



LIA TODAY

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The professional society dedicated to fostering lasers, laser applications, and laser safety worldwide.

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In The News...



Skin Cancers Revealed by Laser Light

A non-invasive laser scan technique, developed by researchers at Duke University, involves scanning the skin with multiple colors of laser light and then using the characteristic absorption of melanin and hemoglobin to assess the distribution of these two chemicals in the suspected area, reported the June 11 issue of *Optics.org*. The distributions of hemoglobin and melanin serve as early warning signs for skin cancer growth and to date, the best clinical method remains simple visual examination to detect the development of melanomas

"Our method involves "shaping" the laser pulses or pulse trains in order to extract the molecules' signatures, and detecting the backscattered light," said team leader Warren S. Warren

Melanomas characteristically have stronger absorption from melanin than from hemoglobin, and in animal studies the Duke team found they could easily pick up the

(Cont. on pg.16,
see **In The News...**)

Laser Programs In Academia Today

by Stephen Lumbert

Laser technology is ever evolving as we continue into the 21st Century. Since lasers entered the mainstream of research and industry during the 1970s, there have been many fine individuals that devoted their entire careers to pursuing improvements in laser technology, application, and an increased awareness of laser safety. In the next several years, many of these pioneers are nearing retirement, and sadly others have left us with only their work and the fond memory of their time with us. Consequently, there is, and will be, an increased need for new people to enter the convergent fields of lasers and optics.

To help bridge this gap, there are a number of laser programs in academia today starting at the community college level progressing to post graduate studies and certifications. At this time, there are two divisions that laser programs tend

to follow in the academic arena. One division has research and development into existing and future technologies as its focal point, and the other division has a strong emphasis on practical training for the laser workplace.

Future Outlook

As the number of industrial and outpatient laser applications increase, so does the need for qualified personnel to perform their respective tasks. Some of the basic areas of study include fiber optics, laser/material interaction, and laser safety. Using grants from a combination of public and private sources, these programs attempt to push the envelope of current laser techniques and knowledge. Laser technicians, operators, and safety officers are in short supply and academia strives to fulfill that need.

(Cont. on pg. 6, see **Programs**)

Review Of Laser Processing Systems in China

by Dr. James Chen Yihong

The Chinese laser market has rapidly been developed and the average annual growth has been about 25% from 1999 to 2005, which is much higher than the global annual growth. Table 1 shows the domestic sales from 1999 to 2005. Compared with the global sales of \$3.7 billion in 2004, the Chinese market is still small, but most of its potential market growth will be in the future.

There are more than 400 laser companies in China, but most of them are very small. The main laser companies are Hans Laser, HG Laser, Chutian Laser, Star Laser, Zihengda

Laser, Ante Laser, Light Star Laser, Aohua Laser, Daheng Laser and Unity Prima etc. Only Hans Laser and HG Laser are public companies in the Chinese stock market.

It is reported that there are more than 20,000 employed in the laser field. Of these, those with a technical background are more than 50% and those with senior qualification (associate professor, senior engineer or above) are more than 30%. This means that the laser technology is still new technology in China. There is laser specialty in more and more universities, and thus more and more graduates will join in the laser industry.

(Cont. on pg. 8 see **China**)

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<http://www.laserinstitute.org>

China, cont. from pg. 1

Laser Usage

The lasers are mainly used in laser marking, cutting, welding and heat treatment/hardening as shown in Fig. 1. Laser heat treatment is more used in China compared with the global market since China-made high-power transverse-flow CO₂ lasers are good enough for industrial applications. In all applications, CO₂ lasers are first in the market and YAG lasers are second. However, high-power laser welders and cutters, micro-machining systems, and advanced laser systems are mainly imported.

Laser marking is an advanced technology in marking application. The most used lasers are CO₂ lasers, lamp-pumped YAG lasers, diode-pumped YAG lasers, and fiber

lasers. At the moment, the key components such as acousto-optic Q-switches, ceramic reflectors, UV lasers, diode modules, fiber-coupled CO₂ and UV optics, and advanced lasers such as fiber lasers, RF-excited CO₂ lasers, and diode-pumped solid-state lasers, are mainly imported. The annual market is about 5,000 sets and \$65-\$104 million. Of industrial laser applications, laser marking is most developed and most widely used in China.

In laser welding, high-power CO₂ lasers, high-power diode lasers, and pulsed Nd:YAG lasers are used. The main application areas are welding of batteries of mobile phones, diamond saw, and

Table 1. Sales in China from 1999 to 2005

Year	1999	2000	2001	2002	2003	2004	2005
Sales (million US\$)	183	248	421	371	479	562	621
Annual growth (%)		35.5	69.9	-11.7	29.0	17.3	10.4

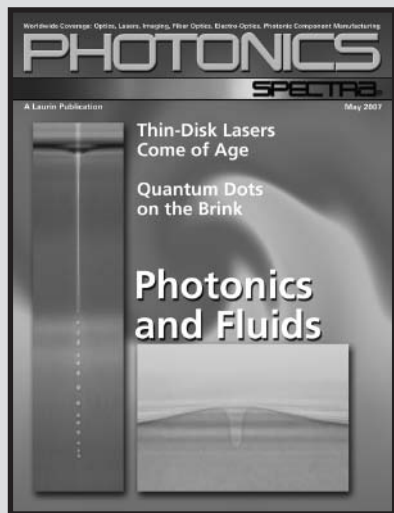
stainless steel plates. The annual market is more than 1,000 sets and \$26-\$40 million. High-power diode lasers are imported.

High-power laser cutting is mature technology in China and high-power CO₂ lasers and Nd:YAG lasers are used in laser cutting. The annual market is 300-400 sets and \$130-\$200million. Low-power CO₂ laser engravers and cutters are mainly made by Chinese companies, but they are very cheap. The annual market is 12,000 sets and \$65-\$91mil-

lion. It is pointed out that more and more these lasers systems are sold into the global market. Last year, a joint venture was set up in China to produce 4000W CO₂ lasers.

There are many other laser machining systems such as laser heat treatment, drilling, sub-surface engraving, and specific application-used systems such as button marking, piston ring marking, IC marking, cloth cutting, PCB drilling, but their market share is not high. Some advanced systems are used in universi-

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ties and research institutes, but they are mostly imported.

Ongoing Issues

There are some problems in the laser field or market, and they are 1) Competition of some products such as laser markers and CO₂ laser engravers is too heavy and their prices are not reasonable. The profit of these products is very limited; 2) Investment in laser field is very small and technology development is too slow, especially in the field of new technology and new systems; 3) Key components rely on import and the laser production chain was not set up. There are too many companies

that make same or similar products, but not many companies develop their own technologies or new products; and 4) Piracy is serious. Once a new machine comes out, there are many copies immediately.

Future Outlook

Photonics is a rapid growth technology and laser technology is a key technology of photonics. The Chinese government puts much money and effort to develop laser technology and its applications. The trend and hot development areas are all-solid-state lasers, diode lasers, fiber lasers, and UV lasers. More and more new processing sys-

tems or specific-application systems are being developed. The combination of small companies to form bigger companies is more popular. More foreign laser companies are interested in setting up joint ventures or sole subsidiary companies in China to go into the Chinese market. *

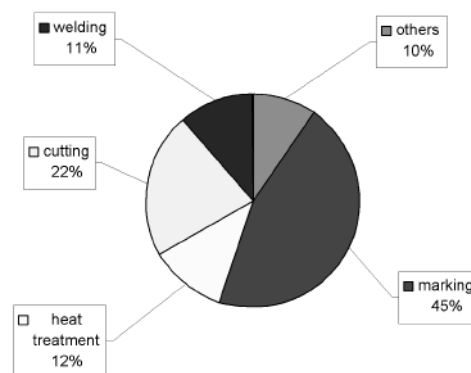


Fig. 1 Applications of laser systems in China.

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Society.

These statistics are based on the data from the Laser Branch, China Optics and Photonics Manufacturing Society.

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BLS Background

The Board of Laser Safety (BLS) was incorporated in September 2002 as a nonprofit organization affiliated with the Laser Institute of America (LIA), a California nonprofit corporation. The mission of the BLS is to provide a means for improvement in the practice of laser safety by providing opportunities for the education, assessment, and recognition of laser safety professionals.

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