Vertical-Cavity, Surface-Emitting
Semiconductor Laser Arrays

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an improved method of coupling arrays of VSELs.

OVERVIEW

Vertical-cavity surface-emitting lasers (VCSELs) have the potential for use in a variety of applications, including high speed optical interconnects, parallel data links, optical recording, 2-D scanning, and optical signal processing. VCSELs have several advantages over conventional lasers, known as “edge emitters.” For instance, the light beam from VCSELs is narrow and circular, making it easier to get the beam into an optical fiber. However, VCSELs cannot currently match the optical power of conventional lasers. Coupled arrays of VCSELs have the potential for increased output power over that available from single VCSELs, but until now, high-power output from coupled 2-D VCSEL arrays had not been realized.

THE INVENTION

UW-Madison researchers have developed a method of coupling arrays of VSELs that overcomes the problems of prior technologies and provides a stable, diffraction limited output at high power levels. The array contains at least four core elements arranged in a 2-D rectangular array. The core elements are separated and surrounded by a matrix region to provide an array of antiguided phase-locked VCSELs.

APPLICATIONS

- High speed optical interconnects
- Parallel data links
- Optical recording
- 2-D scanning
- Optical signal processing
KEY BENEFITS

- General advantages of VCSELs include low-threshold, high-fiber coupling efficiency, simplified fabrication process and a compact size that is well suited to integration.
- Provides stable, diffraction-limited output at high power levels
- Core elements can be arranged in various array geometries including square, rectangular and triangular.
- Can be formed to be either top-surface emitting or bottom-surface emitting
- Core elements can be spaced to provide either in-phase or out-of-phase resonant coupling between them.

ADDITIONAL INFORMATION

Tech Fields
Analytical Instrumentation - Lasers
Information Technology - Telecommunications

CONTACT INFORMATION

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