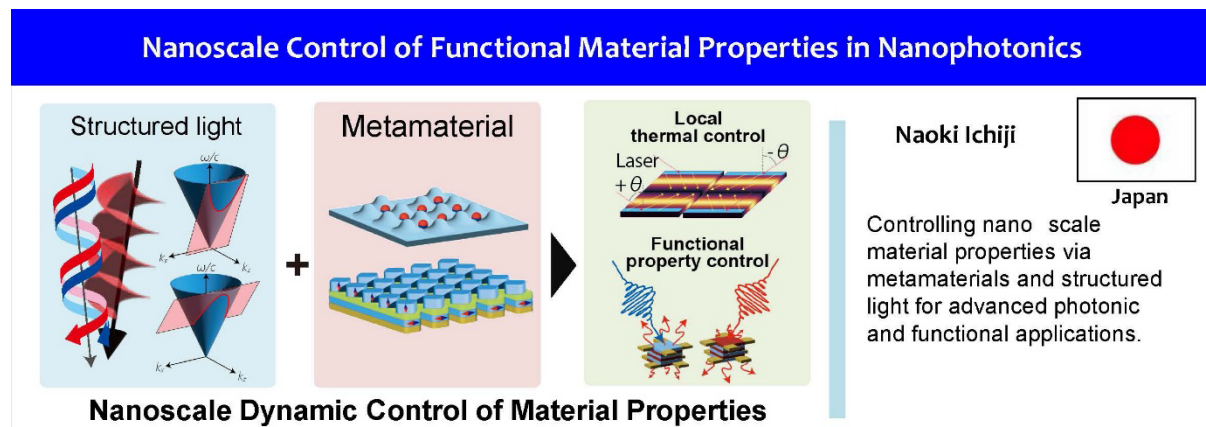


<Research Topics>

Nanoscale Control of Functional Material Properties in Nanophotonics

ICYS Research Fellow Dr. Naoki ICHIJI



■ Research

The growing demand for efficient energy use and conversion has made photothermal energy conversion and thermal management increasingly important research topics. The aim of my research is to create new material functionalities by controlling heat at the micro- and nanoscale using light. Because many thermally driven phenomena are governed by thermal gradients, precise nanoscale control of heat could enable a variety of physical phenomena with very small energy input. In particular, I study how optical near fields and plasmonic structures can be used to generate and control localized heating and two-dimensional thermal distributions on material surfaces. By combining nanofabrication, optical measurements, and electromagnetic and thermal modeling, I seek to establish methods for precise control of heat using light, and to explore phase transitions and other physical phenomena driven by such controlled thermal fields.

■ Comments

I am pleased to join ICYS as a research fellow. In my main research field, nanophotonics, the optical properties of materials are often controlled through geometrical design at the nanoscale. Building on this approach, I am interested in extending nanoscale optical control to a wider range of materials, including functional and magnetic materials. By making use of the broad expertise in materials science at NIMS, the advanced nanofabrication and characterization facilities, and interactions with researchers in different fields, I hope to contribute to the development of materials and devices that are both scientifically interesting and practically useful.

■ Link

<https://www.nims.go.jp/icys/research/#ICHIJI>

<https://www.linkedin.com/pulse/nanoscale-control-functional-material-properties-hbdkc>