**Very Large Mode Slab-coupled Optical Waveguide Laser and Amplifier**  
Technology #13919

**Applications**

Applications include materials processing, such as welding, drilling, cutting, annealing and brazing; laser pumping; free space optical communications; medical applications; and directed energy applications.

**Problem Addressed**

Scaling the spatial mode size to increase the output power of slab-coupled optical waveguide laser (SCOWL) is extremely difficult and can lead to mode collapse of the fundamental mode.

**Technology**

The invention is a very large mode (VLM) slab-coupled optical waveguide laser (SCOWL) which includes an upper waveguide region, lower waveguide region, and an active region positioned between them. The upper waveguide and lower waveguide regions are used for guiding the laser mode while the active region is arranged so etching into the VLM SCOWL is permitted to define the ridge waveguide structures, leaving the active region unetched. One or more mode control barrier layers are positioned adjacent to the active region. These mode control barrier layers are used to control the profile of the fundamental mode and prevent mode collapse of the laser mode.

**Advantages**

- Improved peak power
- Increased and scalable output power
- Implementable in different material systems (already Implemented in the InGaAs/AlGaAs/GaAs material system)

**Categories For This Invention:**

Lincoln Laboratory  
Photonics  
Sources

**Intellectual Property:**

Very large mode slab-coupled optical waveguide laser and amplifier  
Issued US Patent  
8,451,874
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External Links:
Lincoln Laboratory
https://www.ll.mit.edu/index.html

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