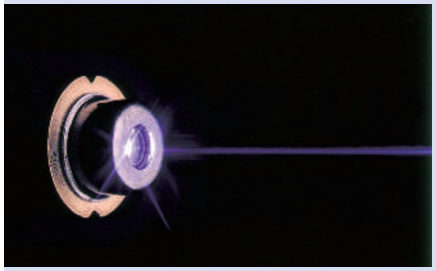
Production of blue–violet diodes ramps up



NICHIA

Owing to increasing consumer demand for higher data-storage capacities and the recording of high-definition television, attention is now shifting from the standard DVD to high-definition-DVD (HD-DVD) and Blu-Ray formats, which can store around three to five times more data on a disc. Unlike DVDs, which rely on red lasers to write and read data, HD-DVD and Blu-Ray use shorter wavelength (405 nm) blue–violet lasers instead.

However, the development of the high-performance next-generation DVD drives has been hindered by the shortage of high-power blue–violet laser diodes. Thanks to the recent announcements made by the GaN-based blue–violet laser-diode tycoons Nichia, Sony and Sharp, this problem may shortly come to an end.

Nichia, the Japanese pioneer of commercial blue laser diodes, has recently announced its plans to mass-produce two new high-power models — a 180-mW pulsed-mode model, for immediate shipment, and a 250-mW model that supports an 8× writing speed, for January 2008. These will be followed in early 2008 by a 320-mW model with pulsed operation, which has already been developed and allegedly offers a 10,000-hour lifetime and a 10× writing speed.

Meanwhile, Sony Shiroishi Semiconductor, a wholly owned subsidiary of Sony, is entering the market with a monthly production capacity of 1.7 million units of GaN-based blue–violet semiconductor lasers. The company aims to fabricate five million diodes a month for low-power playback diodes and to mass-produce its 240-mW model for an 8× writing speed from November this year.

Finally, Sharp has announced plans to spend several billion yen (tens of millions of US dollars) on increasing its monthly production capacity from 150,000 to 250,000 blue–violet laser diodes this summer and to 500,000 by the end of the year. Its new laser chips have a proprietary facet structure that allegedly enables high output power and a long lifetime. Thanks to its expansion plans, Sharp aims to surpass Nichia with a gain of over 50% of the market share.

All these plans look set to bring good news for consumers, with an increase in the supply of blue–violet laser diodes, and will probably bring a price drop for HD-DVD and Blu-Ray disc players.

Alfalight targets efficiency

Alfalight, a US manufacturer of high-power laser diodes based in Madison, Wisconsin, has received a $1.7 million contract from the US Army Research Laboratory (ARL) to develop pump modules for fibre lasers. The contract is part of a 12-month ARL project entitled Scalable High-Efficiency Solid-State Laser (SHESSL) that aims to develop high-performance fibre lasers.

Alfalight's role is to develop and deliver high-power pump blocks based on the firm's fabrication and packaging expertise. Earlier this year, the firm reported that it has succeeded in manufacturing 808-nm laser diodes with a power-conversion efficiency of 55% and fibre-coupled 976-nm diodes with an output power of 6 W.

"The SHESSL award will drive Alfalight to provide improved spatial brightness," said Manoj Kanskar, vice-president of Research and Development at Alfalight. "We expect to develop both usable pump prototypes and provide valuable research results to the Army Research Laboratory on completion."

Medical and military orders drive growth at QPC Lasers

QPC Lasers, a Californian start-up company developing high-brightness laser diodes, seems to have got off to a good start in 2007. The firm has just reported a revenue of $1.1 million for the first quarter of 2007 — a 317% rise over the same period last year. In addition, the firm received a $1 million contract from the US Navy in April.

"The company has begun the transition from the R&D stage to the production stage," commented Jeffrey Ungar, the CEO of QPC. "During the quarter we announced the availability of our next-generation BrightLase direct-diode laser modules and made continued progress with our military applications."

According to QPC, other notable achievements in the first three months of 2007 include a partnership with Cutting Edge Optronics, a business unit of Northrop Grumman, and the receipt of more than 30 new orders.

"We continued to receive strong orders for our medical lasers and now have $2 million in contracts and purchase orders for our generation II medical module," said Ungar. In May, QPC supplied its 2,000th laser for varicose-vein treatment.

Looking forward, the firm expects to generate a total revenue of between $6 million and $7.5 million in 2007, about twice that of 2006. As of 31 March, QPC had cash and cash equivalents of $4.7 million.

Coherent snaps up Nuvonyx

Coherent has purchased Nuvonyx, a privately held US specialist in high-power laser-diode arrays, for $14 million in cash. The deal gives Coherent instant access to the high-power materials-processing market and high-power technology for pumping its solid-state lasers. Coherent expects that the acquisition will generate revenue between $13 million and $16 million in the 2008 fiscal year. Nuvonyx, which is based in St Louis, has developed laser-diode arrays with output powers in excess of 50 kW, thanks to its patented cooling-and-stacking technique. Nuvonyx's lasers are used for a variety of direct-diode materials-processing applications, such as cladding and hardening of metals and welding of metals and plastics.

"The addition of Nuvonyx marks Coherent's entry into the high-power materials-processing market, an area with potential for significant long-term growth," said John Ambroseo, CEO of Coherent. "Nuvonyx's product and technical capabilities are an excellent enhancement to our arrays and components products line, and provide the ability to pump our lasers at increasingly high powers." This acquisition will also accelerate the high-power laser market of Nuvonyx.

Coherent's financial results for the three month's ending 31 March 2007 feature net sales of $152.7 million — up 3.1% over the same period in 2006. The firm now has cash and cash equivalents of $527 million.