**High Efficiency Slab-coupled Optical Waveguide Laser and Amplifier**
Technology #13911

**Applications**

This technology is applicable to optical waveguide lasers and amplifiers which are used in materials processing, laser pumping, medical applications and direct energy applications.

**Problem Addressed**

Original slab-coupled optical waveguide lasers had limited efficiency due to the large number of quantum wells in the quantum well active region, which was located on the top of the waveguide region. These devices required etching through the quantum wells, which can introduce defects, and in the AlGaAs system, limits device reliability and operating time.

**Technology**

High efficiency slab-coupled optical waveguide laser and amplifiers (SCOWL) features an improved design where the active region is placed within the interior region of the SCOWL waveguide, instead of at the edges. This allows for designs with fewer quantum wells and for etching into the SCOWL waveguide, which is required for defining a ridge waveguide, without etching through the quantum well active region. This improved design results in both higher efficiency and higher reliability. This invention is a substantial improvement over previous SCOWL devices and also many other types of single-mode semiconductor lasers.

**Advantages**

- Higher efficiency than current technologies
- More reliable than current technologies
- Increased power output
- Implementable with different material systems (already implemented in the InGaAs/AlGaAs/GaAs material system)

**Categories For This Invention:**
Lincoln Laboratory
Photonics
Sources

**Intellectual Property:**

High efficiency slab-coupled optical waveguide laser and amplifier
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**External Links:**
Lincoln Laboratory
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