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Front-line Researchers

▶ Tatsuaki Okamoto, NTT Fellow, Social Informatics Laboratories, NTT, Inc.

Rising Researchers

▶ Ryo Nishimaki, Distinguished Researcher, Social Informatics Laboratories, NTT, Inc.

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Research and Development toward Sustainable Infrastructure

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- ▶ Prediction of Corrosion Deterioration Based on State of Individual Facilities for Appropriate Maintenance of Communication Infrastructure
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Front-line Researchers

Tatsuaki Okamoto, NTT Fellow, Social Informatics Laboratories, NTT, Inc.

▼ Abstract

As a world-renowned researcher studying cryptography and NTT Fellow at NTT Social Informatics Laboratories, Dr. Tatsuaki Okamoto has formulated the problem of “organized complexity” (a concept he has long contemplated) as “the law of increasing complexity,” informed by cryptographic methodologies. This law provides a unified explanation of the phenomenon of increasing complexity over a long time in subjects such as the universe, living organisms, and human societies. In this interview, we asked him about his thinking behind the formulation of the law of increasing complexity, specific examples demonstrating the validity of the law, and the future direction that the Earth and human society might take if the law is followed.



Feature Articles

Research and Development toward Sustainable Infrastructure

Technologies for Infrastructure Sustainability

▼ Abstract

At the Sustainable Device Technology Laboratory in NTT Device Technology Laboratories, researchers in a wide variety of technical fields with basic knowledge in chemistry and physics seamlessly combine their skills in engineering and programming to conduct research and development that contributes to a sustainable society. One of our research and development themes is sustainable-infrastructure technologies. We aim to implement infrastructure that is both safe and economical in maintenance and management, not only for the communication infrastructure within the NTT Group but also for the entire social infrastructure.

Sustainable Infrastructure

- Safety** • Accident-free and safe work
- Economy** • Low maintenance costs
- Resource recycling** • Reuse and recycling of equipment and materials
- Worker satisfaction** • Workers can conduct maintenance without difficulty

Regular Articles

High-speed Vertical-illumination Photodiode for Beyond-200-Gbaud Applications

▼ Abstract

The rapid increase in data traffic is pushing optical communication systems toward higher symbol rates. High-speed, high-responsivity photodiodes (PDs) are therefore essential for next-generation transceivers. We report on our fabricated vertical-illumination InP/InGaAs (indium phosphide/indium gallium arsenide) PD designed for symbol rates beyond 200 Gbaud, offering a 3-dB bandwidth over 100 GHz. By interference-based absorption enhancement, the PD exhibits responsivity exceeding 0.5 A/W over a broad absorption wavelength range. The inverted p-down structure enables electric-field confinement, resulting in a low dark current of approximately 1 pA with small device-to-device variation. These results indicate the suitability of the fabricated PD for future high-symbol-rate receivers.

