

External Awards

Interop Tokyo 2008 Best of Show Award

Winner: BLOGRANGER TG, NTT

Date: June 12, 2008

Organization: Interop Tokyo

BLOGRANGER TG won the Grand Prix in the application category.

*This award is given to products and their companies.

DBSJ/IEICE SIGDE/IPSJ SIGDBS Distinguished Young Researcher Award

Winner: Naoto Abe, NTT Cyber Solutions Laboratories

Date: June 20, 2008

Organization: DBSJ/IEICE SIGDE/IPSJ SIGDBS

For “Text Segmentation Using Web Search with Threshold Selection” (in Japanese).

DBSJ/IEICE SIGDE/IPSJ SIGDBS Distinguished Young Researcher Award

Winner: Mitumasa Kondo, NTT Cyber Solutions Laboratories

Date: June 20, 2008

Organization: DBSJ/IEICE SIGDE/IPSJ SIGDBS

For “Keyword Profile Extraction Using Wikipedia from Web Browsing History and its Applications” (in Japanese).

DBSJ/IEICE SIGDE/IPSJ SIGDBS Best Young Researcher Award

Winner: Takeshi Kurashima, NTT Cyber Solutions Laboratories

Date: July 7, 2008

Organization: DBSJ/IEICE SIGDE/IPSJ SIGDBS

For “Mining Experiences for Reusing People’s Past Experiences” (in Japanese).

Papers Published in Technical Journals and Conferences

Thick diamond layers angled by polishing to reveal defect and impurity depth profiles

A. Tallaire, M. Kasu, and K. Ueda

Int. Conf. New Diamond Nano Carbons 2007, NDNC, Vol. 17, No. 4-5, pp. 506–510, Osaka, 2007.

Diamond layers were grown to a thickness of 25 to 35 μm either on type-*Ib* synthetic or type-*Ila* natural diamond substrates by using high or low microwave-power densities. To evaluate defects and impurities depth profiles, the samples were angled by polishing and characterized by cathodoluminescence. The first important finding is that boron, nitrogen and structural defects seem to be concentrated in a 7–10- μm -thick region near the substrate/layer interface, as evidenced by strong defect or impurity-related luminescences and a weak free-exciton peak. The diamond quality is thus much improved in the bulk or near the surface, especially when high microwave-power densities are used, due to the inhibition of unepitaxial crystal formation. The second important finding is that using type-*Ila* natural substrates, which contain extremely low levels of impurities, results in a strong decrease in the amount of boron and the intensity of the nitrogen-related peak both in the bulk and at the interface of the CVD layer. These results suggest that most impurities in our CVD layers could originate from the substrate itself.

Thickness dependence of superconductivity and resistivity in $\text{La}_{1.85}\text{Sr}_{0.15}\text{CuO}_4$ films

H. Sato

Physica C, Elsevier, Vol. 468, No. 1, pp. 991–995, 2008.

The temperature dependence of resistivity was measured for

(001)-, (100)-, and (110)-oriented $\text{La}_{1.85}\text{Sr}_{0.15}\text{Cu}_4$ (LSCO) thin films with thickness between 1 and 90 nm on LaSrAlO_4 (LSAO) substrates. As thickness increases, superconductivity appears for (001) films at 3 nm, whereas it appears for (100) and (110) films at 23 nm. The difference is explained by compressive strain in the *c*-axis direction for (100) and (110) films caused by a smaller *c*-axis length in LSAO than in LSCO. It is suggested that small lengths of Cu-O bonds perpendicular to CuO_2 planes degrade superconductivity in this system.

A 10-Gb/s Burst-Mode Clock-and-Data Recovery IC with Frequency-Adjusting Dual Gated VCOs

Y. Ohtomo, M. Nogawa, K. Nishimura, S. Kimura, T. Yoshida, T. Kawamura, M. Togashi, and K. Kumozaki,

Trans. IEICE, Jpn, Vol. E 91-C, No. 6, pp. 903–910, 2008.

A high-speed serial, 10-Gb/s, passive optical network (PON) is a good candidate for a future PON system. However, there are several issues to be solved in extending the physical speed to 10 Gb/s. The issues focused on here are not only the data rate, which is eight times higher than that of a conventional GE-PON, but also the instantaneous amplification and synchronization of AC-coupling burst-input data without a reset signal. An input amplifier with data-edge detection can both detect level-varying input due to AC-coupling and respond to the first bit of a burst packet. Another issue discussed here is tolerance to long consecutive identical digits (CIDs). A burst-mode clock-and-data recovery (CDR) using dual gated VCOs (G-VCOs) is designed for 10-Gb/s operation. The relation between the frequency difference of the dual G-VCOs and CID tolerance is derived with a

frequency tunable G-VCO circuit. The burst-mode CDR IC is implemented in a 0.13- μm CMOS process. It successfully operates at a data rate of 10.3125 Gb/s. The CDR IC using the edge-detection input amplifier and the G-VCO CDR core achieves amplification and synchronization in 0.2 ns with AC-coupling without a reset signal. The IC also demonstrates 1001 bits of CID tolerance, which is more than enough tolerance for 65-bit CIDs in the 64B/66B code of 10 Gigabit Ethernet. Measured data suggest that dual G-VCOs on a die have over a 20-MHz frequency difference and that the frequency adjusting between the G-VCOs is effective for increasing CID tolerance.

Report on research and development of the next generation video contents production and distribution technologies

T. Fujii

DCCJ Newsletter, NPO Digital Cinema Consortium of Japan (DCCJ), Vol. 1, No. 10, pp. 13–14, 2008 (in Japanese).

Activities for the “Research and Development of the Next Generation Video Contents Production and Distribution Technologies” were conducted from July 2005 to March 2008 by five research institutes: NTT, NTT Communications, Keio Univ., Tokyo Univ. of Technology, and Mitsubishi Electric Corp. This document describes the research plan, purpose, results, and future plans. As a result of the research activities, we have achieved breakthrough technologies for next generation digital content with 4K super high definition quality including realtime stream switching for video editing, secure multicast streaming, realtime encryption/decryption, content quality management and production of evaluation material. We will work toward the practical application of these technologies by supporting various formats/contents and stabilizing performance.

NOBUNAGA: Multicylinder-Like Pulse Generator for Kinesthetic Illusion of Being Pulled Smoothly

T. Amemiya and T. Maeda

EuroHaptics 2008, Vol. LNCS 5024, pp. 581–585, Springer-Verlag, 2008.

We have proposed a force perception method based on asymmetric oscillation that exploits the characteristics of human perception. Our previous findings indicate that the pulse frequency determines the effective generation of the kinesthetic illusion of being pulled. However, whether pulse frequency or pulse width is dominant for force

perception has not been clarified. If the pulse width is dominant, the force sensation induced by sequential pulses will be more continuous. This is important because many of those who have experienced the asymmetric oscillation pointed out that the force sensation induced by the stimuli was not felt smoothly compared with physical force. This paper describes the design and development of a new multicylinder-like mechanism for generating sequential pulses, which should enable us to determine which is dominant for force perception.

Low-Cost Optoelectronic Self-Injection-Locked Oscillators

K. -H. Lee, J. -Y. Kim, W. -Y. Choi, H. Kamitsuna, M. Ida, and K. Kurishima

IEEE Photon. Technol. Lett., Vol. 20, No. 13, pp. 1151–1153, 2008.

We demonstrate a new configuration for an optoelectronic self-injection-locked (SIL) oscillator, where part of the electrical output signal is self-injected after passing through a long optical delay line for output phase-noise reduction. The SIL oscillator consists of an electrical free-running oscillator and a long optical feedback loop. For the compact and low-cost configuration, the free-running oscillator is realized with an InP HPT-based monolithic oscillator and electrical-to-optical conversion is carried out by two low-speed and low-cost laser diodes. With this new configuration, we achieve more than 55-dB phase-noise reduction at 10-kHz frequency offset from the center frequency of about 10.8 GHz by injecting 8-dBm optical signals without using any high-speed optoelectronic components.

Design of Haptic Direction Indicator for Visually Impaired People in Emergency Situations

T. Amemiya and H. Sugiyama

ICCHP 2008, Vol. LNCS 5105, pp. 1141–1144, Springer-Verlag, 2008.

Some emergency situations, such as fires or earthquakes, require evacuation to a safe area, often through an emergency exit. This is especially difficult for people with visual disability. Here, we propose a new device, a haptic direction indicator, which will help blind pedestrians intuitively and safely escape from a dangerous area by means of haptic navigation.