


Did you find this news article interesting? 

For m

- | [HOME](#) | [NEWS & ANALYSIS](#) | [PRODUCTS](#) | [EVENTS](#) | [EMPLOYMENT](#) | [BUYER'S GUIDE](#) |
- | [MAGAZINE](#) | [ONLINE ADVERTISING](#) | [CONTACT US](#) |

Fi

[Advanced site search](#)

NEWS & ANALYSIS

NEWS

Browse the archive
2006 January

QUICK SEARCH
Search News Archive

Ads by Goooooogle

Fiber Optics: Training

Improve your fiber optic knowledge. Training for all skill levels.
www.lightbrigade.com

[<< previous article](#) [more articles](#) [next article >>](#)

Inverted vertical-cavity SOA ramps tunability

31 January 2006

Researchers at the University of California, Santa Barbara, have ramped the specifications of their tunable vertical-cavity semiconductor optical amplifier (VCSOA). The device now delivers at least 5 dB fibre-to-fibre gain across a 21 nm tuning range.

The VCSOA comprises a layer of multiquantum wells sandwiched by two distributed Bragg reflectors (DBRs). A MEMS-based electrostatic actuator controls the thickness of an air gap between the active region and the top DBR, which tunes the operating wavelength and enables channel-selective amplification.



[Power cut](#)

In the original tunable VCSOA design (FibreSystems, August 2004 p7), changing the air-gap thickness significantly altered the reflectance of the tunable mirror, limiting the amplifier gain and reducing its tuning range. Now, by inverting the optical cavity and using the MEMS-tuning structure as the high-reflectivity mirror, the researchers have cut the reflectance variance to 0.7%.

"Increasing the reflectance of the suspended MEMS structure means that the stronger membrane reflectance dominates over reflection from the active-region-air interface," said researcher Garrett Cole. "With a more constant reflectance, the amplifier now exhibits a wider effective tuning range."

As the MEMS mirror in the updated design has a reflectance of near unity (varying between 0.993 and 0.986), it can't be used for signal input/output. So the researchers incorporated a transmissive bottom mirror instead. The bottom-emitting VCSOAs exhibit double the tuning range of their top-emitting counterparts and, importantly, operate within the 1550 nm window (1536.4-1557.4 nm).

"We were able to grow DBRs with thicknesses almost identical to the nominal values," commented Cole. "This allowed the tuning range of the device to be centred on the gain peak of the quantum wells, near 1550 nm."

Other figures of merit include a maximum fibre-to-fibre gain of 11.2 dB at 1548 nm, a maximum saturation output power of -1.4 dBm, and an average gain bandwidth and noise figure of 65.2 GHz and 7.5 dB - values that are comparable to state-of-the-art fixed-wavelength VCSOAs.

The next goal is to develop efficient electrically injected VCSOAs. Such devices are powered by directly injecting the charge carriers into the gain medium, removing the need for an external pump laser. "I believe that people will only seriously contemplate the

NEW!
[Sign up](#) to receive news alerts if you are a subscriber. [update](#) or [cancel](#)

LI
Au
[Tami I](#)

commercial development of VCISOAs when electrically injected devices are demonstrated in the 1300-1500 nm transmission window," explained Cole, who is continuing to develop the VCISOAs at Aerius Photonics.

- This article originally appeared in *FibreSystems Europe in association with LIGHTWAVE Europe* January/February 2006 p7.

About the author

[Tami Freeman](#) is acting editor, *FibreSystems Europe in association with LIGHTWAVE Europe*.

E-mail to a friend

[Home](#) | [News & Analysis](#) | [Employment](#) | [Events](#) | [Magazine](#) | [Buyer's Guide](#)
[Products](#) | [Online Advertising](#) | [Contact Us](#)

Tel +44 (0)117 929 7481 | Fax +44 (0)117 925 1942 | E-mail info@fibers.org
Copyright © IOPPW Ltd 2006. All rights reserved.