www.photonicsprismaward.com) recognize excellence in new product innovation within our industry—and the product of VI Systems is an excellent example of this initiative. Winners will be announced during the Awards Ceremony.

Prism Awards for Photonics Innovation

Reception, Banquet and Award Ceremony

Wednesday, the 27th of January 2010

6:30 – 10:00 pm

Hilton San Francisco Union Square

Overview of Technical Presentations

Optical components for very short reach applications at 40 Gb/s and beyond

Paper 7597-53 of Conference 7597

Date: Thursday, 28 January 2010

Author(s): Nikolay N. Ledentsov, James A. Lott, Vitaly A. Shchukin, VI Systems GmbH (Germany); Alexander Mutig, T. D. Germann, Sergey A. Blokhin, A. M. Nadtochiy, Leonid Y. Karachinsky, Dieter Bimberg, Technische Univ. Berlin (Germany)

Abstract

In this talk a summary is given on recent achievements in vertical cavity surface-emitting lasers (VCSELs) and PIN photodetectors suitable for very short reach multimode fiber links that enable bit rates up to and beyond 40 Gb/s. Achievements in current modulated VCSELs, electrooptically modulated VCSELs, top illuminated PIN photodiodes and the related ICs and packaging solutions will be addressed.



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Electro-optically modulated VCSELs and RCLEDs Paper 7597-27 of Conference 7597

Date: Tuesday, 26 January 2010

Author(s): J. A. Lott, V. A. Shchukin, N. N. Ledentsov, VI Systems GmbH (Germany); T. D. Germann, A. Strittmatter, A. Mutig, D. Bimberg, Technische Univ. Berlin (Germany)

Abstract

We present the design, simulation, operating principles, growth, fabrication, and measured performance results of 850 nm-range electro-optically modulated (EOM) vertical cavity surface emitting lasers (VCSELs) and resonant cavity light emitting diodes (RCLEDs). The device structures are grown in a well-controlled single monolithic epitaxial growth step by both molecular beam epitaxy and metal-organic vapor phase epitaxy and are produced via standard large-volume micrometer-scale-device processing techniques. Finally we discuss how to use this innovative approach for the realization of high speed (> 10 Gb/s) optical signal modulation to enable the next generation of low cost and extremely reliable short-reach optical data communication systems.

Submonolayer quantum dots for 850 nm-range VCSELs Paper 7610-23 of Conference 7610

Date: Monday, 25 January 2010

Author(s): James A. Lott, VI Systems GmbH (Germany); Sergey A. Blokhin, Alexander Mutig, Gerrit Fiol, Technische Univ. Berlin (Germany); Vitaly A. Shchukin, Nikolay N. Ledentsov, VI Systems GmbH (Germany); Dieter Bimberg, Technische Univ. Berlin (Germany)

Abstract

We present the epitaxial growth and characterization of sheets of InGaAs submonolayer (SML) quantum dot (QD) structures for applications in 850 nm-range vertical cavity surface emitting lasers (VCSELs). Experimental and device active region calibration structures are characterized using x-ray diffraction, transmission electron microscopy, and photoluminescence measurement techniques. Also, VCSELs containing the SML QDs are produced and characterized resulting in record performance high-speed and temperature performance.

Modeling of photonic-crystal-based high-power high-brightness semiconductor lasers Paper 7597-48 of Conference 7597

Date: Wednesday, 27 January 2010

Author(s): Vitaly Shchukin, PBC Lasers GmbH (Germany); Vladimir Kalosha, Nikolay N. Ledentsov, VI Systems GmbH (Germany), Dieter Bimberg, Technical University of Berlin (Germany)

Abstract

Modeling of semiconductor lasers based on multilayer epitaxial structures with ultrabroad vertical and ultrabroad lateral waveguides (WGs) suggests unique possibilities to fabricate high power high brightness lasers. Ultrabroad WGs are extremely advantageous as they allow extracting high power from a single chip, keeping low beam divergence and reducing undesirable non-linear effects in the gain medium, while one must ensure single mode lasing from a broad WG. Novel concepts addressing this challenge have been developed including vertical photonic crystal formed by epitaxial multilayer structure, lateral photonic crystal formed by multistripe processing with selective pumping of stripes, tilted wave laser based on phase matching effects in the propagation of optical modes in coupled resonators. The results have been employed in the fabrication of practical semiconductor lasers at wavelengths from 635 to 1060 nm.