Misfit Dislocation Free Quantum Dot Lasers

Tech ID: 29481 / UC Case 2018-608-0

BRIEF DESCRIPTION

A way to epitaxially grow quantum dot lasers on Si that are free of misfit dislocation.

BACKGROUND

Current quantum dot lasers have high densities of threading dislocations which result in misfit dislocations and poor lifetimes for the lasers. Research has focused on reducing threading dislocation densities however, misfit dislocations originate in plane meaning they can damage the quantum dot laser lifetime more so than the threading dislocations. Longer lifetimes are incredibly advantageous for commercial lasers. As a result, there exists a need in the field for a quantum dot laser that does not suffer from misfit dislocations.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed a way to epitaxially grow quantum dot lasers on Si that are free of misfit dislocation. These misfit dislocation free quantum dot lasers offer an extended lifetime and improve device performance reliability while maintaining high performance levels.

ADVANTAGES

- Significantly improved laser lifetime
- Improved device reliability
- High performance maintained

APPLICATIONS

- Optical & Electronic
- Lasers

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,693,178	07/04/2023	2018-609
United States Of America	Issued Patent	11,435,524	09/06/2022	2018-609
United States Of America	Issued Patent	10,761,266	09/01/2020	2016-912
United States Of America	Published Application	21/0218230	07/15/2021	2018-608

CONTACT

Pasquale S. Ferrari
ferrari@tia.ucsb.edu
tel: .

INVENTORS

- Bowers, John E.
- Gossard, Arthur C.
- Jung, Daehwan
- Mukherjee, Kunal
- Norman, Justin
- Selvidge, Jennifer

OTHER INFORMATION

KEYWORDS

indadvmat, quantum dot laser, Si

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Materials & Chemicals**
  - Other

RELATED CASES

2018-608-0, 2018-609-0, 2017-045-0, 2016-912-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Bonding of Heterogeneous Material for Improved Yield and Performance of Photonic Integrated Circuits
- Epitaxial Laser Integration on Silicon Based Substrates
- Erbium Modified III-V Semiconductors as Photoconductors in the Terahertz Region
- A Hybrid Silicon Laser-Quantum Well Intermixing Wafer Bonded Integration Platform
- Integrated Reconfigurable Circulator
- Magneto-Optic Modulator
- Quantum Dot Photonic Integrated Circuits
- Ring Resonator-Based Optical Isolator and Circulator
- Integrated Dielectric Waveguide and Semiconductor Layer
- Orthogonal Mode Laser Gyro
- Loss Modulated Silicon Evanescent Lasers
- Monolithically Integrated Laser-Nonlinear Photonic Devices

University of California, Santa Barbara
Office of Technology & Industry Alliances
342 Lagoon Road, ,Santa Barbara,CA 93106-2055 |
www.tia.ucsb.edu
Tel: 805-893-2073 | Fax: 805.893.5236 | padilla@tia.ucsb.edu