QDLASER

QD Laser Unveils World's First Quantum Dot Pure Green Laser Source Module

- *Commercializes green laser for use in palm-sized miniature mobile projectors in 2010*

Tokyo, September 29, 2009 - QD Laser, Inc., today announced that it has developed, in collaboration with Professor Yasuhiko Arakawa of the University of Tokyo's Institute for Nano Quantum Information Electronics (*1), the world's first green laser employing quantum dot semiconductor crystals (*2). (quantum dot green laser) Boasting a compact 5.6mm diameter (Figure 1), as well as the capability of low power consumption by operating at up to 60°C without the need for cooling, the quantum dot green laser is optimal for use in mobile projectors that can be mounted on mobile phones or laptop PCs. QD Laser will begin shipping samples of the laser source module from December 2009, and commercialize it in 2010.

QD Laser will exhibit the quantum dot green laser at CEATEC JAPAN 2009 (booth # 4B25), to be held from October 6 -10 at Makuhari Messe in Chiba, Japan.

Nowadays, there is heavy demand for low power-consuming, compact projector sources that can be mounted on mobile devices, such as mobile phones and laptop PCs. By utilizing a laser for the projector's source, it is possible to achieve focus-free (*3) operations while reducing power consumption, which is an important feature for use in battery-operated devices. In developing a user-friendly, focus-free compact mobile projector, three different lasers are necessary: red, blue, and green. Up until now, however, a green laser had not existed that combines the features of being compact enough for practical use, with low power consumption, and mass-production at a lower cost.

Figure: 1 World's First Quantum Dot Green Laser

QD Laser has achieved the production of a green laser by applying distributed feedback (DFB *4) laser technology, used in high-reliability optical communications, to create a quantum dot semiconductor crystal laser with a wavelength of 1064 nanometers (nm). The photon stream is subsequently filtered through a nonlinear crystal through the process of second-harmonic generation (SHG *5), thereby forming photons with a wavelength of 532nm, half the original wavelength. The conversion of the 1064nm quantum dot laser from electricity to light is very efficient, resulting in a superior reduction in power

consumption. Furthermore, by adopting DFB technology, which has been time-tested in optical communications products, QD Laser has succeeded in simplifying the structure for stable optical coupling to SHG, a complicated process that thus far has required complex control mechanisms. In addition, because QD Laser's quantum dot green laser can be produced on an inexpensive gallium arsenide (GaAs) substrate - used in a wide variety of products ranging from DVD lasers to consumer electronics and LED lasers - it is cost-competitive.

The quantum dot green laser can be packaged in a generic TO-56 (*6), operating with 2 volts DC. Because it can operate at temperatures up to 60°C without cooling, it meets the optimal dimension and power consumption requirements for a compact mobile projector. Additionally, because it enables a high-speed video modulation of 500 MHz or higher, even when used in compact mobile projectors, it enables display of HDTV-class images. By combining the quantum dot laser with an RGB laser source that is already equipped with red and blue lasers, along with a Micro Electro Mechanical Systems (MEMS *7) scanner (Figure 2), ultra-small size and large screen size as well as low power consumption can be realized.

According to Insight Media, the market size of the compact mobile projector market is projected to reach 32 million units in 2012. There are various kinds of anticipated applications, such as head-mounted displays and head-up displays for automobiles, as well as compact mobile projectors.

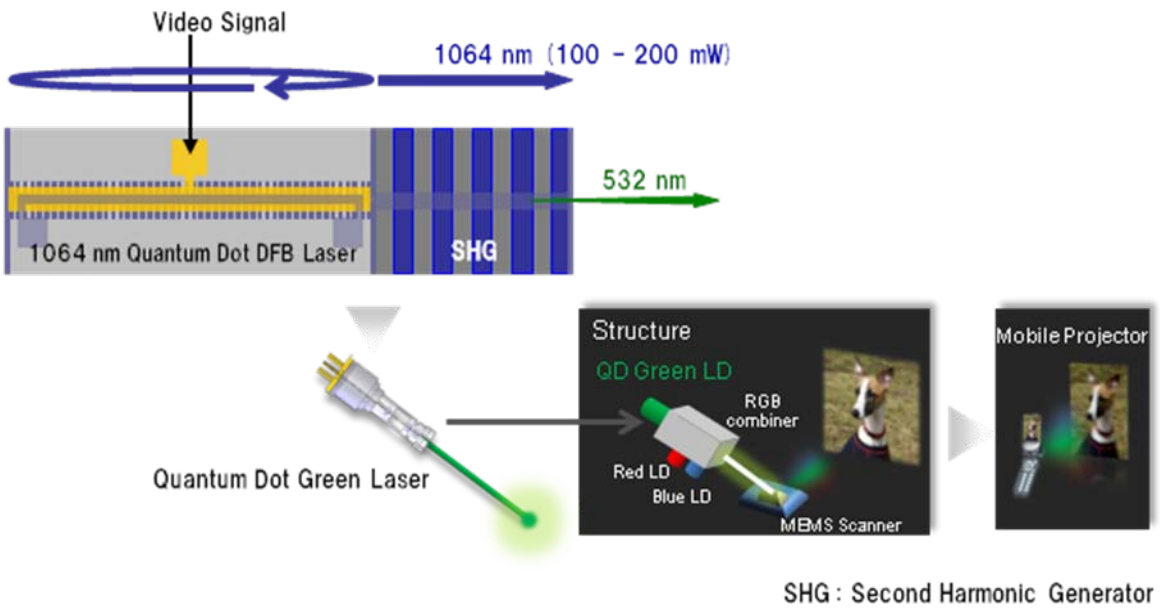

Figure 2: Structure of Quantum Dot Green Laser and Example of Application

QD Laser participates the Special Coordination Funds for Promoting Science and Technology Program: Formation of Innovation Center for fusion of Advanced Technology “Collaborative Research Center of Excellence for Nano-Quantum Information Electronics”. QD Laser and the University of Tokyo has conducted collaborative research contract for this project.

Availability

Samples of the quantum dot green laser will be available in Dec 2009 and commercial products will be released in the mid of 2010.

Glossary and Notes

1. The university Tokyo’s Institute for Nano Quantum Information Electronics

Head of organization Yasuhiko Arakawa

2. Quantum Dot Semiconductor Crystals

Driven and manufactured using nanotechnology, quantum dots are semiconductor crystals that range from a few nanometers up to a few dozen nanometers (1 nanometer is equal to one billionth of one meter).

3. Focus-Free Operations

Using a LED light source, each time the distance between the projector and screen changes, it is necessary to refocus the projector. With laser light sources, however, refocusing is unnecessary regardless of the distance.

4. DFB (Distributed Feedback) Laser

A laser that oscillates in a single mode, as the active region of the semiconductor laser is structured using diffraction gratings, where only wavelengths in the interval of the diffraction gratings are amplified.

5. SHG

Second-harmonic generation is a nonlinear optical process whereby two photons are transformed into one photon with twice the frequency and therefore half the wavelength of the original photon.

6. TO-56

A general-use packaging form for laser light sources with a diameter of 5.6mm.

7. MEMS (Micro Electro Mechanical Systems)

Devices that integrate mechanical parts, sensors, actuators, and electronic circuitry on top of a silicon substrates, glass substrates or organic materials.

About QD Laser, Inc.

Founded in April 2006 with capital funded by Fujitsu Limited & Mitsui Ventures, with headquarters located in Tokyo, Japan. QD Laser, Inc. is a technology leader in the field of quantum dot based semiconductor optical devices, based on more than ten years of research on semiconductor quantum dot technologies in collaboration between Fujitsu Laboratories Ltd. and the University of Tokyo in Japan. For more information: www.qdlaser.com

Press and Customer Contacts

QD Laser, Inc. VP Sales & Marketing, Michael Usami usami@qdlaser.com

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