Semiconductor Light-Emitting Source for Increased Power Levels

INVENTORS • Dan Botez, Iulian Petrescu-Prahova, Luke Mawst

WARF: P97085US
View U.S. Patent No. 6,167,073 in PDF format.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an improved semiconductor light-emitting source that can be applied to antiguided diode lasers and amplifiers.

OVERVIEW

Semiconductor diode lasers are formed of multiple layers of semiconductor materials. The layers surrounding the active structure typically have a lower index of refraction than the active structure, forming a dielectric waveguide that confines the emitted light transversely to the active structure.

The development of high-power coherent diode laser sources has been an area of continued research efforts. The power in symmetric transverse waveguide lasers can be increased significantly by increasing the waveguide while maintaining the quantum-well size; however, since the optical mode hardly penetrates into the cladding layers, it is practically impossible to obtain effective lateral mode confinement for 2-D spatial-mode coherence. A semiconductor laser with increased power levels is needed.

THE INVENTION

UW–Madison researchers have developed a semiconductor light-emitting source that incorporates antiguided lateral confinement of emitted light and an asymmetric transverse optical waveguiding structure. The semiconductor structure includes a substrate, an active region, optical confinement and cladding layers on opposite sides of the active region and at least one core element at which light emission occurs. Means for providing optical feedback are incorporated in the structure when it is operated as a laser; facets at the longitudinal edges of the structure are formed to be sufficiently antireflective when the semiconductor source operates as an amplifier.

APPLICATIONS

• Semiconductor light-emitting sources such as antiguided diode lasers and amplifiers
KEY BENEFITS

• Allows larger core elements to be utilized compared to conventional cores
• Significantly increases light emission spot size
• Provides five times more emission power levels for semiconductor lasers and five times higher saturated power levels for semiconductor amplifiers

ADDITIONAL INFORMATION

Tech Fields
Analytical Instrumentation - Lasers
Semiconductors & Integrated Circuits - Components & materials

CONTACT INFORMATION

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