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III-Vs REVIEW

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Laser Startup Scores Al-free Power Lasers

Semiconductor Laser International Corp, Endicott, NY, USA, has been granted an exclusive license from Northwestern University Center for Quantum Devices, to develop, manufacture, market and sell aluminum free high power semiconductor lasers worldwide. This patented technology was developed by Prof Manijeh Razeghi of Northwestern University.

Al-free diodes are temperature insensitive, which is why they can handle higher power levels. The materials greatly improve laser performance and dramatically increase the power levels which, in turn, results in increased power capabilities of light emitted. Results show high power output and excellent lifetime.

Prof Razeghi's group has recently achieved, on randomly selected devices, 1 W output power for a 100 μm aperture of 60°C, 24,000 h of continuous operation without any degradation in output power or change in wavelength, threshold current or efficiency. Standard devices have lifetimes of several hundred hours under these same operating conditions, according to SLIC.

The exclusive licensing agreement could potentially enable SLIC to replace current Al-based lasers with what they deem to be a far superior product with improved efficiency, power and lifetime all at a lower cost than the competitors. Currently, an Al-based material is used in virtually all commercial high power semiconductor lasers and the properties of aluminum have been

shown to reduce both output power and device lifetimes. Geoffrey Burnham, President and CEO of SLIC said "This is the technology that the laser community has been waiting for. It could revolutionize the entire industry. There are those who believe that this technology might even address portions of the DVD CD market whose potential has yet to be tapped." SLI expects to develop, over the next six months, lasers that in a smaller package, will have five times the power, ten times the reliability all at a cost far lower than the competition.

SLIC had previously announced that it had achieved yields that are "much higher than those achievable with conventional manufacturing technology". The achievement is a result of a USAF manufacturing technology known as Desorption Mass Spectrometry (DMS) feedback control. SLIC has an exclusive 10-year license for the manufacture of HPDLs (High Power Density Lasers) from Wright Labs but recently hired Dr. Keith Evans, formerly of Wright and the person credited with inventing DMS.

The process is MBE based: DMS optimizes the precision of MBE and, through a computer feedback control system, it precisely and automatically corrects for any variations that may occur. As a result, SLIC has been achieving yields "never before possible in this area of GaAs high power semiconductor lasers". Most recently, the company demonstrated

the ability to reproduce detailed growth structures on a run-to-run and wafer-to-wafer basis over a period of two and one half years with virtually no variation in yield.

This summer SLIC hired further technical personnel and began work on the new 60 sq ft facility located in the Kirkwood Industrial Park.

Finally, SLIC has also produced an exclusive laser device to be used in electronic cooling systems such as microwave towers used in cellular phone networks and communica-

tions satellites in space. The company is working with Los Alamos National Labs in NM on the project. The cooperative project using the USAF patented precision growth control manufacturing process known as DMS feedback, SLIC has been able to "develop a prototype high power fibre coupled semiconductor laser which would be at the heart of a system that cools electronic devices to cryogenic temperatures."

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