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## View from the Top

- Hiroshi Tomiyasu, Senior Vice President, Head of Technology and Innovation General Headquarters, NTT DATA

## Front-line Researchers

- Masaya Notomi, Senior Distinguished Researcher, NTT Basic Research Laboratories and Project Leader of NTT Nanophotonics Center

## Rising Researchers

- Yasufumi Ogawa, Distinguished Researcher, NTT Network Innovation Center

## Feature Articles

### Plasmon Control Technology

- Overview and Prospects for Research on Plasmons in Two-dimensional Semiconductor Systems
- Electrical Control of Plasmon Reflectivity in Graphene
- Ultrafast Optical-to-electrical Conversion Processes in Graphene
- Theoretical Proposal for Edge Magnetoplasmon Crystal
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- 50th Anniversary of NTT Yokosuka R&D Center

## View from the Top

### Hiroshi Tomiyasu, Senior Vice President, Head of Technology and Innovation General Headquarters, NTT DATA

#### ▼Abstract

NTT DATA creates new systems and value using information technology to contribute to creating a more prosperous and harmonious society. In accordance with the five strategies laid out in its medium-term management plan for FY 2022 to 2025, the company aims to establish a virtuous cycle of investment and growth and achieve business growth toward the Global 3rd Stage. Hiroshi Tomiyasu, senior vice president and head of Technology and Innovation General Headquarters, NTT DATA, is leading efforts toward this goal in terms of technology. We interviewed him about specific technology strategies and his belief as a top executive.



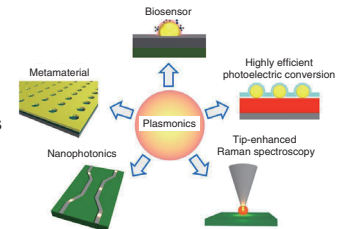
## Feature Articles

### Plasmon Control Technology

#### Overview and Prospects for Research on Plasmons in Two-dimensional Semiconductor Systems

#### ▼Abstract

Plasmons, which are collective oscillations of electric charges, have a wide range of applications in sensors and other technologies. Plasmons have also been attracting attention as potential new information carriers due to their ability to be generated by light and propagate within a region that exceeds the diffraction limit of light. This article presents an overview of the research on plasmon control and basic physical properties exploiting plasmons at NTT Basic Research Laboratories. Future prospects are also discussed.



## Regular Articles

### Ultrafast and Low-power-consumption Membrane Lasers on Si with Integrated Optical Feedback

#### ▼Abstract

We developed energy-efficient membrane III-V distributed-reflector lasers on silicon-based substrates for ultrafast short-reach communication links and neuromorphic computing applications. By leveraging high-speed photon-photon interactions enabled by integrated optical feedback and a high-optical-confinement membrane structure, we demonstrated record-fast directly modulated laser bandwidths and spike-processing rates with ultralow operating energies. This is a step towards our goal of reducing the carbon footprint of information and communication technology and artificial intelligence hardware, while keeping pace with the increasing demand of processing speeds.

