High Coherent Power, Two-Dimensional Surface-Emitting Semiconductor Diode Array Laser

INVENTORS • Dan Botez

WARF: P05334US

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a semiconductor laser that provides seven times the power previously seen from surface-emitting semiconductor lasers.

OVERVIEW

A UW-Madison researcher previously described a high-power, single-mode, two-dimensional, semiconductor diode laser formed on a substrate with an anti-guided array of laterally spaced grating surface emitters (see WARF reference number P02180US). However, scaling that device to include longer arrays reduces device efficiency and output power due to a destructive interference effect inherent in devices with long gratings of constant periodicity.

THE INVENTION

The UW-Madison researcher has now developed a semiconductor laser that uses a variable periodicity, or chirped, grating. The grating works with the previous device to prevent the laser emissions from canceling each other out. The grating structure ensures single longitudinal-mode operation and can also be formed to act as a highly efficient selector of the in-phase array mode.

APPLICATIONS

• Non-invasive medical diagnostics
• Biotechnology
• Laser projection systems
• Optical communications

KEY BENEFITS

• Provides seven times the power previously seen from surface-emitting semiconductor lasers
• Enables CW watt-range, stable, single-mode laser light sources
• Single frequency makes it ideally suited for power scalability via frequency multiplexing in external beam-combining configurations
• Simplified packaging as compared to edge-emitting devices
• Capable of providing tens of watts of power for applications such as high-efficiency, high-resolution magnetic resonance imaging (MRI) with noble gases

ADDITIONAL INFORMATION

Related Technologies
See WARF reference number PO2180US for the inventor's previous laser.

Tech Fields
Analytical Instrumentation - Lasers

CONTACT INFORMATION

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846.